STRATEGIES TO SCALE-UP PAYMENTS FOR ECOSYSTEM SERVICES

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Executive Summary

- **Ecosystems provide numerous ecosystem services**, which remain essential to humankind's prosperity and societal welfare. There is increasing attention for ecosystem services from both policymakers and academics. Target 19 of the Global Biodiversity Framework (GBF) specifically calls for *"stimulating innovative schemes such as payment for ecosystem services, green bonds, biodiversity offsets and credits, and benefit-sharing mechanisms, with environmental and social safeguards"* to increase financial resources for biodiversity conservation. Preparing for COP16 in Colombia, the need for strategic action to achieve the targets set by the GBF is critical.

- Financial institutions are dependent on these services, and as such, have a unique position to be a driving force in the transition to a green economy. In the past, finance was always undertaken from the financial institutions' perspective, rather than from **the perspective of ecosystems**. However, more and more financial institutions are starting to understand the value of the resources provided by ecosystems and their services. The Ecosystem Services Valuation Database (ESVD) for example contains a wealth of information on the monetary value of ecosystem services from all over the world. Frameworks such as the Taskforce on Nature-related Disclosures (TNFD) and the Partnership for Biodiversity Accounting Financials (PBAF) provide financial institutions and companies with essential guidance on risk, impact, and dependency assessments.

- There are three types of ecosystem services: **provisioning, cultural, and regulating ecosystem services**. These services differ in **terms of scale, time, how they are financed and value.**

    - Regulating ecosystem services are essential for the continued existence of provisioning and cultural ecosystem services.
    - Regulating ecosystem services take into account the locality of nature and are site-specific. In addition, regulating ecosystem services occur at a more regional scale than provisioning and cultural ecosystem services. Regulating ecosystem services therefore require a landscape scale – land owners need to work together to ensure the proper functioning of the regulating ecosystem services.
    - The benefits of regulating ecosystem services accrue over a longer time period than those of provisioning and cultural ecosystem services and are seen as a public good.
    - Regulating ecosystem services do not have a direct revenue model, and they are managed (and financed) by public authorities and local communities.
    - Regulating ecosystem services are often given a higher monetary value than provisioning and cultural ecosystem services. These high values of regulating ecosystem services reflects their vital role for both humanity and the ecosystem's overall well-being. The value of ecosystem services can be of use in decision-making processes of governments, NGOs and financial institutions to achieve the targets of the GBF.

- Based on these differences in terms of value, scale, time and how they are financed, different strategies are proposed for scaling up payment of regulating ecosystems. These strategies are based on actions that both the private and public sector separately, as well as in collaboration with each other through blended finance strategies:

    1. Creating **nature positive markets for provisioning and cultural ecosystem services**. By making these ecosystem services more nature positive, the negative impact of over-exploiting these services will be reduced. It also calls for KPIs for regulating ecosystem services.
    2. Creating **coherence and synergies between publicly financed regulating ecosystem services**. It asks for redirecting harmful financial flows and bundling public funds to avoid trade-offs between sustainability themes such as climate, biodiversity and water.

3. **Blended finance strategies based on the interconnectedness of ecosystem services**. By engaging financial institutions that require long-term investments, the pressure of over-exploiting provisioning and cultural services is reduced. As a result, their impact on regulating ecosystem services is also minimized.

- **Some concluding remarks**:
  - The National Biodiversity Strategy and Action Plan (NBSAP) and National Biodiversity Finance Plan (NBFP) are an opportunity to bring policy coherence with regulating ecosystem services at its basis. Governments should look for synergies in existing funding for ecosystem services in policies and programs that have to do with nature, climate adaptation and water management. Bundle funding sources and use them more efficiently. Search for synergy with other sustainability themes through regulating ecosystem services.
  - Blended finance schemes for regulating ecosystem services can help mobilize the private sector and scale up PES.
  - Regulating ecosystems can be used as a way to define the term 'nature positive'.

Contents

Glossary

This glossary provides definitions and explanations of the main concepts discussed in this paper. As far as possible, these definitions and explanations are aligned with definitions and explanations already provided by organizations such as the Convention on Biological Diversity (CBD), the Netherlands Central Statistics Bureau (CBS), the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystems (IPBES) and the International Union for the Conservation of Nature and Natural Resources (IUCN).

