



Council of the
European Union

Brussels, 28 July 2023
(OR. en)

12233/23

ENV 896
CLIMA 367
FORETS 92
AGRI 433
RELEX 960

COVER NOTE

From:	Secretary-General of the European Commission, signed by Ms Martine DEPREZ, Director
date of receipt:	27 July 2023
To:	Ms Thérèse BLANCHET, Secretary-General of the Council of the European Union
No. Cion doc.:	SWD(2023) 285 final
Subject:	COMMISSION STAFF WORKING DOCUMENT Guidance on the Development of Public and Private Payment Schemes for Forest Ecosystem Services

Delegations will find attached document SWD(2023) 285 final.

Encl.: SWD(2023) 285 final



Brussels, 27.7.2023
SWD(2023) 285 final

COMMISSION STAFF WORKING DOCUMENT

**Guidance on the Development of Public and Private Payment Schemes for Forest
Ecosystem Services**

Contents

1. Introduction.....	3
2. Overview on forest ecosystem services.....	5
3. Challenges to forests and the provision of forest ecosystem services	6
4. Valuation and assessment of ecosystem services	7
4.1 Economic valuation of ecosystem services: available approaches	8
4.2 The use of economic values in designing payment schemes for forest ecosystem services ..	12
5. Financing of payment schemes for forest ecosystem services	13
5.1 Support for payment schemes for forest ecosystem services through EU funding	13
5.1.1 The common agricultural policy.....	13
5.1.2 LIFE projects	16
5.2 Public financing through new State aid possibilities	16
6. Research and innovation - Horizon programmes	18
6.1 Horizon 2020 / Horizon Europe.....	18
6.2 Topic calls in Horizon Europe Work Programme 2023-2024.....	19
7. Private payment schemes for forest ecosystem services	19
7.1 Advantages.....	19
7.2 Challenges.....	20
7.3 Addressing challenges.....	21
8. Development of payment schemes for forest ecosystem services.....	23
9. Common framework for public and private financing	25
10. Natural capital accounting: tracking the state of ecosystems and ecosystem services - Integrated Natural Capital Accounting (INCA)	26
11. Payment schemes for forest ecosystem services: case studies and good practices	29
11.1 Examples of national public schemes	29
11.1.1 The forest biodiversity programme METSO (Finland)	29
11.1.2 Croatian payment scheme on forest ecosystem services.....	29
11.2 Examples of private schemes	30
11.2.1 Label Bas Carbone.....	30
11.2.2 FSC ecosystem services procedure	30
ANNEXES	32
ANNEX I - European Commission Workshop on “Public and Private Payments for Forest Ecosystem Services, 31 March 2022 - Report.....	32
ANNEX II - Definitions for each method (UN, 2021)	46
ANNEX III.....	48

1. Projects under Horizon 2020	48
2. Projects under Horizon Europe.....	52
2. Topic calls in Horizon Europe Work Programme 2023-2024.....	54
ANNEX IV - LIFE projects.....	57

1. Introduction

In 2020, the EU had about 160 million hectares of forests while other wooded lands covered about 20 million hectares, equated to 45.1% of the EU- 27's land area ¹.

Forests not only provide wood and non-wood materials and products, but also multiple other services such as habitats for biodiversity, water purification, and regulation of floods and of climate. Their carbon sequestration and cooling capacities and their role in providing renewable raw materials, food and medicines are indispensable for fighting climate change, the transition to a circular bioeconomy and a healthy society.

Despite the actual value of, and increasing demand, for the large variety of forest ecosystem services, wood production remains the main source of income for forest owners and managers, while financial rewards or profits from other ecosystem services are very limited. Forest owners and managers need drivers and financial incentives to be able to provide ecosystem services in addition to wood and non-wood materials and products ². The EU forest sector's economic viability remains a key pillar of sustainable forest management. Furthermore, economic viability is of crucial importance for maintaining the multiple benefits that forests provide to society and especially for providing a living for rural populations. **Public and private payments for forest ecosystem services** represent an alternative option to secure financial sources for multifunctional and protective forest management and sustainable maintenance of ecosystem services ³.

There is no formal definition of payments for ecosystem services in the literature ⁴. Payment schemes for ecosystem services typically involve a set of rules, procedures and requirements in order to incentivise and reward economic operators for carrying out additional activities that increase the provision of one or more ecosystem services. **Payment schemes for forest ecosystem services** are a tool to provide financial incentives to forest owners and managers to provide forest ecosystem services other than the provision of wood (through forest protection, restoration and sustainable forest management) and to increase the resilience of their forests (through the adoption of more climate and biodiversity friendly forest management practices, such as increasing the diversity of tree species, structural diversity, un-even aged silviculture).

In the New EU Forest Strategy for 2030 (the EU Forest Strategy)⁵, the European Commission recognises the central role of forests, foresters, and the entire forest-based value chain in

¹ Eurostat, Agriculture, forestry and fisheries statistics, 2020 edition. <https://ec.europa.eu/eurostat/web/products-statistical-books/-/ks-fk-20-001>

² COM(2021) 572 final.

³ Viszlai, I., Barredo, J.I. and San-Miguel-Ayanz, J., *Payments for Forest Ecosystem Services - SWOT Analysis and Possibilities for Implementation*, 2016.

⁴ Viszlai, I., Barredo, J.I., San-Miguel-Ayanz, J., *Payments for Forest Ecosystem Services - SWOT Analysis and Possibilities for Implementation*, 2016.

⁵ COM(2021) 572 final.

meeting the European Green Deal objectives. It presents an ambitious vision and concrete actions to improve the quantity and quality of EU forests and to strengthen their protection, restoration and resilience – building on the strong engagement, motivation and dedication of all forest and landowners and managers. Their role in the provision of certain ecosystem services is key and needs to be supported. The EU Forest Strategy's aims include the development of financial incentives (particularly for private forest owners and managers) to provide these ecosystem services. In the light of the EU's increased climate and biodiversity ambition, the EU Forest Strategy encourages the establishment of payment schemes for ecosystem services and the roll-out of carbon farming practices and other non-productive investment for environment- and climate-related objectives, including for adaptation to climate change⁶.

The Natura 2000 network is a coherent European system of protected areas established pursuant to the Habitats Directive⁷ and the Birds Directive⁸, collectively known as EU 'nature legislation'. Sites protected under the Habitats Directive are known as special areas of conservation (SAC), while those protected under the Birds Directive are special protection areas (SPA). Approximately 375,000 km² of forests are included in the Natura 2000 Network. This represents around 50% of the total terrestrial area in Natura 2000 and around 21% of the total forest resource in the EU. Of this, an estimated 160,000 km² are forests that constitute habitat types of community interest, listed in Annex I of the Habitats Directive. More than 80 types of ecologically precious forests across Europe, from the subarctic birch forests of Scandinavia to the palm groves of Crete, are specifically listed and protected by this Directive.

The aim of Natura 2000 is not to prevent economic activities, as long as they are compatible with the conservation objectives of the sites. Member States must define these conservation objectives and establish the necessary measures for the maintenance or restoration of targeted species and habitats in Natura 2000 sites. They are encouraged to elaborate Natura 2000 management plans, that can be specifically designed for the site or integrated into other development plans, such as forest management plans, provided that the conservation objectives are clearly included within such plans. Forests in Natura 2000 can be managed with a view to achieving multiple functions, such as wood production, recreation, if these are compatible with the conservation objectives.

Furthermore, under the updated EU Bioeconomy Strategy⁹, the Commission has made a commitment to actively support and promote all types of innovations and practices for sustainable food and farming systems, forestry and bio-based production through a systemic

⁶ COM(2021) 82 final.

⁷ Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, OJ L 206, 22.7.1992, p. 7.

⁸ Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds, OJ L 20, 26.1.2010, p. 7.

⁹ European Commission, Directorate-General for Research and Innovation, *A sustainable bioeconomy for Europe: strengthening the connection between economy, society and the environment: updated bioeconomy strategy*, Publications Office of the European Union, Luxembourg, 2018, <https://data.europa.eu/doi/10.2777/792130>

and cross-cutting approach that links actors, territories and value chains. It develops a Strategic Deployment Agenda¹⁰ which will provide a long-term vision on pathways to deploy and scale up the bioeconomy in a sustainable and circular manner. This approach will address a number of points, such as new opportunities arising for the forestry and other sectors in the light of new business models that are based on the valuation of forest ecosystem services. The EU Bioeconomy Strategy Progress Report¹¹ further highlights the role of the bioeconomy strategy in identifying, assessing and addressing trade-offs between policy targets and competing land uses. An integrated bioeconomy land-use assessment is also an action in the Commission's Communication on Sustainable Carbon Cycles¹² and will provide the basis for reducing pressures on land and sea. Ecosystem services are an integral part of this action.

In the New EU Forest Strategy for 2030, the Commission made a commitment to provide advice and technical guidance on the development of payment schemes for forest ecosystem services in order to support Member States. This guidance is now fulfilling that commitment. It builds on the virtual workshop on public and private payments for forest ecosystem services¹³ (organised by the Commission on 31 March 2022; see report of the workshop in Annex I) and publicly available information. The workshop was attended by over 150 participants from the Commission, Member States, potential beneficiaries (forest owners and managers), forestry and ecology research and policy institutes and non-governmental organisations active in the field of forest and forestry. They discussed the design and implementation of public and private payment schemes, focusing on key challenges and possible solutions.

The guidance in this document is intended to be **voluntary** and **not prescriptive**. It aims to be a useful source of information and advice - in a user-friendly document - to help public and private entities and forest owners and managers develop and implement payment schemes for forest ecosystem services. It complements any national guidelines that may exist.

2. Overview on forest ecosystem services

Ecosystem services can be defined as the contribution of ecosystems to benefits used in economic and other human activity¹⁴. Ecosystems provide multiple goods and services which

¹⁰ Action 2.1.

¹¹ European Commission, Directorate-General for Research and Innovation, *A sustainable bioeconomy for Europe: strengthening the connection between economy, society and the environment: updated bioeconomy strategy*, Publications Office of the European Union, Luxembourg, 2018, <https://data.europa.eu/doi/10.2777/792130>

¹² COM(2021) 800 final.

¹³ https://enrd.ec.europa.eu/news-events/events/commission-workshop-public-and-private-payments-forest-ecosystem-services_en

¹⁴ United Nations et al., *System of Environmental-Economic Accounting: Ecosystem Accounting*, white cover pre-edited version of 29 September 2021. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf

benefit people in many ways: economically, materially, health-wise, emotionally and socially. Humans are fundamentally dependent on the flow of ecosystem services ¹⁵.

Forests are multifunctional and provide a large variety of services that are key to human well-being. These **forest ecosystem services** (or **forests' contributions to people**) include many elements. Some of them might be more obvious than others.

Forests provide us with many **goods**: timber, cork, resin, wood biomass foods, such as honey, nuts, fruits and mushrooms; and aromatic and medicinal plants. These can be a source of income for people, though not always (many of them are common goods).

Forests can be the perfect place to relax, enjoy nature and practise recreational activities (e.g. cycling, running, tree-climbing and walking). These activities can support **tourism** or simply support human **well-being**, both physically and psychologically. People have **cultural** and **spiritual** associations with the forest.

Forests are the world's largest carbon storehouses after oceans, containing 662 billion tonnes of carbon (more than half the global carbon stock in the soil and vegetation ¹⁶). They help mitigate climate change by absorbing carbon dioxide, storing it in wood, leaves and the soil, and releasing oxygen for people to breathe.

Forests have an important role in the global **water cycle**. They absorb water from the soil through tree roots, return it to the atmosphere and produce small particles which can trigger rain formation and modify the local and regional air circulation patterns. The diversity of trees and plants that make up forests around the world prevent erosion and can improve and maintain **soil quality**, which plays a crucial role in the nutrients cycle and in filtering water.

3. Challenges to forests and the provision of forest ecosystem services

The availability and diversity of ecosystem services depend on the condition of the ecosystem in question. Humans dynamically interact with ecosystems and any changes they cause in ecosystems and the services they provide can affect human well-being. The greater the pressure on ecosystems, the more limited the services they provide.

Society benefits from forests in many ways and we expect our forests to perform multiple functions, simultaneously and sustainably. Furthermore, the demands on forest ecosystem services are increasing and diversifying due to population growth and urbanisation. Such demands can be complicated to manage, especially because the demand for wood from

¹⁵ Millennium Ecosystem Assessment, *Ecosystems and Human Well-being: Synthesis*, Washington DC, 2005. [chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.millenniumassessment.org/documents/document.356.aspx.pdf](https://www.millenniumassessment.org/documents/document.356.aspx.pdf)

¹⁶ Food and Agriculture Organization, *The State of the World's Forests*, Rome, 2022.

forests is also increasing and forest management practices often prioritise wood production¹⁷. Balancing the different demands on these forest ecosystems is therefore a major challenge for our times¹⁸.

Forests are affected by climate change and their response to it is driven by the local site conditions (e.g. changes in site properties such as temperature, water and nutrient supply due to climate change) and the adaptability of trees¹⁹. Changes and biodiversity loss can influence the supply of ecosystem services,²⁰ which is why biodiversity, as with ecosystem services, must be protected and sustainably managed.

Deforestation threatens ecosystem services and the well-being of people that depend on them. Many regions in the world experienced deforestation in 1990-2020, but the EU's forests experienced a net total gain in forest area,²¹ due to both, restoration of natural forest and planting of monocultures with different consequences on biodiversity and ecosystem services availability²².

4. Valuation and assessment of ecosystem services

The Common International Classification System of Ecosystem Services (CICES) classifies ecosystem services into three main categories: i) provisioning, ii) regulation and maintenance, and iii) cultural²³. Ecosystem services can be assessed in physical terms as well as in terms of economic value. Physical assessment is based on biophysical models of ecosystem services that consider the functions and processing of the ecosystems to provide the service in question. Economic valuation is based on economic and/or socio-economic models that reveal the value of the service in question in both monetary and non-monetary terms. There is therefore a wide range of available approaches to, and methodologies for, valuing ecosystem services and they should be selected on the basis of prior analysis²⁴.

Ecosystem services provide a wide range of benefits to specific economic sectors and to society, in general. For this reason, society and individuals value ecosystem services to

¹⁷ <https://sincereforests.eu/forests/balancing-demands/>

¹⁸ <https://sincereforests.eu/forests/balancing-demands/>

¹⁹ Jandl, R., Spathelf, P., Bolte, A. et al, 'Forest adaptation to climate change – is non-management an option?', *Annals of Forest Science*, 76, 2019. <https://doi.org/10.1007/s13595-019-0827-x>

²⁰ <https://www.fao.org/ecosystem-services-biodiversity/en/>

²¹ Food and Agriculture Organization and United Nations Environment Programme, *The state of the world's forests: forests, biodiversity and people*, Rome, 2020. <https://doi.org/10.4060/ca8642en>

²² IPBES: Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. S. Díaz, et al. (eds.). IPBES secretariat, Bonn, Germany, 2019.