Concept	Definition	Source
Biodiversity	The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.	CBD
Blended finance	The strategic use of development finance for the mobilisation of additional finance towards sustainable development in (developing) countries.	World Economic Forum (WEF)
Cultural ecosystem services	The nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experience, including, knowledge systems, social relations, and aesthetic values.	IPBES
Ecosystem	A dynamic complex of plants, animals, and microorganisms, and their non-living environment, interacting as a functional unit (e.g. deserts, coral reefs, wetlands, and rainforests).	IPBES
Ecosystem services	The contributions of ecosystems to the benefits that are used in economic and other human activity.	CBS
Natural capital	The stock of renewable and non-renewable natural resources (e.g., plants, animals, air, water, soils, minerals) that combine to yield a flow of benefits to people.	IPBES
Nature-based Solutions	Actions to protect, sustainably manage and restore natural or modified ecosystems while simultaneously providing benefits for human well-being and biodiversity.	IUCN
Nature positive investment	Financial resources committed to activities which explicitly and measurably maintain or enhance the integrity of ecosystems against a defined baseline - or create the enabling conditions for doing so.	Inter-American Development Bank
Payments for Ecosystem Services	A type of market-based instrument that is increasingly used to finance nature conservation. Payment of ecosystem services programmes allow for the translation of the ecosystem services that ecosystems provide for free into financial incentives for their conservation, targeted at the local actors who own or manage the natural resources.	IPBES
Provisioning ecosystem services	The products people obtain from ecosystems; may include food, freshwater, timber, fibres, medicinal plants	IPBES
Regulating ecosystem services	The benefits obtained from the regulation of ecosystem processes, including air quality regulation, climate regulation, water regulation, erosion regulation, water purification and waste treatment, disease and pest regulation, pollination and natural hazard regulation.	CBS
Landscape approach	Term used to describe collaborative initiatives in specific places that span multiple sectors and go beyond the scale of individual farms, forest management units and protected areas. Essentially, it means coherent intervention at a landscape scale to secure food, fibre and energy production, improvements in social welfare, water security and ecosystem conservation.	World Wide Fund for Nature (WWF)

1. Introduction

1.1 An ecosystem perspective

Ecosystems and the services they provide make human life possible by providing nutritious food and clean water, regulating diseases and climate, supporting the pollination of crops and soil formation, and providing recreational, cultural, and spiritual benefits. Furthermore, healthy ecosystems are vital for a large number of companies and thus underpin economies worldwide. The economies of all and especially developing countries are heavily reliant on natural resources, and hence ecosystem services, for their income with major exports in agricultural commodities, fish, timber and minerals, as well as a heavy reliance on tourism[1]. The same holds for many indigenous peoples and local communities who depend on ecosystem services for their economies and well-being.

However, the rate of global change in ecosystem condition and species abundance during the past 50 years is unprecedented in human history. According to the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)[2], the direct drivers of change with the largest global impact have been changes in land and sea use, direct exploitation of organisms, climate change, pollution, and the invasion of alien species. Anthropogenic disturbances have changed the capacity of the ecosystems to provide the appropriate levels of ecosystem services, mainly due to the degradation of natural resources that, in turn, results in the potentially irreversible loss of ecosystem functions and services, with the ultimate effect of reducing human wellbeing[3].

The Dasgupta Review, an independent study that was commissioned by the UK Treasury in 2019 describes how economies, livelihoods and well-being all depend on nature, and finds that humanity has collectively mismanaged its "global portfolio" and that demands far exceed nature's capacity to supply "goods and services" humans rely on[4]. The unsustainable engagement with nature is endangering the prosperity of current and future generations. The review states that a solution starts with understanding and accepting that the world's economies are embedded within nature, not external to it.

As the Dasgupta Review describes, ecosystem services are undervalued, because of economic and political insufficiencies and weaknesses in accounting the value of the nature. This might be due to a lack of funding and legal infrastructure or technical inabilities, such as insufficient quantification processes coupled with traditionally free use perception embedded in the socio-economic structures. This has led to the economic invisibility of nature. , which is key to incorporating the importance of ecosystems and their services into economic, financial and policy decision-making is the use of the monetary value of a specific ecosystem service.

1.2 Policy attention for ecosystems

Ecosystems have received increasing attention from both policymakers and academics. The United Nations (UN) Decade on Ecosystem Restoration[5], for example, calls for the protection and restoration of ecosystems all around the world for the benefit of both people and nature. The UN General Assembly has proclaimed the UN Decade following a proposal for action by over 70 countries from all latitudes. It aims to halt the degradation of ecosystems and restore them to achieve the Sustainable Development Goals (SDGs). The UN Decade runs from 2021 through 2030, which is also the deadline for the SDGs. The UN Decade is supported by the UN Decade Finance Task Force[6], which aims to catalyze actions that can contribute to unlocking the capital needed to meet its goals. The Task Force is chaired by the World Bank and coordinates impactful research,

[1] The Economic, Social and Ecological Value of Ecosystem Services I Eftec
[2] Global Assessment Report 2019 I IPBES
[3] Prevention of worldwide degradation of land and nature can contribute to human wellbeing I PBL
[4] The Economics of Biodiversity: the Dasgupta Review
[5] UN Decade on Ecosystem Restoration
[6] UN Decade on Ecosystem Restoration Finance Taskforce

tools, datasets, projects, and partnerships. It takes steps to increase awareness and foster political will in the public or private sectors, in support of scaling up investment in ecosystem restoration[7].

Another important global framework in the context of ecosystems is the Kunming-Montreal Global Biodiversity Framework (GBF)[8] which was adopted during the fifteenth meeting of the Conference of the Parties (COP 15) in Montreal in December 2022. This framework, which supports the achievement of the SDGs, sets out the pathway to reach the global vision of a world living in harmony with nature by 2050. Key elements of the GBF are four goals for 2050 and 23 targets for 2030. Ecosystem services also have an essential place within the GBF. Target 19[9] on resource mobilization specifically calls for *"stimulating innovative schemes such as payment for ecosystem services, green bonds, biodiversity offsets and credits, and benefit-sharing mechanisms, with environmental and social safeguards"* to increase financial resources for biodiversity conservation to 200 billion US dollars per year. Preparing for COP16 in Colombia, the need for strategic action to achieve the targets set by the Global Biodiversity Framework (GBF) is critical.

Furthermore, the European Union (EU) launched its Biodiversity Strategy[10], which aims to put Europe's biodiversity on a path to recovery by 2030 as part of the Green Deal[11]. Restoring nature provides multiple benefits according to the European Commission. Restoring forest ecosystems for example can contribute to climate change mitigation and adaptation, while restoring marine ecosystems will allow fish stocks to recover. The Commission also states that every euro invested into nature restoration adds 8 to 38 euros in benefits. The Commission estimates that 6 to 8 billion euros needs to be mobilized annually until 2030 to restore nature and ecosystems annually, excluding costs for marine and urban ecosystems and pollinators[12]. To achieve this, market-based instruments like fiscal approaches, payments for ecosystem services, and result-based payment schemes. have to be promoted to cover the costs of restoration and to prevent deterioration.

The EU taxonomy**[13]** is a cornerstone of the EU's sustainable finance framework and an important market transparency tool. It helps direct investments to the economic activities most needed for the transition, in line with the Green Deal objectives. The taxonomy is a classification system that defines criteria for economic activities that are aligned with a net zero trajectory by 2050 and the broader environmental goals other than climate. The Taxonomy is aligned with the Corporate Sustainability Reporting Directive (CSRD), the Commission's regulation designed to implement sustainability reporting standards[14]. The CSRD includes a broad array of obligations, making sustainability disclosure mandatory. The directive seeks to establish uniformity and comparability in sustainability reporting, setting requirements for reporting on environmental and social impacts including biodiversity, human rights, anti-corruption efforts, and supply chain sustainability. The reporting standards include measures specifically for ecosystem services; companies will need to report on the size and scale of their dependencies on natural resources and ecosystem services.