²³ **Provisioning** includes all nutritional, non-nutritional material and energetic outputs from living systems as well as abiotic outputs (including water). **Regulation and maintenance** includes all the ways in which living organisms can mediate or moderate the environment that affects human health, safety or comfort, together with abiotic equivalents. **Cultural** includes all the non-material (and normally non-rival and non-consumptive) outputs of ecosystems (biotic and abiotic) that affect physical and mental states of people. <https://cices.eu/>

²⁴ Forest Europe, *Analysis of different approaches and methodologies on valuation and payments for forest ecosystem services in the pan-European region*, 2020.

express recognition of their role and importance. The valuation can be expressed in multiple ways, the so-called **value pluralism**²⁵ of ecosystems and ecosystem services, which is thoroughly explained in the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) approach²⁶. Values are analysed in many different ways depending on the scientific context (i.e. biophysical, social or economic science).

This guidance focuses on methods of economic valuation.

4.1 Economic valuation of ecosystem services: available approaches

Economic valuation methods can be applied to reveal the **total economic value of ecosystem services**²⁷. Within the framework of total value, the methods reveal two main categories of values – the use and non-use value categories – which can each be analysed into different value components. Use values are those values that relate to private and quasi-private goods, for which market prices usually exist. Non-use values are those values that do not involve direct or indirect uses of the ecosystem service in question.

Economic valuation assessment is relatively straightforward for some ecosystem services. This is for example the case for most of the ecosystem services where benefits (e.g. production of timber or mushrooms and fruits) are traded in markets and their value is reflected in market prices.

Market prices are nonetheless not available for many other services. Cultural and regulating services are public goods for which there is no market structure able to indicate their monetary value. Public goods have two key attributes: non-excludability and non-rivalry. Put simply, no one is excluded from their use and there is no competition in the level of use. This means that the markets do not reflect the demand for these services and therefore cannot reflect their value. Moreover, their supply may depend either on private initiatives and/or the good condition of the ecosystem to supply these goods and services. There is no strong incentive for private initiatives to supply services which everyone can use without charge. As for the good condition, it is often a matter of proper environmental management.

In the absence of direct market transactions, price information must be derived from parallel market transactions that correspond to the good to be valued. If there isn't direct price information on ecosystem services, hypothetical markets may be created to assess the value. On this basis, economic valuation can be performed by employing:

1. direct methods rely on directly observable market prices;

²⁵ Palola, P., Bailey, R. and Wedding, L., 'A novel framework to operationalise value-pluralism in environmental valuation: environmental value functions', *Ecological Economics*, Vol. 193, 2022, p. 107327. <https://doi.org/10.1016/j.ecolecon.2021.107327>

²⁶ <https://ipbes.net/contrasting-approaches-values-valuation>

²⁷ The Economics of Ecosystems and Biodiversity (TEEB), *Mainstreaming the economics of nature: a synthesis of the approach, conclusions and recommendations of TEEB*, 2010.

2. indirect methods rely on implied (shadow) prices;
3. benefit or value transfer methods rely on a transfer or values from past valuation applications that are obtained either through direct market-based methods or indirect methods.

Direct methods use price information that is provided by market transactions or use prices implied by expenditure. **Indirect methods** use a hypothetical market setting to obtain shadow prices. Stated preference methods reveal the willingness to pay for environmental goods given improvements in their current state.

The values assessed in indirect methods correspond to welfare-based values – unlike the values assessed in direct methods, which correspond to exchange-based values. Welfare-based values involve the total value of a good or a service (i.e. both use and non-use values) and are preferred in policy appraisal and cost-benefit analysis to exchange-based values. Table 1 sets out the typology of the economic valuation methods²⁸ and Annex II describes the methods in detail. The table provides an overview of the diversity of the available methods and highlights the fact that there is not a one-fit-for-all solution when it comes to economic valuation of ecosystem services. Overall, the choice of a method is usually a data-driven decision that suits the valuation purpose. For example, indirect methods are preferred in project appraisal contexts because they capture both use and non-use values.

²⁸ A detailed description of the approaches can be found in:

- chapter nine of United Nations et al., *System of Environmental-Economic Accounting: Ecosystem Accounting*, white cover pre-edited version of 29 September 2021. Available at: <https://seea.un.org/ecosystem-accounting>
- Natural Capital Accounting and Valuation of Ecosystem Services (NCAVES) and Mapping and Assessment for Integrated Ecosystem Accounting (MAIA), *Monetary Valuation of Ecosystem Services and Assets for Ecosystem Accounting*, 2022.

Table 1: typology of economic valuation methods

Economic valuation approach	Subcategories of the approach	Methods
Direct: based on observable market prices	Prices embodied in market transactions	Resource rent or net factor income method
		Production function method
		Hedonic pricing
	Prices based on revealed expenditure	Averting behaviour
		Travel cost method
	Prices based on expected expenditures	Replacement cost
		Avoided damage cost method
		Simulated exchange value method
	Prices from similar goods services	Surrogate prices
Indirect: based on implied or shadow prices	Stated preferences methods	Contingent valuation
		Choice modelling
	Other	Shadow project cost
		Opportunity cost of alternative uses
		Prices from economic modelling
		Qualitative methods / deliberative group valuation
Benefit or value Transfer	Unit transfer	Simple/unadjusted value transfer
		Adjusted unit value transfer
	Value function transfer	Single-site or single-study value function transfer
		Value transfer using data-synthesis methods such as meta-analysis

In relation to forest ecosystem services, the selection of the appropriate valuation method should:

- correspond to the nature of the service (i.e. whether it is a provisioning, regulating or cultural service) and the type of values (i.e. use or non-use) that the service provides;
- follow the geographical scope (e.g. local, regional, national or international);
- define the benefits and beneficiaries of the service. This information will provide guidance on which method is a good fit;

- d) take into account the complexity of the method and the available resources (financial, human/expertise, data, time, etc.).

The selection and employment of the method should be expert-based and follow a consultation process in which both policy stakeholders and experts will participate. Decision-makers and policymakers will set the context and objectives of the valuation. Environmental economics experts will plan the implementation steps.

For example:

- Provisioning services are related to benefits for which market prices can give an approximate value. Timber provision can therefore be valued through the direct approach using market prices for timber products.
- Carbon sequestration is a regulating service that is related to the benefit of climate-change mitigation. Emission trading schemes set exchange carbon prices that can be used as proxies for carbon sequestration value.
- Flood control is also a regulating service that benefits society by reducing the risk of flooding events which cause damage and impose costs – so an expenditure-based approach and an avoided damage cost method can be applied in this case.
- Recreational services are cultural services that provide recreational opportunities in forest areas. Both revealed expenditure (that of the travel cost method) and the stated preferences method could be used to assess the value of these services.

Past studies that involve comprehensive reviews of the literature for forest valuation studies²⁹ at the global or EU level³⁰ indicate how valuable forest ecosystem services are in monetary terms. Table 2 gives an example of the selected method and the mean value obtained for different forest ecosystem services based on approximately 150 primary studies³¹. Regulating services are valued higher than provisioning services while the large standard deviation of the mean values signals the huge diversity in values across the employed valuation methods.

²⁹ Acharya, R.P., Maraseni, T., and Cockfield, G., 'Global trend of forest ecosystem services valuation – an analysis of publications', *Ecosystem Services*, Vol. 39, October 2019, p. 100979. <https://doi.org/10.1016/j.ecoser.2019.100979>

³⁰ Grammatikopoulou, I., and Vačkářová, D., 'The value of forest ecosystem services: a meta-analysis at the European scale and application to national ecosystem accounting', *Ecosystem Services*, Vol. 48, April 2021, p. 101262. <https://doi.org/10.1016/j.ecoser.2021.101262>

³¹ Grammatikopoulou, I., and Vačkářová, D., 'The value of forest ecosystem services: a meta-analysis at the European scale and application to national ecosystem accounting', *Ecosystem Services*, Vol. 48, April 2021, p. 101262. <https://doi.org/10.1016/j.ecoser.2021.101262>

Table 2: Selected method and mean value of ecosystem services*

	Expected expenditure	Market price	Stated preferences	Revealed expenditure	Other	Mean value in EUR/ha/year (constant 2016 prices)	Standard deviation
Timber provision		•				100.55	107.36
Non-timber provision		•				26.39	31.27
Air quality	•		•		•	141.99	148.54
Climate regulation through carbon sequestration and storage	•	•	•		•	910.45	1895.75
Habitat maintenance	•		•			300.90	247.98
Liquid flows (e.g. physical barriers to flows)	•			•		1088.62	1173.70
Mass flows (e.g. physical barriers to landslides)	•		•	•	•	405.74	408.87
Leisure	•		•	•		421.64	1442.31

* See footnote 37.

4.2 The use of economic values in designing payment schemes for forest ecosystem services

Economic valuation can support the design of policy schemes such as payment schemes for forest ecosystem services. The process starts by setting the context (i.e. selecting the ecosystem services to be provided). The decision on the set of ecosystem services is usually policy-driven (e.g. maintenance of forest ecosystem services due to biodiversity targets). A scoping analysis can help identify where the scheme should focus. The management plan is then drafted to identify the provision's expected benefits and costs.

The assessment of benefits is not as straightforward as the assessment of costs. The benefits of ecosystem services provision come from both use and non-use values and for one or more ecosystem services (as explained above). The direct method captures better-use values, while indirect methods, which are based on hypothetical markets, are more suitable for services where non-use values prevail over use values. Habitat and species maintenance ecosystem service is a good example.

Forest ecosystems provide many different services and there are many synergies as well as trade-offs between them (e.g. carbon sequestration versus timber provision). Some economic valuation methods such as the stated preference methods can accommodate these trade-offs.

5. Financing of payment schemes for forest ecosystem services

The design of payment schemes for forest ecosystem services can be financially supported through EU funding or co-funded research projects, through national funding (State aid) and through private initiatives. Depending on the funding instrument, support for beneficiaries - who undertake voluntary management commitment beyond mandatory requirements- could cover the costs of the scheme and income forgone; provide an additional incentive beyond compensation; finance pilot and research projects that improve the effectiveness of the scheme; or provide payments based on the achieved results for the provision of the ecosystem service in question.

5.1 Support for payment schemes for forest ecosystem services through EU funding

5.1.1 The common agricultural policy

Since 2000, the common agricultural policy (CAP) has been supporting (under its second pillar on rural development) the sustainable management of forests and improving forest ecosystem services through a variety of measures such as:

- i. the increase of forest and wooded areas through afforestation and agroforestry;
- ii. the prevention and restoration of damage to forests from forest fires, natural disasters and catastrophic events (including pest and disease outbreaks) and climate-related threats;
- iii. investment in multifunctional sustainable forest management through non-productive investment that helps improve the provision of ecosystem services (creating or preserving habitats favourable for biodiversity, water and soil protection, climate change adaptation or increasing the social and cultural value of forests);
- iv. investments in improving the economic value of forests and increasing the mobilisation of forest potential, including renewable energy production (e.g. from woody biomass); and
- v. support for specific and voluntary management commitments that go beyond the legal obligations targeting biodiversity, habitat protection, water purification, recreation and public health.

For the CAP's **2014-2022 rural development programming period**, the planned forestry related total public expenditure (European Agricultural and Rural Development Fund (EAFRD) and Member States' contributions) amounted at the beginning of 2023 to approximately EUR 8.2 billion and this amount could be further increased by the so-called

horizontal (cross-policy) measures (e.g. training, advisory services, cooperation, support for producer groups or European Innovation Partnerships) or infrastructure which also contributes to the increased level of provision of ecosystem services.

According to the still running updated rural development programmes for 2014-2022, the following planned support could be provided at the EU level till the end of their implementation ³²:

- afforestation (EUR 2.1 billion);
- establishment and renewal of agroforestry systems (EUR 42.2 million);
- protection of forests against fires or natural disasters and other damages (EUR 2.2 billion);
- restoration after fires or other damage (EUR 675.5 million);
- improving environmental, climate-adaptation or other ecosystem-services-related non-production investments (EUR 1.5 billion);
- improving the economic value of forests and mobilisation of forestry products and services (EUR 834.4 million); and
- forest-environment and climate-services-related voluntary commitments (EUR 307.7 million).

The forest projects financed under the 2014-2022 programming period can be found at the projects database of the European Network for Rural Development ³³. A project in Slovenia ³⁴ (2016-2020, total budget EUR 7 345 293) to restore forests damaged by natural disasters and improve the viability of forests and thus contribute to improving ecosystem services could be mentioned as a concrete example. The scheme supported the implementation of measures to restore over 1 100 hectares of damaged forests and the plantation of over three million saplings of 19 forest tree varieties.

For the **2023-27**, the new CAP follows a performance- and result-based approach built around 10 key objectives ³⁵. These objectives are focused on social, environmental and economic goals, and are the basis on which EU countries have designed their CAP Strategic Plans. Two of the key objectives are to contribute to halting and reversing biodiversity loss; to enhance ecosystem services and preserve habitats and landscapes; and to contribute to climate-change mitigation and adaptation.

³² The n+3 years rules for RDP spending mean that there are 3 years that overlap with the new CAP Strategic Plans when both the 'old' RDP measures, and the 'new' CAP SP interventions can support forestry activities. Due consideration is taken to avoid double-funding.

³³ https://enrd.ec.europa.eu/projects-practice_en

³⁴ https://enrd.ec.europa.eu/projects-practice/restoring-forests-damaged-natural-disasters-and-improving-viability-forests_en

³⁵ The objectives are: 1) to ensure a fair income for farmers, 2) to increase competitiveness, 3) to improve the position of farmers in the food chain, 4) climate change action, 5) environmental care, 6) to preserve landscapes and biodiversity, 7) to support generational renewal, 8) vibrant rural areas, 9) to protect food and health quality, 10) fostering knowledge and innovation. https://agriculture.ec.europa.eu/common-agricultural-policy/cap-overview/new-cap-2023-27/key-policy-objectives-new-cap_en

Regulation (EU) 2021/2115 (the CAP Strategic Plans Regulation)³⁶ requires each Member State to set national rules for the implementation of the interventions contained in its CAP Strategic Plan, including the potential eligible beneficiaries; the eligible support; the specific design, requirements and eligibility of the interventions; and the identification of relevant baseline elements.