On a national level, the French government has adopted a law in 2019 that takes into account *"the preservation of the biodiversity of the ecosystems and the natural resources, in particular the participation in the objective of zero net artificialization and the use of renewable energy[15]*." Specifically, article 29 of the law on Energy and Climate provides details on expected disclosures across both biodiversity and climate. It requires financial institutions to publish information on the portion of their assets complying with the environmental criteria set out in the EU Taxonomy.

Simultaneously, the Dutch government has adopted the new policy "Water en bodem sturend (water and soil as guiding)"[16] to ensure that the soil-water system plays a decisive role in the

[7] Finance Task Force for the UN Decade on Ecosystem Restoration I World Bank
[8] Kunming-Montreal Global Biodiversity Framework
[9] Kunming-Montreal Global Biodiversity Framework Target 19
[10] Biodiversity Strategy I European Commission
[11] European Green Deal I European Commission
[12] Impact assessment accompanying the proposal for a Regulation on nature restoration I European Parliament and European the Council
[13] The EU Taxonomy I European Commission
[14] European CSRD I European Commission
[15] Article 29 of Law on Climate and Energy I French government
[16] Kamerbrief "Water en bodem sturend"| Rijksoverheid

spatial planning of the Netherlands. The goal is to make the Netherlands more resistant to climate change and to avoid pressures on biodiversity and ecosystems. The narrative is that we should see the soil as more than only as square meters of land, but as a living ecosystem is. Four different types of areas in the Netherlands are distinguished: (1) cities (2) lower peatlands, (3) salinized lands, and (4) elevated sandy soils.

Box 1:, Natural capital and Nature-based Solutions (NbS) and ecosystem services

Natural capital is the stock of renewable and non-renewable natural resources that provide a flow of benefits to people. Nature-based Solutions increase the stock of natural capital by creating or enhancing the condition of ecosystems and biodiversity, which in turn increases the flow of ecosystem services and the value that helps to meet societal challenges. NbS are known to provide many ecosystem services to a variety of different stakeholders and play a vital role in both the climate and biodiversity crisis. Harnessing synergies and taking an integrated approach to sustainability issues can lead to shared financing. However, the lack of integration of regulating ecosystem services in business cases, makes benefits of NbS invisible and inhibits the uptake of NbS in financial decision-making. The valuation of ecosystem services provides a common language to discuss the impact and dependencies of all stakeholders on the benefits received from nature. Explicitly using economic valuation of ecosystem services can contribute to the uptake of NbS by providing insight in the contributions of nature to societies and economies, looking at all relevant ecosystem services. This understanding enables stakeholders to assess the benefits of NbS and the risks associated with adhering to grey solutions.

Reference: Siebers, Quinn, van Vliet, van 't Hoff & Guisado Goni (2024)

1.3 Payment for Ecosystem Services (PES)

Payment for Ecosystem Services (PES) originates from the mainstream environmental economics understanding of market failures—namely externalities and public goods—being at the heart of environmental problems[17]. PES schemes allow for the translation of ecosystem services into financial incentives for their conservation. As mentioned earlier, regulating ecosystem services are usually not priced in the conventional markets, which means that providers of these services (e.g. land owners, managers) or resource users do not take them into consideration in land- or resource-use decisions. According to the Dasgupta Review, this leads to people drawing excessively on ecosystems services to which access is unrestricted. Through PES, there are schemes where landowners are paid for the provision of certain ecosystem services by users or beneficiaries of these services. The combination of direct incentives with conditional contracts is can lead to better environmental outcomes and more efficient allocation of nature finance. The OECD counted over 150 PES programs in 36 countries worldwide in 2020[18]. PES programs have been developed in Mexico and China in the early 2000s and expanded through other Central and South American countries—the region with the highest number of PES mechanisms in the world[19].

PES is highly flexible – there are many ways to structure schemes based on the specific context, the ecosystem services in question and the scale of application[20]. The biophysical nature of different ecosystem services as well as the characteristics of the ecosystem are of crucial importance for PES design. The actors in PES schemes include beneficiaries or users, providers, as well as different intermediaries, and donors. These actors may be private individuals, as in the case of individual landowners, communities, or representatives of different organizations (e.g., NGOs, companies, government, scientific bodies), and of civil society. Ecosystem services are generated both on private, common, and public lands, and the owners, tenants, and/or managers of these lands are the ecosystem providers. Several multilateral organizations and NGOs such as the World Bank and the Global Environmental Facility (GEF), the International Union for Conservation of Nature (IUCN) and the World Wildlife Fund (WWF) are viewed as driving forces behind the existing

[17] Payments for Ecosystem Services—the Case of Forests
[18] Tracking Economic Instruments and Finance for Biodiversity 2021 I OECD
[19] Payments for Ecosystem Services—the Case of Forests
[20] Policy instrument Payment for Ecosystem Services I IPBES

spread of PES initiatives around the world. Box 2 describes some of the critiques that PES schemes face.

Box 2: Critiques on PES schemes

PES schemes have faced some criticisms. Some scholars state that it is impossible to properly quantify the value of nature and ecosystems. They argue that nature should be conserved for nature's sake and not monetary returns. Critics further argue that PES programs run the risk of concealing the complexity of ecosystems, for example by determining a monetary exchange value for particular ecosystem services. It is emphasized that ecosystem services often have a common- or public-good character, making it challenging to define clear boundaries, property rights, and values for ecosystem services. Furthermore, the underlying capitalistic logic of this conservation approach may increase social inequalities. Due to these critiques, this paper argues that PES should be seen as an instrument to enhance transition: it is not the final objective. Nature should be valued for its intrinsic value rather than only for its monetary or instrumental value.

Reference: Metabolic (2018)

1.4 Financial institutions and ecosystem services

According to the World Economic Forum[21], approximately 44 trillion US dollars in economic value depends on nature, which is more than half of the global GDP. According to the study 'Indebted to Nature'[22] by Dutch Central Bank (DNB) and the Netherlands Environmental Assessment Agency (PBL), Dutch financial institutions have outstanding financing worth 510 billion euros to companies with significant dependencies on one or more ecosystem services. This is more than a third of financial sector of The Netherlands and considered to be an underestimation due to lack of data. The ECB calculated in 2023[23] that approximately 75% of companies in the euro zone are highly dependent on at least one ecosystem service.

As biodiversity declines, so does the ability of ecosystems to provide vital ecosystem services. Research by the European Central Bank[24], the Network of Central Banks and Supervisors for Greening the Financial System (NGFS)[25], the World Economic Forum and the earlier mentioned study by DNB and PBL, show that in addition to climate risks, biodiversity loss can lead to material risks and consequences, both at company level as well as for macro-economic and financial stability. As such, financial institutions need to improve and sustainably manage their impacts, dependencies, risks and opportunities in relation to not only biodiversity but also ecosystem services. Financial institutions can have major impacts on biodiversity through their investment, lending and insurance activities, either positively or negatively. As such, the financial sector is vital to realize the transition to a nature positive society and economy.

More and more financial institutions are starting to understand the value of the resources provided by the planet's ecosystems, such as pollination, fresh water and fertile soils. In a Community of Practice (CoP) that ran from 2014 to 2016 in the Netherlands, including a varied group of financial institutions such as the ASN Bank, FMO and Actiam, financial institutions shared experiences on their activities and investment strategies regarding ecosystems and biodiversity issues[26]. An important lesson was that to better understand the risks and opportunities related to biodiversity, the perspective should be reversed and resilient ecosystems should be the start of the journey instead of focusing on financial risks and returns (see figure 1).

[21] Half of World's GDP Moderately or Highly Dependent on Nature I WEF
[22] Indebted to Nature I DNB and PBL
[23] The impact of the euro area economy and banks on biodiversity I European Central Bank
[24] The economy and banks need nature to survive I European Central Bank
[25] Nature-related risks could have significant macroeconomic and financial implications I NGFS
[26] Finance for One Planet: CoP Financial Institutions and Natural Capital