The CAP Strategic Plans Regulation does not explicitly provide for forest ecosystem services. CAP payments can only compensate forest owners/managers for costs incurred and income foregone. They can also in some cases cover the transaction costs of carrying out the management required to deliver environmental and climate outcomes. They are not based on the real or expected value of the forest ecosystem services delivered.

The Regulation nonetheless provides support through the European Agricultural Fund for Rural Development for several types of interventions (i.e. specific management commitments and investments (e.g. an increase of forest or wooded areas); support for the sustainable management of existing forest areas and the relevant investment; afforestation and maintenance of afforested land) that support multifunctional forests and contribute to the maintenance and/or improvement of ecosystem services.

Article 70 ‘Environmental, climate-related and other management commitments’: this covers voluntary commitments that go beyond the relevant statutory or other relevant management requirements (5-7 years with the possibility of a longer period). The payments for specific management commitments under this article are based on costs incurred / income foregone (taking into account the targets set) and may also cover transaction costs.

Some payments for investments related to the provision of ecosystem services (e.g. ‘non-productive’ investments – see below) can be connected to specific management commitments.

Article 72 (‘area-specific disadvantages resulting from certain mandatory requirements’ (Natura 2000)): the payments fully or partially compensate costs incurred / income foregone (including transaction costs) related to the area-specific disadvantages in the area concerned.

Article 73 (‘investments’): Member States may increase the standard support rates up to 100% for activities, such as afforestation; agroforestry; land consolidation in forestry; green non-productive investment linked to one or more of the specific objectives (e.g. related to the provision of ecosystem services); investments in the restoration of forestry potential following natural disasters, adverse climatic events or catastrophic events and investments in appropriate preventive actions, as well as investments in maintaining the health of forests).

³⁶ Regulation (EU) 2021/2115 of the European Parliament and of the Council of 2 December 2021 establishing rules on support for strategic plans to be drawn up by Member States under the common agricultural policy (CAP Strategic Plans) and financed by the European Agricultural Guarantee Fund (EAGF) and by the European Agricultural Fund for Rural Development (EAFRD) and repealing Regulations (EU) No 1305/2013 and (EU) 1307/2013 (OJ L 435, 6.12.2021, p. 1).

Article 77 ('cooperation'): the support that is provided can contribute to various forms of cooperation (including a European Innovation Partnership), which could be a very useful way to try out the new methods for enhancing the provision of ecosystem services in various ways.

5.1.2 LIFE projects

The LIFE programme³⁷ is the EU's funding instrument for environment and climate measures. LIFE's objective is to contribute to the implementation, updating and development of EU environmental and climate policy and legislation by co-financing projects with EU added value.

The programme provides support for integrated approaches, pilot, demonstration and best practice projects that contribute to the implementation of biodiversity objectives and climate change mitigation strategies and action plans at regional or national level. This includes projects combining the restoration and promotion of ecosystem services with the establishment of innovative financing tools.

Annex IV provides examples of LIFE projects that support the establishment of payments for forest ecosystem services schemes in practice.

5.2 Public financing through new State aid possibilities

The new guidelines for State aid in the agricultural and forestry sectors and in rural areas³⁸ entered into force on 1 January 2023 and provide an important innovation of relevance for Payments for Ecosystem Services. They include an **incentive element for payments for biodiversity, climate, water or soil-related services**. It will be possible under these rules for forest managers not only to be granted 100% compensation for additional costs and income foregone, but also to get an additional incentive of 20% of the eligible costs for the ecosystem services provided.

This incentive is the result of the evaluation of the previous State aid rules which showed that while those rules had already a solid potential to contribute to the transition to a sustainable and biodiversity-friendly land sector, in their previous form they were not always sufficiently ambitious to fully contribute to achieving the objectives of the Green Deal and the targets set out by the European Climate Law. In particular, where those measures only allowed for the compensation of the additional costs and income foregone, they did not always offer the required incentives to commit to new activities. The evaluation showed that, at the previous level of aid intensities, the uptake of measures such as forest-environment climate services,

³⁷ https://cinea.ec.europa.eu/programmes/life_en

³⁸ OJ C 485, 21.12.2022, p. 1.

was too low to have an impact. In fact, only a few Member States have introduced such schemes in the last years and the majority of them have had a low uptake (table 3).

Table 3: state aid schemes for forest-environment and climate services and their uptake

SA number	MS	Annual budget million EUR	% of annual budget used*					
			2015	2016	2017	2018	2019	2020
SA. 41046	FI	90.0	11%	50%	47%	56%	58%	56%
SA. 42464	DK	2.5	10%	11%	9%	7%	11%	28%
SA. 45294	DE	28.0			3%	0%	0%	0%
SA. 48810	UK	34.0					1%	1%
SA. 50409	DE	0.8					11%	57%
SA. 54137	CZ	39.0					35%	111%

* Under State aid procedural rules, Member States may exceed the total budget of approved aid schemes by up to 20% without having to re-notify.

Under the new rules, Part II, Section 2.3 on ‘aid for forest-environment and climate services and forest conservation’, aid may be granted to support voluntary management commitments which help achieve one or more of the climate- and environment-related specific objectives set out in Article 6(1) of Regulation (EU) 2021/2115³⁹. Those commitments should go beyond the relevant mandatory requirements established by the national forestry legislation or other relevant national or EU legislation. Commitments must be undertaken for a period of 5 to 7 years. However, Member States may (where necessary and duly justified) set a longer period for particular types of commitments. In duly justified cases (e.g. in the case of forest genetic resources), Member States may also establish a shorter period of at least 1 year in the State aid notification. Management interventions that are necessary only once or a few times during the forest cycle are also eligible.

The new State aid rules have undergone a significant simplification process: ‘pure’ national aid (i.e. aid not co-financed under the CAP) for forestry can now be block-exempted⁴⁰ up to set thresholds⁴¹. This means that in several cases Member States will not need a formal approval decision to grant forestry aid, thus cutting red tape and costs. However, if a Member State wishes to use the above-mentioned additional 20% incentive payment, it has to notify

³⁹ These commitments are to contribute to climate-change mitigation and adaptation (including by reducing greenhouse gas emissions and enhancing carbon sequestration) and promote sustainable energy; to foster sustainable development and efficient management of natural resources such as water, soil and air (including by reducing chemical dependence); to contribute to the halting and reversing of biodiversity loss; and to improve ecosystem services and preserve habitats and landscapes.

⁴⁰ Commission Regulation (EU) 2022/2472 of 14 December 2022 declaring certain categories of aid in the agricultural and forestry sectors and in rural areas compatible with the internal market in application of Articles 107 and 108 of the Treaty on the Functioning of the European Union (OJ L 327, 21.12.2022, p. 1).

⁴¹ See Article 4 of Regulation (EU) 2022/2472.

the Commission and the Commission has to adopt a formal approval decision after scrutiny of the aid.

6. Research and innovation - Horizon programmes

6.1 Horizon 2020 / Horizon Europe

Horizon 2020 was the EU's research and innovation funding programme in 2014-2020 with a budget of nearly EUR 80 billion ⁴². It has been succeeded by Horizon Europe ⁴³, the EU's key funding programme for research and innovation with a budget of EUR about 95.5 billion for 2021-2027.

The Commission promotes a science-based contribution of EU forests to the European Green Deal ambitions of climate neutrality and resilience, biodiversity conservation and sustainable growth through its overall research and innovation policy. Research and innovation aspects regarding payments for ecosystem services and ecosystem valuation are supported by the Horizon 2020 and ongoing Horizon Europe projects.

European investment into forest research has been conducted mainly through the challenge “Food security, sustainable agriculture and forestry, marine, maritime and inland water research and the bioeconomy” of Horizon 2020 with a total budget of around € 155 million for 2014-2020.

The forest-related research and innovation measures under Horizon Europe notably are supported through cluster 6 on ‘food, bioeconomy, natural resources, agriculture and the environment’ in Pillar II of Horizon Europe, which account already to around EUR130 million of EU funding for the first four years (2021-2024). Large-scale research and innovation partnerships with the Member States and Associated Countries, such as the Biodiversity Partnership Biodiversa+ or the future partnership “Forests and Forestry for a Sustainable Future” are being prepared as part of the Horizon Europe work programmes and pool resources for joint activities in Europe.

This cluster provides opportunities to enhance and create synergies between forests’ environmental, social and economic goals and to put human economic activities on a path towards sustainability. The research and innovation policy addresses the multiple benefits from forest ecosystem services and their interdependencies in an interdisciplinary and integrative manner. The aim is to add more value to sustainable and multifunctional forests and to maximise their benefits for society.

⁴² https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-2020_en

⁴³ https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en

The forest related research and innovation activities are also supported through the EU Mission ‘A Soil Deal for Europe’. The Soil Deal Mission will gradually create 100 Living labs to lead the transition to healthy soils by 2030. The Soil Deal Mission will contribute to meeting the Green Deal ambitions and targets, such as preserving and restoring ecosystems and biodiversity (by improving soil structure and promoting diversification in agriculture and forestry), and safeguarding forests (by reducing erosion and desertification). The first living labs will be funded through annual calls under the ongoing Horizon Europe work programme 2023, with a specific call on carbon farming in living labs (see below).

Annex III describes some examples of Horizon 2020 and Horizon Europe projects that address the payments for forest ecosystem services and their valuation or are strongly linked to them. They provide best practices, innovative policy solutions and innovative business models to support payments for forest ecosystem services.

6.2 Topic calls in Horizon Europe Work Programme 2023-2024

In December 2022, the Commission adopted the 2023-2024 work programme of Horizon Europe, with a budget of around EUR 13.5 billion. Calls for proposals are published in the EU Funding and Tender Opportunities Portal⁴⁴. Projects that can contribute to various aims (e.g. -inter alia- supporting the sustainable use of forest ecosystem services and ways to how they will be integrate them into public and business decision- making, as well as approaches for enabling transformative changes, including by deploying nature-based solutions) can be funded under the following Destinations set out in part 9 of the Work Programme:

- biodiversity and ecosystem services;
- innovative governance, environmental observations and digital solutions in support of the Green Deal;
- the circular economy and bioeconomy sectors.

Annex III provides examples of calls of for topics that are open in 2023 or 2024:

7. Private payment schemes for forest ecosystem services

7.1 Advantages

All payment schemes reward the provision of ecosystem services and can therefore be especially important if other marketable ecosystem services (e.g. timber) fail to generate sufficient income for forest actors to take action. Incentives under private payment schemes create win-win solutions for their beneficiaries because they combine climate and

⁴⁴ <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/home>

environmental impacts with additional financial opportunities through the generation of certificates that can be traded on the markets.

Unlike public payment schemes for forest ecosystem services, private schemes allow unmediated contracts between ecosystem service suppliers and beneficiaries⁴⁵. Private schemes therefore have the advantage of ensuring flexibility for the scheme design, as also emerged during the workshop held by the Commission on 31 March 2022 on public and private payments for forest ecosystem services (Figure 1 in Annex I). This can be reflected in the different building blocks of a scheme, i.e. the definition of the eligibility criteria, the choice of the specific ecosystem services that should be supported, the suitability of governance structures, the liability rules in cases of non-compliance and – of particular relevance when compared to the relatively rigid public frameworks – the potential to cover several types of costs. This makes it possible to target support where it is most needed and provides an extremely flexible tool to serve different policy objectives, e.g. to increase carbon removals in order to achieve the EU's climate goals.

7.2 Challenges

The challenges identified for the implementation of private payment schemes for forest ecosystem services do not differ much from public schemes. The main challenges concern the difficulty of establishing the economic value of ecosystem services⁴⁶ and trade-offs between multiple ecosystem services covered by a scheme (Figure 2 in Annex I).

The financial cost of the schemes is a further important barrier. Ecosystem services are typically linked to long-term maintenance requirements that deter potentially interested parties from engaging in such activities because they often do not provide an economic return that is commensurate with the costs involved in providing the service and the necessary monitoring, reporting and verification (MRV).

Another major challenge of these schemes is the quality of MRV and the availability of credible, site-specific and relevant data. MRV is a central element of result-based schemes because outcomes need to be quantified, verified and monitored to ensure the necessary additionality, i.e. that they are taking place due to the activity which should not be required by law, and permanence of the service and to ensure that trade-offs with other services do not occur elsewhere (leakage). Land managers, project developers and scheme owners currently lack primary data on the state and trends of ecosystems at the landscape and land management unit levels which are particularly important for establishing the baselines. Individual landowners and small local schemes can often not afford the costs of providing

⁴⁵ The United Kingdom's Department for Environment, Food and Rural Affairs, *Payments for Ecosystem Services: A best practice guide*, 2013. <https://www.gov.uk/government/publications/payments-for-ecosystem-services-pes-best-practice-guide>

⁴⁶ Particularly for services that are only indirectly provided (e.g. health).

such data. Activity data and emission factors produced by the greenhouse gas inventories are not easily available and accessible for private landowners.

The potential complexity of payment schemes for forest ecosystem services, the diversity of forests and other ecosystems in the EU and the lack of quality data can make it difficult to establish these schemes. Uptake can similarly be affected by regulatory frameworks that inhibit ecosystem services (e.g. unclear ownership or tenure rights⁴⁷); by poorly targeted incentives that do not reward pioneers⁴⁸ or subsidise environmentally harmful practices; or by the opinions of many citizens and companies that see the supply of ecosystem services primarily as a duty of the wider community or of government.

7.3 Addressing challenges

Stakeholder feedback (Figure 3 in Annex I) indicates that there are different but equally appropriate ways to address these challenges. The use of a valuation method that combines ecological and economic elements can help to ensure a more holistic approach to covering the different aspects inherent in ecosystem services, but **public-private financing synergies** can help alleviate the financial burden of MRV and investment costs. The CAP through its rural development forestry interventions (Section 5.1.1) and State aid with its new incentive possibility beyond the mere compensation of income foregone and additional costs (Section 5.2) can provide funding opportunities that can be combined with revenues coming from the sale of certificates on private markets (Section 9).

Stakeholders have also identified **robust certification** as an appropriate way to increase the scale of payment schemes for forest ecosystem services. As indicated above, dealing with nature-based solutions poses specific challenges linked to the difficulty of quantifying the benefits, and of verifying and monitoring that they continue to take place and do not move harmful activity elsewhere. Moreover, due to the existence of several certification schemes that apply different rules and approaches and because of the various uses that can be made of certificates, it is difficult for potential beneficiaries to assess the quality of the ecosystem service provided (and prevent greenwashing).