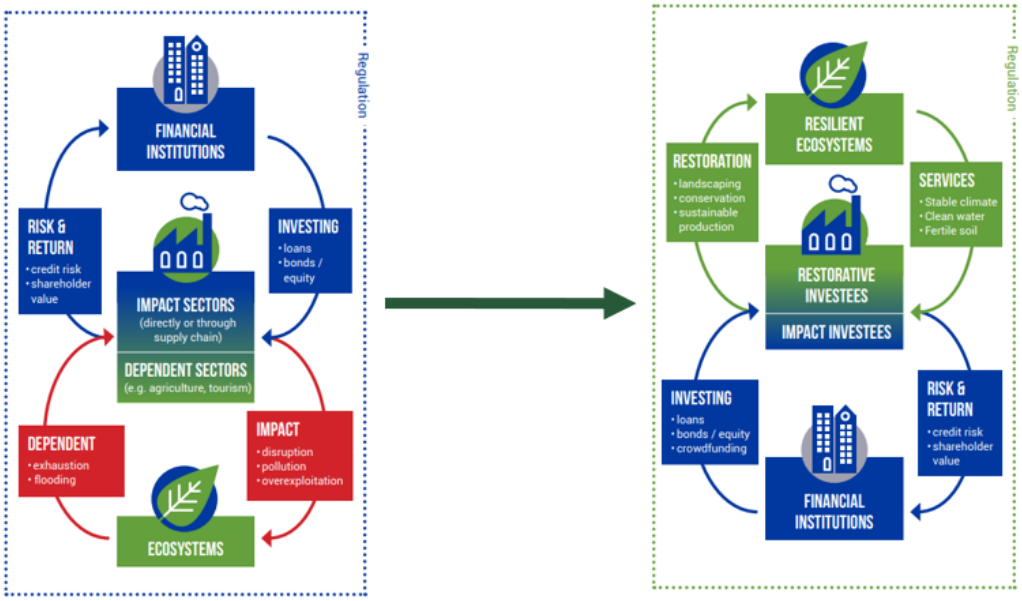


Figure 1: Towards an ecosystem perspective on finance based on IUCN, 2007 (Van Leenders & Bor, 2016).

To support a shift in global financial flows away from nature-negative outcomes and toward nature positive outcomes and to aid financial institutions in assessing their impact and dependencies on nature, the Taskforce Nature-related Financial Disclosures (TNFD) was established. It launched a risk management and disclosure framework to report and act on evolving nature-related risks in September 2023. The framework explicitly calls for reporting on production processes located near critically endangered ecosystems[27].TNFD has designed an integrated approach for the assessment of nature-related issues: the LEAP approach. It consists of four steps:

1. Locate the interface with nature
2. Evaluate dependencies and impacts on nature
3. Assess nature-related risks and opportunities
4. Prepare to respond to, and report on, material nature-related issues, aligned with the TNFD's recommended disclosures

Another financial coalition, the Partnership for Biodiversity Accounting Financials (PBAF) focuses on supporting financial institutions in the assessment of ecosystem services dependency-related risks and opportunities[28] and launched its third annual standard in July 2023. The PBAF standard identifies five main steps of a dependency assessment: (1) identification of sectors financed, (2) linking sectors to data on ecosystem services dependencies, (3) identifying potential direct/indirect dependencies on ecosystem services, (4) ecosystem services provision at the production location and (5) reporting on dependency assessment results.

Financial institutions that want to use the TNFD framework, the PBAF standard or report for the CSRD can use the ENCORE tool (Exploring Natural Capital Opportunities, Risks, and Exposure). ENCORE enables users to visualize how economic sectors depend on nature and how environmental changes can create financial risks. Starting from a business sector, ecosystem service, or natural capital asset, ENCORE can be used to explore natural capital risks. BNP Paribas was one of the first financial institutions to test the ENCORE[29] dependency tool[30]. To do so, they took their aggregate assets under management in listed corporates and bonds and used the ENCORE database to understand their investees' direct dependencies on ecosystem services. They found that water, flood/storm protection, and climate regulation were the most important ecosystem services that BNP Paribas' investment portfolios depend upon (see figure 2).