In the light of the need for increased carbon sequestration to achieve the EU's climate targets, the Commission on 30 November 2022 proposed a voluntary regulatory framework for the certification of carbon removals⁴⁹. The certification framework will increase transparency, methodology standardisation and environmental integrity to prevent negative impacts on biodiversity and ecosystems. In particular, by setting QUALITY criteria for carbon removals as regards QUantification, Additionality, Long-term storage and sustainabiLITY, it will

⁴⁷ <https://op.europa.eu/en/publication-detail/-/publication/573bd669-9ac6-11e6-868c-01aa75ed71a1/language-en>

⁴⁸ For example, when PES schemes unintentionally incentivise land managers to stop applying good practices because they want to achieve a lower baseline of ecosystem services in order to be able to receive financial compensation for increased performance.

⁴⁹ COM(2022) 672 final, https://climate.ec.europa.eu/eu-action/sustainable-carbon-cycles/carbon-removal-certification_en

constitute the first fundamental step towards establishing reliable markets that will support the large-scale development of private certification schemes. In addition to carbon sequestration, potential co-benefits of carbon removals (e.g. conservation of habitats and species, and improved water or air quality) that are relevant to payments for forest ecosystem services could also be rewarded through an increased value of the certificates. The proposed EU-wide carbon removal certification framework will focus on carbon sequestration, but it will also make it possible to address several of the above-mentioned challenges for private payments for ecosystem services.

Upon request, the Commission may grant to Member States the free licence to use the Natura 2000 logo on goods and services including on non-wood forest-based products. To benefit from the logo, products and services have to originate completely or significantly from or are provided in specific Natura 2000 sites and are fully compatible with their conservation objectives, provided that the latter have been established in accordance with the Habitats and Birds Directives⁵⁰.

Ensuring high-quality data for MRV should become a particular priority for result-based schemes. MRV is a crucial element in delivering the relevant ecosystem service, limiting adverse impacts, and ensuring additionality and compliance with the scheme rules. It is also precise, well-timed, cost-effective, unbiased and replicable⁵¹.

Monitoring can be conducted via modelling, direct measurement or indicators. Today's forest monitoring builds heavily on field observations acquired in national forest inventories (and, in a few cases, national forest soil inventories). Site-based forest inventories are expensive and take several years to complete. Top-down approaches through e.g. **earth observation** can complement bottom-up measurements taken in national inventories⁵². High-frequency image acquisition provides comprehensive and standardised information on the state of the land and thus contributes to densifying information on forests in space and time, leading to **improved geo-spatial datasets**. In this way, parcel-level information not only monitors the impact of measures and tracks progress towards the target, but also indicates the improvements by comparison with surrounding land that is not under a payment scheme⁵³.

The monitoring should be harmonised across the EU Member States so that the forest sector actors have a comprehensive and comparable picture of the state and evolution of forests and forest biomass provision in the EU. To this end, the Commission announced in the New EU Forest Strategy for 2030 that it will be submitting a legislative proposal on EU forest observation, reporting and data collection with the objective of building – jointly with the Member States and in full respect of the principle of subsidiarity – a more efficient forest

⁵⁰ (2021/C 229/03) https://ec.europa.eu/environment/nature/natura2000/management/natura2000-logo_en.htm

⁵¹ <https://www.cbd.int/financial/pes/unitedkingdom-bestpractice.pdf>

⁵² Monitoring via earth observation should complement *in situ* monitoring because the latter might still be needed in order to monitor benefits for biodiversity and because ground data are necessary for calibration of indicators.

⁵³ Investments in the restoration of forestry potential following natural disasters, adverse climatic events or catastrophic events and investments in appropriate preventive actions, as well as investments in maintaining the health of forests.

monitoring framework ⁵⁴. Freely available, reliable and timely forest data will be key for land managers and forest owners in order to quantify and monitor possible payments for (i) climate mitigation or co-benefits for ecosystem services under the above-mentioned future EU certification framework; and (ii) the effective functioning of result-based payment schemes for forest ecosystem services under State aid or the CAP that are intended to incentivise the actors in the forest sectors to enhance or maintain forest ecosystem services.

Moreover, the reporting by Member States under the proposed revision of the Environmental Statistics Regulation ⁵⁵ will improve the information currently available on the extent and condition of ecosystems, and on the flows of ecosystem services. The revision of the Regulation means that the ecosystem accounting module of the global standard of the System of Environmental-Economic Accounting (SEEA EA ⁵⁶) is being implemented at the EU level.

Collecting and interpreting biodiversity data for application in a business context is often challenging. The biodiversity data landscape is continually evolving. Companies and investors can use a wide range of data sources to assess biodiversity performance. Data for biodiversity measurement come from many sources ranging from ecological field surveys to government data bases and corporate disclosures. The increasing affordability of access to remote sensing data means that new data sets are becoming available that can track impact and performance in real time. There is a huge demand from businesses and finance institutions for more clarity on biodiversity data that are suitable for use in a business context. A lot of work is being done to improve the **availability and accessibility of data on biodiversity** for businesses, including through guidance developed by the EU Business and Biodiversity Platform ⁵⁷.

8. Development of payment schemes for forest ecosystem services

A payment scheme for forest ecosystem services needs to benefit both buyers and sellers in order to be effective and to avoid discouraging the actors, who are participating voluntarily, from participating. The economic viability of the EU's forest sector remains a key pillar of sustainable forest management and is of crucial importance for maintaining the multiple benefits that forests provide to society, including providing income for rural populations.

Scheme developers can make the most of opportunities to support the provision of forest ecosystem services by making the best use of all available funds and by designing payment schemes which can be managed through private and public partnerships (see Section 9).

⁵⁴ [EU forests – new EU Framework for Forest Monitoring and Strategic Plans \(europa.eu\)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2022:329:FIN)

⁵⁵ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2022:329:FIN>

⁵⁶ United Nations et al., *System of Environmental-Economic Accounting: Ecosystem Accounting*, white cover pre-edited version of 29 September 2021. Available at: <https://seea.un.org/ecosystem-accounting>.

⁵⁷ For an overview, see the Business and Biodiversity Platform's Thematic Report on Biodiversity Data of April 2022: https://green-business.ec.europa.eu/businessbiodiversity/our-activities/workstreams/methods_en

In order to develop and manage payment schemes for forest ecosystem services, public and private entities are encouraged to:

- identify and assess the many different ecosystem services. Nature is a complex and interconnected system, and ecosystem services do not function independently of one another. Attempts to maximise the supply of one service are therefore likely to influence the provision of other services, either positively or negatively;
- clearly define the goals and objectives of the payment schemes for forest ecosystem services because these help to guide the design of the scheme and enhance transparency;
- take into account priority EU policies that would benefit from payment schemes for forest ecosystem services (e.g. climate-change adaptation and mitigation, biodiversity protection and restoration, combating desertification, water regulation and risk reduction);
- bundle multiple ecosystem services together in order to increase benefits and reduce the transaction costs;
- identify and manage potential trade-offs, given that increasing the provision of an ecosystem service in one area may create pressure on ecosystem services elsewhere (leakage); and given that payment schemes for forest ecosystem services can be set up in such a way as to avoid leakage (whereby securing an ecosystem service in one location leads to the loss or degradation of ecosystem services elsewhere);
- set a timeframe (and, where feasible, a longer timeframe) for the implementation of the scheme to ensure the permanent and continuous provision of forest ecosystem services. Longer-term payment schemes could encourage beneficiaries to participate in the scheme by providing a stable and reliable source of income and ensuring the provision of forest ecosystem services. Furthermore, forest management requires a long-term perspective and this must be factored into any scheme;
- prioritise forests (taking into account their type, condition and location; ecosystem services to be paid for; costs and benefits; and threats) to be covered by the payment scheme because it might be difficult to provide funding for all eligible forests; and to that end establish baselines and target payments to forest ecosystem services that are at risk of loss or enhance their provision;
- develop a robust MRV framework;
- ensure transparency by involving stakeholders at all stages and (in the case of public funding) informing the public about the use made of public money and the benefits resulting from the supported schemes.

The Green Book on payments for environmental services from Mediterranean forests ⁵⁸ sets out 10 basic questions that should be raised before developing and implementing any payment scheme:

- which economic, social or environmental problem do we want to solve with the payment for ecosystem services scheme?
- what added value will the scheme provide to society?
- how do beneficiaries of forest goods and services perceive these benefits?
- to what extent are they aware of the need to introduce a new mechanism?
- how much are they ready to pay?
- which institutional arrangements can help in gathering money and distributing it among the participating forest manager agents?
- what are the legal constraints?
- how can we reduce related transaction costs?
- what is likely to happen without any payment scheme?
- what would the role of the public sector be in this specific scheme?

9. Common framework for public and private financing

The financial burden linked to the design of payment schemes for forest ecosystem services is an important challenge to their large-scale deployment. Uncertainty about revenue possibilities, the sometimes insufficient reward of the ecosystem provided due to the difficulty of its valuation combined with the necessary investment and maintenance costs (including with regard to monitoring) often deters forest holders from joining such schemes.

As mentioned in Section 7.1, private schemes are more flexible in terms of scheme design and are therefore better suited as pure result-based schemes. However, their effectiveness and long-term price stability depend on proper support from either private or public sources because result-based schemes without some form of *ex ante* payments to forest managers seem unlikely to attract a sufficient level of uptake. To that end, **public and private funding instruments can be combined to create stronger incentives** and a synergetic approach to addressing the limitations or weaknesses linked to a specific funding instrument.

It is important to consider the ecosystem service that the scheme intends to deliver in order to determine the best support-mix. This will probably influence the choice of the most suitable financing instrument. The limitations of the different sources of financing are another element to consider in order to target support to the different necessary elements of the scheme in the most effective way.

⁵⁸ Simončič, T. and Matijašić, D., *The Green Book on Payments for Environmental Services from Mediterranean Forests*, Slovenia Forest Service, Ljubljana, 2013. This is cited in Viszlai, I., Barredo, J.I. and San-Miguel-Ayanz, J., *Payments for Forest Ecosystem Services - SWOT Analysis and Possibilities for Implementation*, 2016.

As indicated above, the CAP can support action-based schemes (i.e. payments to carry out a set of management actions), investment and cooperation costs, advisory services, etc. However, with regard to result-based schemes, the CAP delivery mechanisms could still be adapted further (particularly at the national level) in order to facilitate these new approaches, while ensuring their robustness and controllability. State aid financing and private initiatives can offer additional and, in some cases, more effective mechanisms. Additional revenues from carbon markets and a higher State aid budget can make an important difference.

The CAP, private schemes and State aid can complement each other. This **reduces risks for forest managers** (particularly when the risk of non-delivery is high) **and secure revenues**. This could be achieved through hybrid mechanisms that combine action-based payments (under either the CAP or State aid) and revenues coming from the sale on private markets of certificates that reflect the value of the ecosystem service provided.

With regard to carbon sequestration, the Commission has (as mentioned in Section 7.3) recently proposed an **EU voluntary framework for the certification of carbon removals** on the basis of four quality criteria. This will make it possible to certify carbon removals robustly, reliably and transparently and help to re-establish the trust needed in order to mobilise public and private funding. In addition to the climate benefits in terms of carbon sequestration, the proposed framework explicitly acknowledges the importance of **co-benefits** as regards sustainability by requiring that carbon removal activities must have a neutral or positive impact on environmental objectives and by prioritising removals that have a significant positive impact on biodiversity. This is particularly important for the upscaling of payment schemes for forest ecosystem services, because private schemes currently tend not to formally incorporate co-benefits and wider sustainability in their payment structures because this can increase complexity and costs.

Furthermore, the proposed framework is intended to reduce costs and administrative burden for small companies by allowing small-scale operators to be certified as a group of operators so that that MRV costs can be shared ⁵⁹.

10. Natural capital accounting: tracking the state of ecosystems and ecosystem services - Integrated Natural Capital Accounting (INCA) ⁶⁰

Natural capital accounting is a statistical framework for organising data, tracking changes in the extent and the condition of ecosystems, measuring ecosystem services and linking this information to economic and other human activities. It aims to illustrate the benefits that

⁵⁹ More information is available at https://climate.ec.europa.eu/eu-action/sustainable-carbon-cycles/carbon-removal-certification_en

⁶⁰ <https://ecosystem-accounts.jrc.ec.europa.eu/about-inca>

society receives from ecosystems and their services. The official statistical standard of ecosystem accounting is the System of Environmental Economic Accounting ([SEEA](#)).

The integrated natural capital accounting (INCA) project is a joint effort by Eurostat, the Joint Research Centre, DG Environment and DG Research and Innovation as well the European Environment Agency. The project has already been through three implementation phases, starting in 2015, and has been in its third phase since 2021. Throughout this period the objective of INCA has been to compile pilot applications of accounts at the EU level on ecosystem extent, condition and services. These pilot applications have allowed the project to produce concrete tools and operational guidelines that will make it easier for practitioners to run an ecosystem services account on a regular basis. The objectives of the project include the development of a set of policy uses from project outcomes.

The INCA approach provides an operational procedure to assess and value ecosystem services. The initial subject of this assessment is the ecosystem service potential, which represents the ecological side that quantifies what ecosystems can provide, independently of whether or not they are used. The socio-economic side of ecosystem services is then assessed. This corresponds to the ecosystem service demand that includes the demand of economic sectors, households and global society (the latter is relevant when the ecosystem service refers to overarching environmental targets such as climate change and biodiversity loss). When the ecosystem service's potential matches the ecosystem service's demand, an ecosystem service use is generated. When this is not the case, a mismatch occurs that signifies the lack of an ecosystem to supply services or an overuse of the services (the overuse applies when regeneration or absorption rates are exceeded). All the information that the approach provides is crucial for:

- a. revealing the value of ecosystem services for the economy and society;
- b. keeping track of how the use of ecosystem services is developing;
- c. (on the basis of the above) providing management options for the sustainable use of ecosystems.

Nine ecosystem services were assessed in the applications of ecosystem accounts in INCA project. These services relate to different ecosystem types. The supply and use tables (SUTs) of services are the main feature of ecosystem accounts. The supply part indicates the flow of supply from ecosystem types (ET1, ET2, etc.) and the use part indicates the flow of demand (analysed by different economic sectors).

Indicators of particular interest can be revealed on this basis. In the examples below we present the case of forest ecosystem services and the habitat and species maintenance ecosystem service.

1. Forest ecosystem services

The forest ecosystem provides a range of services, such as timber, carbon sequestration, flood control, soil retention, water purification, species maintenance and nature-based daily recreation (i.e. daily visits of people to nature).

The following **indicators** are derived after analysing the data which are reported in the SUTs of ecosystem service accounts:

- the **overall contribution** of the forest ecosystem type as a proportion of the total value of ecosystem services. The total value is EUR 214 billion and **51% of this total value is supplied by woodland and other forests.**
- the **relative value of ecosystem services** provided by forests; out of a total EUR 101 billion in value, **nature-based daily recreation, timber provision and habitat and species maintenance** account for 28%, 21% and 19% respectively;
- the **attribution ratio of ecosystem services to forests** (i.e. how much of the total value of each ecosystem service that is supplied by all ecosystem types is attributed to forests). **Carbon sequestration and timber provision** had the highest attribution ratio (100%). The ratios for habitat and species maintenance and nature-based daily recreation were close to 60%;
- the **dependence ratio of economic sectors on forests** (i.e. how much of the total value of ecosystem services that each economic sector uses is dependent on the value of services supplied by forests). The forestry sector showed the highest ratio (100%) while **global society and households depend by as much as 60-80% on forests.**

2. Habitat and species maintenance

One of the ecosystem services assessed in the INCA project is the habitat and species maintenance (HSM) service. A stated preference survey with the choice experiment (the definition of the method is available in Annex II) was conducted in four EU countries that were selected as representative of a range of diverse environmental and social contexts. An EU map of HSM service was produced using value transfer techniques. The results suggested that the public considers that HSM policy needs to be strengthened. In fact, considering the aggregate amount that EU residents are prepared to pay annually for HSM (EUR 30 billion), we can expect that the post-2020 biodiversity policy (with a committed annual budget of EUR 20 billion) would probably receive public support.

More than 50% of the HSM supply is provided by forest ecosystems and this figure has been increasing in recent years (between 2000 and 2018). All parts of the service are used by the global society as a pure public good.

11. Payment schemes for forest ecosystem services: case studies and good practices

11.1 Examples of national public schemes

11.1.1 The forest biodiversity programme METSO (Finland)

The aims of the 2008-2025 METSO programme ⁶¹ are to:

- halt the ongoing decline in the biodiversity of forest habitats and species; and
- establish favourable trends in southern Finland's forest ecosystems.

The programme is based on a Finnish government resolution that contains 14 measures to achieve these aims. The measures include actions to improve the network of protected areas; enhance habitat management in commercially managed forests; improve the knowledge base on forest biodiversity; promote collaboration between forest and environmental organisations; increase awareness of forest biodiversity; and enhance the communication, education and training of professional foresters. Forest owners can voluntarily offer their forest sites for protection in the METSO programme and they receive financial compensation equivalent to the full value of timber at the protected site.

The programme is coordinated by the Ministry of the Environment and the Ministry of Agriculture and Forestry.

11.1.2 Croatian payment scheme on forest ecosystem services

The scheme was established in 1991 and involves a fee of 0.07% (0.0525% since 2010) of annual income. Since 2020, all legal and natural persons that are engaged in economic activities and that have an income greater than 7.5 million HRK (approximately EUR 1 million) are obliged under the Forest Act to pay a fee for the use of forest ecosystem services that amounts to 0.024% of their total annual revenues. The fee for forest ecosystem services is paid to a special state budget account. The law specifically requires 51% of the scheme's total collected funds to be used for the public good (30% for demining forests, 20% for firefighting activities, and 1% for scientific research in the field of forestry). The remaining 49% of the collected funds is allocated for use to forest owners in proportion to the share of forest and forest land area that they manage, in accordance with forest management plans.

⁶¹ <https://metsonpolku.fi/en/metso-programme>

11.2 Examples of private schemes

11.2.1 Label Bas Carbone

Label Bas Carbone⁶² is a French standard that focuses on the certification of carbon offset projects in afforestation, reforestation of destroyed or impacted forests, and conversion of coppices to high stands in forests. Each project type lasts for 30 years and *ex ante* credits are generated in either year 0 or year 5. Co-benefits are estimated for the socio-economic, water, soil protection and water dimensions. The scheme is open to all entities that want to offset CO₂-emissions, including private firms, public bodies, administrations and citizens. In most instances, the costs for the funding entities range between EUR/tCO₂ 15 and 35. However, for complex and costly projects and for projects located in areas where the soil is less fertile and the climate is less conducive to tree development, the price can exceed EUR/tCO₂ 100. 173 forestry projects had been certified by 2022, representing a potential offset of tCO₂ 320 302.

Additionality is verified by analysing existing public subsidies and an economic analysis. The project promoter must demonstrate that it is not eligible for existing public subsidies or that they amount to less than 50% of the project costs. It must also demonstrate that the land concerned by the project is not subject to any regulatory obligation. Lastly, the project promoter must demonstrate that the forestry project is not the most profitable solution. If no economic analysis is carried out, the carbon credits are automatically reduced by 20%.

As regards MRV, each project needs to be submitted to a sequence of several checks. First, the eligibility and carbon gain calculations are verified by the Ministry for the ecological transition's decentralised services. Then, after five growing seasons, the effective implementation of the project will be subject to an independent audit that (depending on the type and size of the project) can include a control via documentation and an on-site control. After the audit and for a period of 30 years, the ministry or its decentralised services can carry out random on-site controls.

The non-permanence risks are evaluated by the project promoter and verified by the ministry services during the examination of the project. It works with a system of discounts applied to the carbon gains that are proportionate to the level of risk identified. A 10% discount is systematically applied to each project in order to reflect the general risks.

11.2.2 FSC ecosystem services procedure

The Forest Stewardship Council (FSC) promotes environmentally sustainable, socially responsible and economically viable forest management and has been widely adopted in developed countries, particularly in the EU. In 2018, around 19% of EU forests was certified under the FSC scheme, albeit with large variations between Member States.

⁶² <https://label-bas-carbone.ecologie.gouv.fr/>

The FSC has developed a private ecosystem service procedure⁶³, which is applied globally and implemented in different EU Member States (e.g. Denmark, Estonia, France, Italy, Latvia, Lithuania and the Netherlands) as an add-on to the FSC forest management certification for the quantification of the impact of ecosystem services on land so that positive changes can be quantified, valued and sponsored. However, this is not an offsetting scheme because claims are not tradable and can only be used inside a value chain or as proof of the impact of sponsorship. The procedure, which currently involves 53 forest managers and covers around 1 million hectares worldwide⁶⁴, provides a framework for validation and labelling that allows forest managers and companies to purchase the right to make verified statements on their actual impact on ecosystems. Claims are allowed for carbon, biodiversity, water, soil and recreation (depending on the land manager's choice). They are valid for one year for the investor or sponsor only, and provide certainty, trust, and transparency for corporate and investor impact reporting.

⁶³ <https://fsc.org/en/document-centre/documents/resource/316>

⁶⁴ These figures are higher than those reported during the workshop on 31 March 2022 (see Annex I).

ANNEXES

ANNEX I - European Commission Workshop on “Public and Private Payments for Forest Ecosystem Services, 31 March 2022 - Report

BACKGROUND

The European Commission in its new [EU Forest Strategy for 2030](#), released in July 2021, committed to provide advice and technical guidance to Member States on the development of payment schemes for ecosystem services in forests.

Within this context, the European Commission organised an online workshop on 31 March 2022, to take stock of the experience and views of Member States and relevant stakeholders in the field of payments for forest ecosystem services.

The event was attended by over 150 participants, from the European Commission, Member States, potential beneficiaries (forest owners and managers), forestry and ecology research and policy institutes, and non- governmental organisations active in the field of forest and forestry. They engaged in discussions on the design and implementation of public and private payment schemes, focusing on key challenges and possible solutions.

The workshop aimed to:

- present recent developments and key ongoing initiatives;
- discuss key needs and challenges for setting up PES schemes;
- identify gaps and research and innovation needs;
- encourage regular exchange of information, knowledge, and good practices.

INTRODUCTORY MESSAGE

[Pierre Bascou](#) (DG AGRI Director - Directorate B) introduced the event organised jointly by DG AGRI, DG CLIMA and DG ENV, highlighting the multi-functional approach of the new EU Forest Strategy.

Through the EU Forest Strategy, the European Commission acknowledges the important contribution of forests and those who own and manage them for achieving the objectives of the European Green Deal. The Strategy aims to improve the quantity and quality of EU forests, supporting the growth of healthy, diverse and resilient forests that deliver benefits for climate and the environment, alongside economic benefits. The EU Forest Strategy also aims to diversify local economies, beyond the focus on wood and wood products, through the

delivery of ecosystem services, the promotion of tourism, and the uptake of forest related bio-based business activities.

In order to achieve the ambitious goals set in the EU Forest Strategy, adequate funding must be secured: the common agricultural policy (CAP) offers flexible opportunities to support the implementation of the EU Forest Strategy, encouraging the ongoing management of forests and the delivery of ecosystem services; however most of the aid available under the CAP consists of payments to compensate forest managers and owners for income foregone and additional costs incurred for the management carried out. Further support possibilities, complementing CAP payments, can be made available through State aids. The agricultural and forestry State aid Guidelines, that are currently under revision, will include support going beyond income foregone/additional costs, thereby providing an incentive element to payments beyond pure compensation.

In addition to public funding, forest ecosystem services can also be supported through private initiatives. Member States are invited to maximise opportunities to support the provision of forest ecosystem services, by making best use of all available funds, by designing payment schemes which can be managed through private and public partnerships, and be included under the CAP Strategic Plans and/or financed through national resources.

The European Commission has committed, in the new EU Forest Strategy, to provide advice and guidance to Member States for the development of public and private payments for ecosystem services and support national authorities through the necessary preparatory work. This support will be twofold: on the one hand, a guidance document to facilitate access to relevant information and good practice examples; on the other hand, Geo-hubs, composed of DG AGRI colleagues to assist their peers in national ministries.

PAYMENTS FOR FOREST ECOSYSTEM SERVICES IN THE EU

[Tamas Szedlak](#) (DG AGRI) presented the funding opportunities available under the CAP to support forest owners and managers in delivering ecosystem services.

Trees are a key provider of ecosystem services such as carbon storage, soil stabilisation as well as providing important wildlife habitats. Since 2000, the CAP supports forest management, and specifically: i) the increase of forest and wooded areas, through afforestation and agroforestry; ii) the prevention and restoration of damage to forests from forest fires, natural disasters and catastrophic events, including pest and disease outbreaks, and climate related threats; iii) investments in multifunctional sustainable forest management, including support for specific management commitments targeting biodiversity, habitat protection, water purification, recreation, and public health; iv) investments in renewable energy production including from woody biomass.

However, in line with the current World Trade Organisation (WTO) rules in force, CAP payments can only compensate forest owners/managers for costs incurred, income foregone

and in some cases they can also cover transaction costs for carrying out the management required to deliver environmental and climate outcomes. They are not based on the value of the forest ecosystem services delivered.

The advantage of supporting forest management through the development of private payment schemes, is that in a private business environment, the buyer of ecosystem services can pay more than the actual costs incurred or income foregone, providing real incentives to forest managers. Therefore, private schemes can be more appealing and ultimately successful.

[Gabor Padisak](#) (DG COMP) provided an update regarding the ongoing revision of the 2014 agricultural and forestry State aid Guidelines and of the Agriculture Block Exemption Regulation (EU) No 702/2014 (ABER).

A first round of interservice consultations within the Commission, as well as consultations with Member States was completed, and a second round was about to start. The revised Guidelines, to be adopted by the end of 2022, were expected to enter into force in January 2023.

Maintaining the existing State aid rules to the extent possible is a guiding principle for the ongoing revision process, however several updates are needed to mirror the novelties introduced by the CAP Strategic Plans Regulation (EU) No 2021/2115 (SPR), ensure the coherence of State aid rules with the latest policy developments, above all with the objectives of the European Green Deal. The revision will also reflect the lessons learned through past experience.

For instance, in the past, the uptake of forest measures has been very low, whether financed through State aid or through CAP rural development interventions. Forest managers were often not interested in such measures, mainly because the payments offered were considered not sufficiently appealing. Based on this experience and in line with the SPR Regulation, the following two major changes are now being introduced: i) the aid may cover also collective and result-based schemes, like carbon farming schemes; ii) incentive payments up to 20% of the total aid granted can now be granted on top of compensation for income foregone and additional costs.

[Georg Winkel](#) (Project Coordinator, University of Wageningen) and Sven Wunder (European Forest Institute, EFI) presented the outcomes of the latest research activities carried out within the framework of the 2018-2022 Horizon 2020 funded project SINCERE - Spurring INnovations for forest eCosystem sERvices in Europe. They focused in particular on the findings presented in the policy paper [‘Governing Europe’s forests for multiple ecosystem services: opportunities, challenges, and policy options’](#), published in March 2022.

Payments for Ecosystem Services (PES) can be regarded as voluntary transactions between ecosystem service users and ecosystem service providers. The following six key challenges for developing a European PES system, have been identified:

- 1) insufficient alignment between demand and supply of forest ecosystem services (FES);

- 2) the lack of information on FES demand and supply;
- 3) a polarisation between economic interests in the development of the bioeconomy and environmental concerns, posing a serious threat to the overall governance of FES;
- 4) a widespread perception of the regulatory framework as one of the main inhibiting factors;
- 5) climate change adaptation (which however could be seen also as an opportunity);
- 6) the diversity of forest situations in Europe and related difficulties for finding common solutions.

On the alignment of FES demand and supply, the results of a European wide survey carried out through the H2020 project Clearing House showed the importance of different forest ecosystem services for European citizens. Regulating FES (e.g. human health, carbon storage) and cultural FES (e.g. recreation) scored the highest; while provisioning FES (e.g. fuelwood and hunting) the lowest. Another European wide survey (conducted under the H2020 projects SINCERE and INNOFOREST), involving forest owners and managers and focusing on the supply of FES, shows on the contrary that provisioning forest ecosystem services contribute over 80% to forest income, whereas cultural and regulating forest ecosystem service only contribute less than 20%.

Arguments in favour of an EU-wide PES system

An EU-wide PES system could have the potential to:

- increase the multifunctionality of forests;
- provide a chance to align FES demand and supply, compensating for trade-offs between provisioning and other types of ecosystem services;
- address EU policy priorities on climate mitigation and biodiversity protection, at the core of society's perceptions of the importance of forests.

An EU-wide PES system could also contribute to the creation of a forest 'counterpart' in a CAP dominated by agriculture, levelling the playing field in terms of support for the sustainable management of forests.

Arguments against an EU-wide PES system

As forests are largely under the competence of Member States, there are limitations to the scope of an EU-wide PES system: for example, an EU-wide approach might not be able to fully relate to local priorities and correctly address/reflect the different peculiarities of local ecosystem services (e.g. watershed or recreational benefits are quite local in nature). Finally, there are also concerns related to how such schemes would be funded, particularly the willingness of EU citizens to finance FES through additional taxation, especially at this already challenging time, following the COVID emergency and in the middle of a new energy crisis.

The conclusions of the SINCERE project are that a possible EU-wide PES system should be built around the following principles and related considerations:

1. **Systemic objectives:** it should be decided whether the scheme should support the conservation and management of forests as a stand-alone objective or within the framework of land use policy more generally.
2. **Sources of finance:** an EU scheme could rely on EU funds, MS contributions, or a combination of the two. It could be of a voluntary or mandatory nature. It could encourage and build on synergies with private payments;
3. **Innovative design:** ambition and flexibility should be carefully balanced, also allowing for innovative approaches, such as new competitive contracting mechanisms (e.g. reverse auctions);
4. **Priority areas:** priority areas of intervention should be defined; for instance, the scheme could focus on EU priorities for ecosystem services (climate and biodiversity related) or take a more flexible approach to address regional/local needs; it could further focus its resources on areas where forests are under greater climate adaptation pressure (creating possibilities for improvements through adaptation), or areas of especially high demand for multiple ecosystem services (e.g. in densely populated areas);
5. **Timeframe:** generous time horizons and long-term contracts are needed for both ecosystem service delivery and forest owners' forward planning.

SUSTAINABLE CARBON CYCLES

[Yvon Slingenberg](#) (DG CLIMA Director – Directorate C) presented key aspects of the Commission's Communication on 'Sustainable Carbon Cycles', adopted in December 2021, and the latest steps taken by the Commission to support the upscaling of carbon farming, including the development of a new regulatory framework for the certification of carbon removals.

The EU will have to substantially increase its carbon removals in the coming years, because emission reductions alone will not be enough to achieve the ambitious objective of EU climate neutrality by 2050 as set by the Climate Law.

Targeted policies for carbon removals – including policies supporting carbon farming and the development of bio-based value chains – must be implemented to create new opportunities for the forestry sector, provide incentives for more climate-friendly practices, and create new sources of income for forest owners and managers.

Forests are key for delivering the EU's long-term climate objectives as they play a fundamental role for carbon sequestration and long-term storage with an estimated share of 47.5% of the total value of ecosystem services (9 times more than the value supplied by urban areas).

The Commission's Communication sets out an action plan to promote and upscale carbon farming in the EU and other sustainable solutions to increase carbon removals, including forestry-related removals. The Communication highlights the role of EU and national public

funding tools to finance carbon farming schemes, reducing the risks for land managers, including the CAP and State aid.

Land management takes time, soils are restored slowly, and planting and growing trees do not happen over night. Any policy framework therefore should offer a long-term perspective. Forest owners and managers who invest in biodiversity protection deserve to be rewarded and given visibility and recognition. The Commission is working to put in place the necessary measures to support them, encouraging the development of payment schemes for FES and carbon farming initiatives to facilitate investments and provide transparent, easy to access and appealing financial incentives, be it under public funding or through private markets.

In addition, the Commission is developing a regulatory framework for the certification of carbon removals and will present a legislative proposal by the end of 2022. The new rules will deliver a higher degree of transparency, methodology standardisation and environmental integrity. By setting robust criteria in relation to additionality, permanence and environmental safeguards and by defining the many benefits of carbon removals, it will constitute the first fundamental step to enable a reliable future carbon market.

The legal proposal will be preceded by an impact assessment. To involve stakeholders actively in this process, the Commission launched a public consultation open for feedback until 2 May 2022. In addition, a new Expert Group on carbon removals and certification is expected to be set-up in the coming months.

VALUATION OF FOREST ECOSYSTEM SERVICES

[Zuzana Sarvašová and Martina Štěrbová](#) (National Forest Centre, Slovakia, Members of the Expert Group on Valuation and Payments for Forest Ecosystem Services, Forest Europe - former Liaison Unit Bratislava) presented key outcomes of the work carried out by the Expert Group on Valuation and Payments for Forest Ecosystem Services, focusing on three main strands:

- i) analysis of different approaches and methodologies on Valuation and Payments for Forest Ecosystem Services in the Pan-European Region;
- ii) review of case studies and best practice examples of valuation methods and PES schemes implemented in signatory countries; and
- iii) formulation of recommendations addressed to policy makers.

The group was set-up under the Slovak Presidency of Forest Europe as a specific initiative to follow-up on the actions listed in the [2015 Madrid Ministerial Resolution 1](#) and in particular on the commitment to incorporate the value of forest ecosystem services into a green economy.

The work of the group resulted in the publication of a [study on different approaches and methodologies on PES valuation](#), and the creation of a searchable web portal serving as an interactive platform for knowledge and information exchange on forest ecosystem services, focusing on:

- 1) the direct and indirect benefits for humans from ecosystems and their preservation/restoration;
- 2) valuation approaches and methods, listed by type of FES and case studies; and
- 3) examples of payments for FES, based on 5 key principles:
 - a) voluntary commitment;
 - b) well-defined ecosystem services;
 - c) the beneficiaries pay;
 - d) direct payments to forest owners/managers; and
 - e) conditionality.

When developing PES, it is important to consider several aspects that can present both opportunities and challenges, particularly for trading. These include the prevailing market conditions and the existing regulatory framework. PES provide an opportunity to assign a price to previously un-priced ecosystem services and help raise awareness about environmental and climate issues. Through PES, rural communities can further develop, and gain access to new markets by selling their services. However, the schemes should be carefully monitored and controlled to make sure that payments go to those forest owners who are sustainably managing forests to provide ecosystem services to society.

[Alessandra La Notte and Ioanna Grammatikopoulou](#) (European Commission's Joint Research Centre (JRC)) presented the progress made by the Integrated Natural Capital Accounting (INCA) project launched by the European Commission in 2015 and developed by the JRC, DG ENV and DG RTD in partnership with Eurostat and the European Environment Agency.

The INCA project uses the global System of Economic Environmental Accounting – Ecosystem Accounting (SEEA EA) adopted by the UN Statistical Commission in March 2021, which provides a new statistical framework to help countries measure their natural capital. INCA aimed to pilot methods for developing nine different ecosystem accounts for the EU. It integrates economic and environmental data to offer a more comprehensive view of the interrelationships between the economy and the environment. The outcomes provided a useful basis for the further development of the SEEA EA framework.

The INCA approach allows the ecological side of ecosystem services (supply) to be linked with the socio-economic side (demand). The match between supply and demand corresponds to the actual flow or use of an ecosystem service that is depicted in two tables: the supply and the use table which are compiled for a specific accounting period in both physical as well as in monetary terms. This system enables an assessment of what proportion of the ecosystem service value is allocated to forests. It can also show a dependence indicator, providing for instance information on the percentage of the value that is taken by a particular sector (e.g. dependency of forestry sector on ecosystem services).

There is no 'one size fits all' valuation method, different ecosystem services may require different methods, however methods based on observed prices and costs seem to be the most

reliable. Ecosystem accounts can be very useful for the design of PES, providing monetary reference values of each service (such as the value of ecosystem services provided by woodland and forest), that can be compared with the opportunity costs and inform the calculation of the payment rate.

MAIN OUTCOMES OF PARALLEL BREAK-OUT GROUP DISCUSSIONS

Break-out Group 1: Payments for Ecosystem Services in Forests in the EU, with a focus on public funding schemes.

Introduced by two examples of public PES schemes provided by:

1. [Terhi Koskela](#), *Natural Resources Institute – The Finnish experience with public PES schemes*
2. [Ante Kaliger](#), *Ministry of Agriculture – The Croatian experience with public PES schemes*

- Public schemes – as in the experience of Finland – can successfully encourage trust and collaboration between different stakeholders, raising awareness, promoting joint efforts and supporting the creation of value chains, essential preconditions to preserve forests and deliver ecosystem services.
- In the Croatian experience, the public payment scheme, introduced already back in 1991, works similarly to a tax and the financial resources collected are used exclusively to fund the public goods delivered by forest managers/owners. This direct link established between the ‘FES fee’ and the public goods helps increase public awareness about the results of the projects financed by scheme and their benefits for society. Without such a scheme it would be hard to continue preserve and restore forest ecosystems (especially in the karst area) and many jobs would be lost.
- One of the key questions is what should be funded through public funds and that also depends on the different local contexts: given the diversity of forests across the EU, and also the diverse cultural backgrounds, different solutions are needed in different countries to promote and maximise the use of Payments for Ecosystem Services. There is not a ‘one-size-fits-all model’.
- Another key issue is whether payments using public money should support the costs of the management carried out by forest managers to provide ecosystem services or based on the value of the ecosystem services provided. As for the beneficiaries, there is a wide-spread consensus about rewarding forest managers and not simply the forest owners.
- When designing public payment schemes for Forest Ecosystem Services, one further key consideration is that these should not lead to negative effects or the degradation

for other ecosystem services. Safeguard clauses should be included in the schemes to avoid such risks.

- To be sustainable and successful, payment schemes should be designed to match as far as possible the actual forest cycle. Forest management requires a long-term perspective and this must be factored into any scheme.
- Transparency should be ensured at all stages, in the designing of PES and their implementation, involving stakeholders and informing the public about the use made of public money and the benefits resulting from the supported schemes.
- Finally, to further promote the upscaling of PES it is important to support the piloting of different approaches on the ground, and facilitate the exchange of data, knowledge and experience across the EU, including lessons learned and examples of good practices and difficulties encountered.

Break-out Group 2: Payments for Ecosystem Services in Forests in the EU, with a focus on private funding schemes.

Introduced by two examples of private PES schemes provided by:

3. [Asger Olesen](#), *Chief Climate and Ecosystem Officer, Forest Stewardship Council International (FSC)*
 4. [Olivier Gleizes](#), *Label Bas Carbone, Centre national de la propriété forestière (CNPF), France*
- The Forest Stewardship Council developed a private Ecosystem Service Procedure, applied globally and implemented in different EU Member States, working as an add-on to the FSC Forest Management certification for the quantification of ecosystem services' impacts on land, so that positive changes can be quantified and sponsored – however this is not an offsetting scheme. The procedure, currently involving 42 forest managers and covering some 840 thousand hectares worldwide, provides a framework for validation and labelling, through which forest managers and companies can buy the right to make verified statement on their actual impacts on ecosystems. Six types of statements/claims were developed, covering carbon, biodiversity, water, soil, and recreation.
 - In France, the National Forestry Center (CNPF) developed a low-carbon standard certification scheme for voluntary off-setting, applicable to private companies as well as public bodies. The scheme, recognised by the French government, allows for the certification of the CO₂ sequestration of forest management projects. The scheme relies on three different forest methodologies covering respectively: i) afforestation (of agricultural land or abandoned land); ii) reforestation of destroyed forests; iii) conversion of coppice to high stand. The project is based on the following key criteria: additionality; monitoring of levels of CO₂ sequestration; verification (audit) by a third party; traceability of carbon; permanence of carbon sequestration; delivery

of social and environmental co-benefits (including benefits for biodiversity, water, soil protection and local employment).

- Key advantages of private payment schemes for ecosystem services are: i) a greater flexibility in possible design options, including the combination of different financial instruments, and tailored eligibility criteria to address specific ecosystem services and better reflect their complexity; ii) the potential of covering several types of costs (beyond the costs that can be covered through public schemes); iii) the possibility of relying on different governance structures, involving a variety of stakeholders, including private investors and sponsorship.
- On the other hand, the main challenges to the implementation of private PES are: i) ensuring a reliable valuation of ecosystem services; ii) facing long-term maintenance costs; iii) implementing a reliable system for measuring, reporting and verification (MRV). These could be addressed by: i) relying on a combination of ecological and economic valuation methods (the INCA and the SEEA EA frameworks are a good example of such an integrated approach); ii) exploring public-private financing possibilities; iii) improving the robustness of certification (e.g. relying on the upcoming EU certification of carbon removals).
- The further upscaling of private PES could be supported by: i) promoting greater synergies and between the available public funding tools (e.g. CAP, LIFE Programme, State aid); ii) relying on the activities of existing public stakeholder networks (such as the ENRD, the EIP-AGRI and the future CAP Network) to share and disseminate knowledge and good practices; iii) providing specific support for knowledge and advice as a mandatory component of the scheme.

Results of Break-out Group 2 polls and further feedback collected through Mentimeter

Break-out Group 2: Private PES – Polls

Figure 1

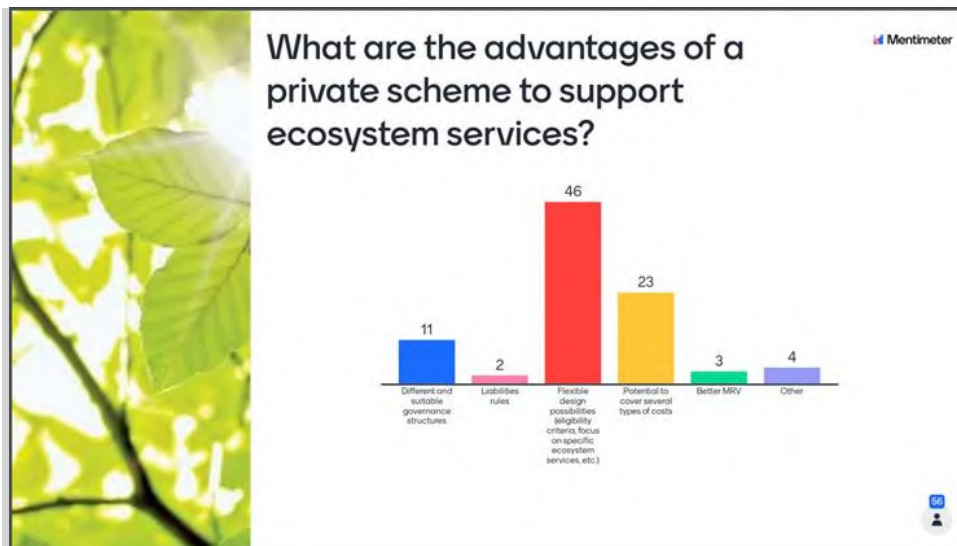


Figure 2

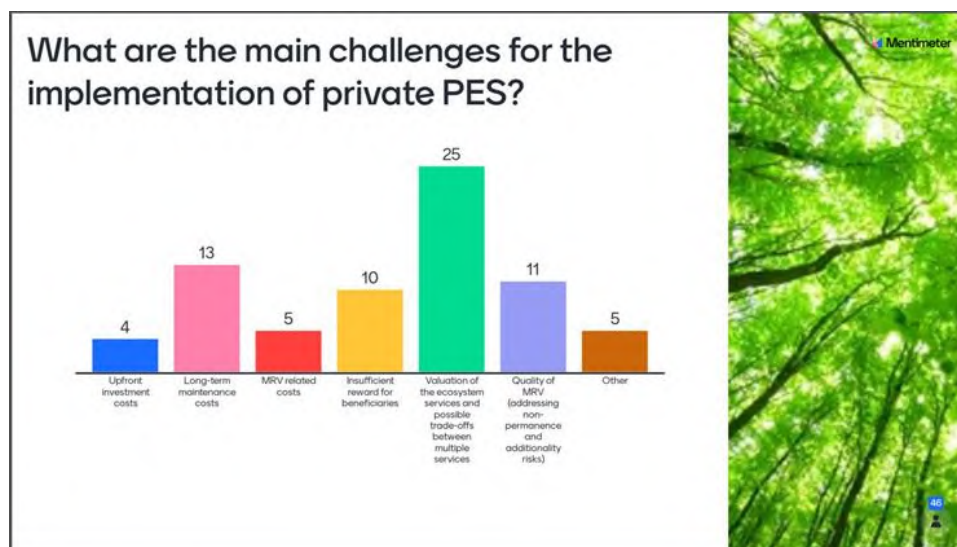
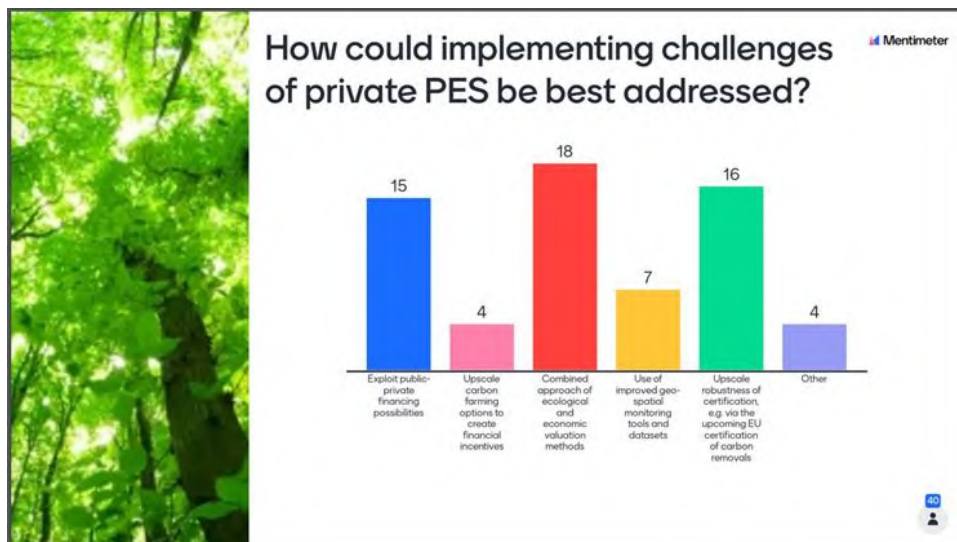


Figure 3



Closing plenary – Further comments and take-home messages

Any further comments? / What is your take-home message?

Focus PES in sustainable forest management and not in strict protection. Forest need management. How to avoid greenwashing.

Forest PES issue is growing in the EU (it is a start)

principles at EU level and local applications for PES

The discussion has shown the complexity of this topic. Invite and learn from the key stakeholders, in particular foresters, to design the PES


Take also paying for habitat destruction/loss on board

Sharing best practices by using case examples

An ever growing topic, but it's complex and complicated.

I am worried about the overlapping of private and public initiatives in the forest Carbon market

Public and private forests will require different approach. Public forests can easily be limited in terms of various management action incl. strict protection and close to Nature forestry



Any further comments? / What is your take-home message?

A complicated issue that has already been discussed several times but a long way to go. The meeting was good and beneficial.

The ideas and models for payment schemes for Forest Ecosystem Services are rather diverse, "one size fits all" - not an appropriate solution

Further considerations should take into account provisioning services as well, since today's meeting focussed on Carbon removal and biodiversity

In relation to payment for ES which does not have a market value, new payment models can provide new opportunities.


PES should not serve as a greenwashing tool under a false pretence of nature protection

I agree, that one size does not necessarily fit all countries.

For private PES an important missing factor is the 'tragedy of the commons'. In fact it is a form of charity and will be restricted to that 'market'. Many citizens view ecosystem services the role of government and will not participate.

Holistic approach is needed for evaluation of all services of forests including ecosystem services and other socio-economic needs.

PES Flexible schemes are needed to include all the types of forest: production, conservation and strictly protected. Private Landowners must be included in this development process.



Any further comments? / What is your take-home message?

Idea about combined approach to the issue

Regional specificities, forest multifunctional aspects are importance and possibility of MS to finance PES.

this has shown to be a complex topic that needs of a transparent and participatory discussion. One size does not fit all, please do not forget this.

PES are about providing new opportunities and income streams for foresters, not about restrictions and red tape.


Accounting sounds very complex

The cross balance between cost versus profits should be accounted when designing ecosystems payments.

Member States / regional conditions have to be taken into account.

Any initiative must fully respect the diversity of forests, forest management systems and property rights. One size will not fit all

PES within SFM is the key to stay in a balanced serving all society related services including wood production. PES should not be used to additionally enlarge the strictly protected areas.



Mentimeter

Event webpage: https://enrd.ec.europa.eu/news-events/events/commission-workshop-public-and-private-payments-forest-ecosystem-services_en

ANNEX II - Definitions for each method (UN, 2021 ⁶⁵)

A **resource rent or net factor income** method estimate a value for an ecosystem service by taking the gross value of the final marketed good to which the ecosystem service provides an input and then deducting the cost of all other inputs, including labour, produced assets and intermediate inputs.

A **productivity change or production function method** the ecosystem service is considered an input in the production function of a marketed good. The value of the service is derived in three stages. First, the marginal product (contribution) of the ecosystem service is estimated as the change in the value of production consequent upon a marginal change in the supply of the ecosystem service. Second, the marginal product is multiplied by the price of the marketed good to derive a marginal value product for the ecosystem services. Third, this marginal value product is multiplied by the physical quantity of the provided ecosystem service to obtain the value of the ecosystem service.

The **hedonic pricing** estimates the differential premium on property values or rental values (or other composite goods) that arises from the effect of an ecosystem characteristic (e.g., clean air, local parks) on those values.

The **averting behaviour method** assumes that individuals and communities spend money on preventing or mitigating the negative effects and damages caused by adverse environmental impacts. The revealed expenditure demonstrates the value placed on the associated ecosystem services.

The **travel cost method** is commonly used in economics to estimate the value of recreational areas based on the revealed preferences of visitors to the site. A demand function for recreation is estimated by observing the actual number of trips that take place at different costs of travelling to a recreational or cultural site and assuming that people hold similar preferences with respect to visiting the site.

The **replacement cost method** estimates the cost of replacing the ecosystem service by something that provides the same contribution to benefits. It is also known as the substitute cost or alternative cost approach.

The **avoided damage costs** method estimates the value of ecosystem services based on the costs of the damages that would occur due to the loss of these services. Similar to replacement costs, the focus will generally be on services provided by ecosystems that are lost if the ecosystem were not present or was in sufficiently poor condition such that the services were not available.

The **simulated exchange value** method estimates the price and the quantity that would prevail if the ecosystem service were to be traded in a hypothetical market. The method is

⁶⁵ United Nations et al., *System of Environmental-Economic Accounting: Ecosystem Accounting*, white cover pre-edited version of 29 September 2021. Available at: <https://seea.un.org/ecosystem-accounting>

applied by using results from demand functions for the relevant ecosystem service. These are used to calculate the price for the ecosystem service that would occur if it was actually marketed. This requires combining the information on the demand function with a supply function and an appropriate market structure.

The **surrogate price** method is a price-based method because market prices for the specific ecosystem service are not observable, valuation is performed using market price equivalents.

The **contingent valuation** method is a survey-based stated preference technique that elicits people's behaviour in constructed markets. In a contingent valuation questionnaire, a hypothetical market is described where the good in question can be traded. This contingent market defines the good itself, the institutional context in which it would be provided, and the way it would be financed. Respondents are asked about their willingness to pay for, or willingness to accept, a hypothetical change in the level of provision of the good, usually by asking them if they would accept a particular scenario.

The **choice experiment method** is a method where an individual is offered a set of alternative levels of supply of goods or services (typically two or three), in which the characteristics vary according to defined dimensions of quality and cost. It has the same perspective as the contingent valuation method.

The **benefit or value transfer method** utilizes data from specific locations in the estimation of monetary values in other location. It may entail values from all categories of valuation methods, direct and indirect. There are two main approaches to transfer: unit value transfers and value function transfers. Value function transfers may be further disaggregated into subgroups, including 'meta-analysis' function transfers.

ANNEX III

1. Projects under Horizon 2020

Spurring INnovations for Forest ECosystem SERvices in Europe (SINCERE) project⁶⁶

SINCERE project (2018-2022) developed innovative policies and new business models by connecting knowledge and expertise from practice, science and policy, across Europe the EU and beyond.

Based on results from SINCERE and insights from the ERA-NET project **NOBEL** (see below) and the Horizon 2020 project **CLEARING HOUSE** four pathways were outlined⁶⁷ to better align landowner incentives, stakeholder interests and societal objectives with forest ecosystem services in the EU by means of:

- 1) an integrated policy framework to ensure that various forest policies at the EU and Member State levels do not impede each other, but work together in a manner that supports the management of the EU's forests for multiple forest ecosystem services;
- 2) the development of an EU-wide system for payments for forest ecosystem services that can significantly advance the provision of such services;
- 3) encouragement of, and support for, innovation for the provision of multiple forest ecosystem services across the EU, through stakeholder engagement, and networking across sectors and policy levels;
- 4) improvements to the system for monitoring the supply of, and demand for, forest ecosystem services –, especially for regulating services (e.g. habitat provision and improvement of air quality) and cultural services (e.g. education and recreation).

Smart information, governance and business innovations for sustainable supply and payment mechanisms for forest ecosystem services (InnoForEst) project⁶⁸

InnoForEst project examined the delivery of forest ecosystem services and promoted the development of innovative policy, management, and business solutions.

SINCERE and InnoForEst have developed a range of recommendations in order to:

- gain knowledge about successful best- practice solutions in the EU, and to engage local stakeholders and build the capacity for exchange and learning;

⁶⁶ <https://sincereforests.eu/>

⁶⁷ Winkel G., Lovrić M., Muys B., Katila P., Lundhede T., Pecurul M., Pettenella D., Plieninger T., Prokofieva I., Parra Novoa C., Püzl H., Roitsch D., Jellesmark Thorsen B., Tyrväinen L., Torralba M., Vacik H., Weiss G., Wunder S., 2022. Governing Europe's forests for multiple ecosystem services: opportunities, challenges, and policy options. <https://doi.org/10.5281/zenodo.6393968>

⁶⁸ <https://innoforest.eu/>

- create platforms for exchange between scientists, practitioners, policy makers, and further stakeholders at different levels;
- offer practitioners a business and marketing strategy development course, that allows them to integrate social, economic and ecological components to create and deliver a triple- value proposition;
- effectively integrate the role of forests and their ecosystem services across the range of EU policies (e.g. the EU Biodiversity Strategy and the European Green Deal as well as the future common agricultural policy) where forests are of highest importance in addressing climate change and biodiversity loss;
- provide climate- financing opportunities that are coupled with returns for forest owners and managers so they can ensure the provision of ecosystem services;
- pay attention to socio-political settings and demonstrate genuine interest in people in order to create trust and explore action pathways;
- empower and enable local stakeholders to take action and actively shape the process. This can be achieved by providing technical support and expert knowledge for process facilitation (particularly the guided/joint establishment of local/ regional platforms for stakeholder engagement, exchange and learning the guided implementation of agile management, learning and innovation frameworks);
- tie funding to the clarification and transparency of the relationship between the innovative governance mechanism, forest management, and the provision of forest ecosystem services.
- develop upscaling mechanisms by: transferring, taking up and adapting of ideas and knowledge from elsewhere (D 6.2 ⁶⁹);
- organise a structured stakeholder- network building process for mutual learning and exchange beyond the local and regional levels (i.e. facilitate these processes at the national and EU levels).

NOBEL – Novel business models and mechanisms for the sustainable supply of, and payment for, forest ecosystem services project ⁷⁰

⁶⁹ D6.2 Interim Report on Replicability and Upscaling Potentials of Governance Innovations (favoring provisioning and financing of forest ecosystem services).

⁷⁰ <https://nobel.boku.ac.at/>

The project, which lasted from 1 February 2019 to 31 January 2022, assessed the current and future role of marketable and non-marketable forest functions, goods and services (i.e. forest ecosystem services) and developed strategies and mechanisms for their sustainable provision.

The project identified four policy pathways to align forest ecosystem services provision and demand ⁷¹:

Pathway 1: systematically monitor the supply of, and demand for, forest ecosystem services by: combining monitoring technologies (e.g. remote sensing, national forest inventories and citizen science approaches) to compile spatially explicit data on ecosystem services' supply and demand that is meaningful for policymakers, society and forest owners, and by monitoring developments over time.

Pathway 2: facilitate enhanced policy integration by managing the diversity of views and related interests regarding forests by: a) giving access to the policy-making process to all forest-related societal groups, b) aligning agreed policy objectives with policy instruments, c) monitoring policy implementation, and d) adopting policies accordingly.

Pathway 3: develop payments for ecosystem services (PES) by: considering whether to establish a forest-focused European PES system characterised by a) a focus on key priority ecosystem services, b) stable (public/ private) finance sources (e.g. by redirecting money), c) space for innovative designs (e.g. reverse auctions), d) priority areas such as landscapes with high potential for ecosystem services provision or high societal demand, and e) a long-term commitment plus monitoring and compliance mechanisms.

Pathway 4: enable bottom-up participation and learning among innovators by facilitating participatory, bottom-up processes at the regional and local levels to map out priorities and identify potential conflicts; and by using transnational networking to improve learning by forest owners and managers who are developing ecosystem services-related innovations.

The project also identified six challenges associated with the four pathways.

Challenge 1 (imprecise information on demand and supply): information on forest ecosystem services has improved in recent decades, but still mostly focuses on wood production (especially at the local and regional levels). There is no systematic information on societal demands on forest ecosystem services in the EU.

Challenge 2 (increasing pressure to adapt to climate change): climate change is having an increasing impact on the EU's forests, but the required adaptation is creating new threats and opportunities for ecosystem services provision.

⁷¹ Winkel, G., Lovrić, M., Muys, B., Katila, P., Lundhede, T., Pecurul, M., Pettenella, D., Pipart, N., Plieninger, T., Prokofieva, I., Parra, C., Pülzl, H., Roitsch, D., Roux, J-L., Thorsen, B.J., Tyrväinen, L., Torralba, M., Vacik, H., Weiss, G., Wunder, S.. 2023. How to govern Europe's forests for multiple Forest Ecosystem Services? Policy Brief 3. European Forest Institute.

Challenge 3 (lacking policy integration): there is a tendency towards polarisation in EU forest policy between environmental/ conservation concerns and forest- use interests. This, in turn results in disputes over competences, inhibiting compromise seeking, and the development of effective policy- mixes for multiple forest ecosystem services.

Challenge 4: (ambiguous regulatory frameworks): conflicting interests translate into ambiguous and partially conflicting regulatory frameworks, as well as strikingly different assignments of property rights across countries that may constrain forest owners' options to innovate.

Challenge 5: (misalignment of supply and societal demand): society prioritises forests as habitats for species or places for nature recreation, but forest owners generate most of their income from wood.

Challenge 6: (diversity constrains one-size-fits-all solutions): forests and forest management practices vary widely across the EU (e.g. there are significant regional variations in the intensity of wood harvesting and in forest-related risks such as fire). This underlines the need to translate EU policy frameworks into regionally adapted forest policy mixes.

HoliSoils – Holistic management practices, modelling and monitoring for European forest soils⁷²

The project (2021-2025) provides an improved, integrated, and harmonised monitoring and modelling framework for forest soils across Europe. The project aims to improve the understanding of the role of forest soils in the global climate through carbon storage and emissions and removals of greenhouse gases (GHG). It provides support and training on standardised sampling and monitoring protocols for land use and forestry experts who work on GHG inventories. It also provides guidance to forest owners and managers, as well as decision makers, extension services and industry, on Climate-Smart Management options for forest soils.

ALTERFOR - Alternative models and robust decision-making for future forest management⁷³

The project (2016–2020) explored the potential to optimize forest management models currently in use in different forested areas in European countries. The international consortium of scientists and forestry practitioners examined alternative forest management models (FMMs) in ten case study areas. Each area represented different forest management practices and socio-ecological conditions across Europe. The project aimed to provide deep knowledge regarding alternative FMMs and how they can affect the provision of ecosystem

⁷² <https://holisoils.eu/>

⁷³ <https://alterfor-project.eu/>

services. It involved relevant actors from different fields (such as forestry, nature conservation, renewable energy, and water management) and facilitated efficient knowledge transfer to adopt alternative FMMs.

2. Projects under Horizon Europe

FORWARDS — The ForestWard Observatory to Secure Resilience of European Forests

⁷⁴

The project (2022–2027) will prototype the ForestWard Observatory, a pan-European monitoring and evaluation tool that will help demonstrate the impact of climate change on forests, and support decision-making: 1) at European and national scale to provide a strategic perspective of disturbances, future risks, and critical vulnerabilities and threats to European forests; and 2) at regional and local scale to deliver more operational information for local climate-smart forestry (CSF) and restoration management practices. Forests and society can transform, mitigate and adapt to climate-induced changes thanks to CSF. The project will develop tools for pan-European and spatially explicit projections on forests and for regionalised CSF and restoration roadmaps. The aim is to evaluate synergies and trade-offs regarding conversion and restoration activities.

The eco2adapt — Ecosystem-based Adaptation and Changemaking to Shape, Protect and Maintain the Resilience of Tomorrow's Forests ⁷⁵

Forests can be destroyed through climatic events such as storms or drought, or attacked by pests and pathogens, leaving a devastated landscape and despairing local populations. The project (2022–2027) will develop the ecosystem-based adaptation framework derived from nature-based solutions and work in Living Labs located in climate hotspots in Europe and China. The project proposes a portfolio of adapted management solutions and innovative bioeconomic and governance business models, including insurance, governance and certification, for stakeholders to interact differently with a multifunctional social-ecological forest system at a regional scale. They will also provide a suite of cutting-edge tools to monitor forest vulnerability and resilience (such as invasive species and biodiversity) for use by diverse societal groups, from the citizen to the policy-maker. By including tailored communication to all levels of society, they will reach out to a broad audience with the capacity to cause positive change.

informa — Science-based integrated forest management for climate mitigation ⁷⁶

⁷⁴ <https://forwards-project.eu/>

⁷⁵ <https://www.eco2adapt.eu/>

The project (2022–2026) aims to deliver meaningful knowledge and applicable solutions. The project pairs up technological tools such as satellite imagery, data mining, and climate and ecosystem modelling with participatory approaches. This way, it will bridge the gap between stakeholders working in the field and science, policy, carbon markets and society in general. This will be done while considering various types of forest-climate interactions and the provision of other ecosystem services such as biodiversity conservation and sustainable forest products. Carbon offsetting and voluntary carbon markets, based on carbon certifications, can provide an important incentive to promote climate-compatible practices in forestry. The project explores schemes launched in Europe to generate credits from reforestation, afforestation, and other forest projects. Informa will transfer insights and propose methodological improvements to existing and future carbon certification schemes, carbon monitoring programmes, networks, and tools to help create long-term economic incentives for sustainable forest management.

ForestPaths — Co-designing holistic forest-based policy pathways for climate change mitigation⁷⁷

The project (2022 – 2027) will provide clear policy pathways that outline alternative trajectories for how European forests and the forest-based sector can help climate change mitigation, while conserving their biodiversity and sustaining ecosystem services. Across-the-board stakeholders, such as forest owners, practitioners, researchers and policymakers, will be engaged in four demo cases and four policy labs to co-design and evaluate policy pathways, which will be quantified through next-generation integrated assessment techniques. The generated policy pathways will be available on ForestPaths’ interactive CANOPY policy support platform, tailored for use by national and regional European authorities.

Opt4EU - OPTimising FORest management decisions for a low-carbon, climate resilient future in Europe⁷⁸

The project (2023-2027) will support EU forests in their capacity to mitigate and adapt to climate change. The project applies from science to practice logic, with a user-centred Decision Support System (DSS) assisting decision-making in 8 case studies. 16 partners from 9 countries will work together on management practices, ecosystem service provision and CO₂ sink provided by forests, enhancing forest resilience and its capacities to mitigate climate change. The project aims to produce ready-to-use service near to operational at European level, while a user adoption and up-take plan will maximise the societal and business impact.

⁷⁶ <https://informa-forests.eu/>

⁷⁷ <https://forestpaths.eu/>

⁷⁸ <https://optforeu.eu/>

2. Topic calls in Horizon Europe Work Programme 2023-2024

HORIZON-CL6-2023-BIODIV-01: integrative forest management for multiple ecosystem services and enhanced biodiversity⁷⁹

The total indicative budget for the topic is EUR 7 million (one project is to be funded). This topic addresses integrative forest management strategies that optimise actively managed forest ecosystems in such a way that the ecological and socio-economic functions are sustainable and economically viable.

The aim is to improve the understanding of how integrative forest management concepts (e.g. close-to-nature forestry, continuous cover forestry and retention forestry) are currently applied in the EU; their implications for the environment and biodiversity, society and the forest-based economy; and how to accelerate the implementation of innovative approaches through targeted and evidence-based guidelines and tools.

HORIZON-CL6-2024-BIODIV-01-8: conservation and protection of carbon-rich and biodiversity-rich forest ecosystems⁸⁰

The total indicative budget for the topic is EUR 12 million (two projects are to be funded). Successful proposals will support the protection of biodiversity-rich forest ecosystems, at the species' distribution rear edges and margins that are at a high risk of collapse due to the rapidly changing climate. The project must implement the multi-actor approach and ensure adequate involvement of the primary production sector and the wider forest-based value chain.

HORIZON-CL6-2023-GOVERNANCE-01-7: integrated assessment of land use and biomass demands to contribute to a sustainable, healthy and fair bioeconomy⁸¹

The total indicative budget for the topic is EUR 4 million (one project is to be funded). The objectives of the successful proposal will include seeking to understand and identify factors that determine land management practices and enable nature-based solutions that maximise the co-production of ecosystem services, biodiversity restoration and preservation, enhanced climate mitigation and net primary production.

⁷⁹ Deadline for proposals: 28 March 2023.

⁸⁰ Deadline for proposals: 22 February 2024.

⁸¹ Deadline for proposals: 23 March 2023.

HORIZON-CL6-2023-CircBio-01-13: capturing market trends and societal perceptions for tailor-made forest services⁸²

The total indicative budget for this call topic is EUR 12 million (two projects are to be funded). This topic addresses the increasing demand on the EU's forests to provide a highly diverse set of goods and ecosystem services, and the resulting opportunities for primary producers to diversify and enhance their incomes through the valuation of ecosystem services.

Project results are expected to contribute to outcomes that include the following:

- improved integrated management concepts with a focus on market-oriented approaches to meet the growing demand for ecosystem services (including carbon removals through carbon farming);
- development of decision support and management tools (including digital technologies such as Artificial Intelligence (AI), sensors and robotics) that will facilitate the joint delivery of multiple ecosystem services;
- increased long-term resilience of forest production and use- systems and associated value chains;
- improved guidelines on carbon farming and payment for ecosystem services design and implementation in Europe the EU formulated and implemented.

HORIZON-CL6-2023-CircBio-01-12: optimising the sustainable production of wood and non-wood products in small forest properties and development of new forest-based value chains⁸³

The total indicative budget for this topic is EUR 12 million (two projects are to be funded). This topic addresses sustainable production potentials with a view to securing and promoting small-scale forest management for the sustainable use of wood and non-wood products, while also fully respecting the 'cascading- use' principle and contributing to biodiversity objectives (including forest ecosystem restoration and protection). The project will help to improve guidelines on carbon farming and PES (Payment for Ecosystem Services) design and their implementation in the EU formulated and implemented.

HORIZON-CL6-2023-CircBio-01-14: monitoring the multi-functionality of European forests⁸⁴

⁸² Deadline for proposals: 28 March 2023.

⁸³ Deadline for proposals: 28 March 2023.

⁸⁴ Deadline for proposals: 28 March 2023.

The total indicative budget for this topic is EUR 4 million (one project is to be funded). This topic addresses the design of a comprehensive forest information system that aligns information on forest state, ecosystem services (including biomass) provision and demand for socio-economic ecosystem services.

The project will, among other outcomes, develop a list of parameters relevant to the monitoring of a range of forest ecosystems services.

HORIZON-MISS-2023-SOIL-01-09: Carbon farming in living labs⁸⁵

The total indicative budget for the topic is EUR 12 million. This topic will set up four to five living labs (or more) to work together on carbon farming, covering one or several land use types. The living labs shall be located in at least three different Member States and/or Associated Countries.

The aim is to increase carbon sequestration and protection of carbon in soils, living biomass and dead organic matter, with environmental co-benefits safeguarded or enhanced, in different regions within the EU and Associated Countries where the selected living labs are operating.

⁸⁵ Deadline for proposals: 20 September 2023.

ANNEX IV - LIFE projects

Innovative forest management strategies to enhance biodiversity in Mediterranean forests. Incentives and management tools⁸⁶

This project (2018-2023) aims to improve the biodiversity of Mediterranean forests, including through the development of innovative financing mechanisms (including quantification methods and land stewardship tools) to compensate forest owners for the loss of income caused by biodiversity restoration practices.

CLIMARK — promotion of forest management for climate- change mitigation through the design of a local climate credit market⁸⁷

The project (2017-2022) tested a local ‘climate credit’ market as a tool to incentivise multifunctional forest management that focuses on climate- change mitigation. The valuation of carbon sink capacity, water use efficiency and biodiversity formed the conceptual basis of the market. Forest owners were brought together with companies that wanted to offset their ecological footprint. The companies purchased climate credits to fund all or part of a forest project. The project successfully generated revenue for forest owners while reducing the risk of megafires, rejuvenating carbon sinks for sequestration, and improving water provision and biodiversity in the region. Its success prompted the Catalan government to adopt a legal agreement to formally establish the credit market.

CO2PEF and PES⁸⁸

The project (2020-2023) was set up to promote and support the forest ecosystems in carbon storage, and to prevent fire and windthrow risks (including through the analysis of ecosystem services in three forest areas located in the Alpine and Tosco-Emiliano Apennines regions and their economic evaluation). The results will be used when creating, certification and credit systems to finance the provision of forest ecosystem services.

FOREST CO₂, assessment of forest-carbon sinks and promotion of compensation systems as tools for climate change mitigation⁸⁹

The project (2016-2021) modelled and accounted CO₂ emissions and carbon sequestration resulting from sustainable forest managements systems. The purpose was to support forest

⁸⁶ <https://lifebiorgest.eu/en/home-2/>

⁸⁷ <https://lifeclimark.eu/en/>

⁸⁸ <https://lifeco2pefandpes.eu/en/objectives/>

⁸⁹ <https://lifeforestco2.eu/life-forest-co2-project/?lang=en>

management projects as tools for mitigation, through the implementation of carbon footprint management systems, with the ultimate aim of compensating companies in the non- EU-ETS regulated sectors, as well as public and private organisations.

Making Good Natura — making the of public goods provision the core business of Natura 2000⁹⁰

The project (2016-2020) developed valuation methods and innovative environmental governance approaches based on self-financing for ecosystem services (e.g. through permits, usage tax, carbon sequestration, commercial activities or and donations) in Natura 2000 study sites. Results include a free online software webGIS for the valuation and quantification of ecosystem services⁹¹ and a manual for the valuation of ecosystem services and implementation of payment for ecosystem services schemes in agricultural and forest landscapes⁹².

ProForPES —promoting effective forest payment for ecosystem services (PES) through the EU’s financial and state aid programmes⁹³

Building on the experiences of key payments for forest ecosystem services Horizon projects (SINCERE, InnoForESt, and Nobel), the LIFE ProForPES project (2023-2025) aims to collect, synthesise and to integrate the knowledge and the know-how already present at the national and EU levels on PES and PES-like schemes. The strengths and weaknesses of the selected cases will be investigated using an assessment framework that will be developed for the project. The project will also investigate the readiness and potential to integrate PES and PES-like services within the EU’s financial programme and the state aid framework through an in-depth institutional analysis of the existing gaps and potential within the two frameworks.

⁹⁰ <http://www.lifemgn-serviziecosistemici.eu/>

⁹¹ <https://www.lifemgn-serviziecosistemici.eu/EN/results/Pages/se0.aspx.html>

⁹² https://www.lifemgn-serviziecosistemici.eu/EN/Documents/LIFE+MGN_Manual_EN.pdf

⁹³ <https://webgate.ec.europa.eu/life/publicWebsite/project/details/101086509>