[27] Nature-related Risk and Opportunity Management and Disclosure Framework Beta v0.4 I TNFD
[28] Taking biodiversity into account: assessment of dependencies on ecosystem services I PBAF
[29] Exploring Natural Capital Opportunities, Risks and Exposure (ENCORE) tool
[30] Sustainable by Nature: Our Biodiversity Roadmap I BNP Paribas

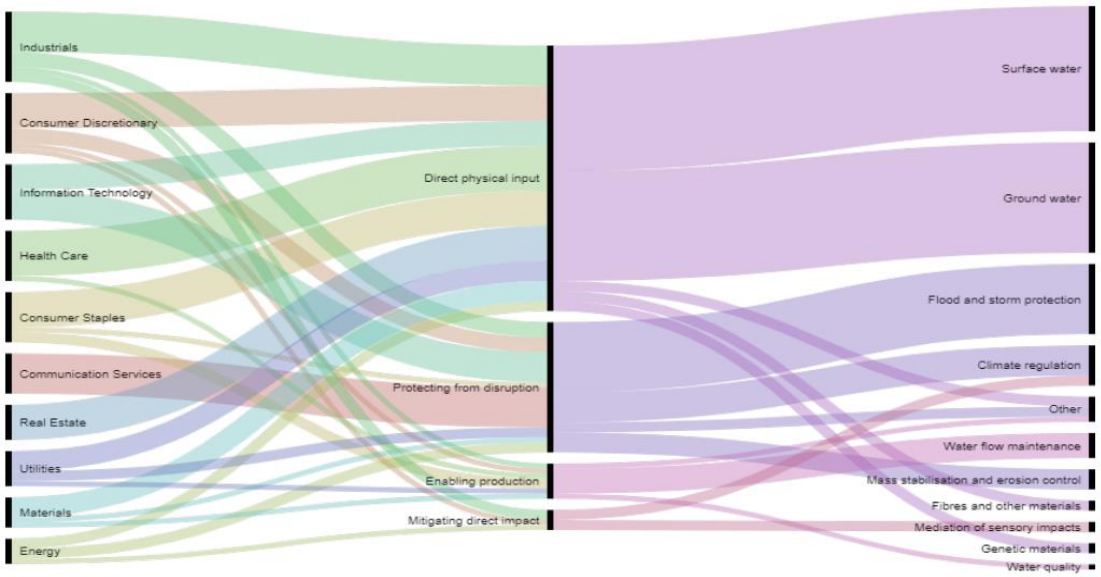


Figure 2: BNP Paribas Asset Management's dependencies on ecosystems services per euro invested (Paribas Asset Management; ENCORE, 2021).

ASN Bank, a bank that has been active in the space of biodiversity for many years, undertook a dependency assessment and found that 14% of the investments of ASN Impact Investors in listed equity (68 out of 200 companies) have a dependency on ecosystem services such as groundwater and climate regulation of high and very high materiality in 2020[31]. The most common ecosystem service their investees depend on is groundwater, which is the case for 44 of the 68 companies. Depending on the state of the water ecosystem and its services in the areas where the companies are located, this could result in a financial risk for them and their investors. The work of the ASN will be touched upon later in this paper. Box 3 describes the interlinkages between TNFD, PBAF and CSRD.

Box 3: Interlinkages between TNFD, PBAF and CSRD

The work of PBAF is most closely linked to the 'Evaluate' phase of TNFD's LEAP approach. PBAF provides guidance and defines requirements and recommendations on biodiversity impact and dependency assessments. While TNFD is a global, voluntary framework, the Corporate Sustainability Reporting Directive (CSRD) is EU-specific and mandatory. The CSRD significantly expands existing rules on non-financial reporting, with almost 50,000 companies across Europe likely to be affected in the coming years. The EU's Environmental and Sustainability Reporting Standards (ESRS), which are the criteria upholding the recently implemented CSRD, explicitly recommend that companies follow the TNFD LEAP approach to identify material nature-related impacts, risks, and opportunities.

Reference: PBAF (2023)

PBAF released a report in 2024 which includes advices on how to evaluate the impacts on ecosystem services, their monetary value, and the stakeholders affected for the identification of nature-related financial risks and opportunities. Insights can be directly helpful within the due diligence step of the loan and investment process and in scaling-up financing mechanisms like payments for ecosystem services and blended finance. The report "Finance in Support of Nature"[32] advices financial institutions to start to experiment with different financial instruments, such as green bonds, debt for nature swaps, grants and venture philanthropy in support for nature.

Based on the three types of ecosystem services (provisioning, cultural, and regulating ecosystem services), this paper describes and visualizes how to scale up payment for regulating ecosystem services based on characteristics of these services. Based on the unique characteristics of ecosystem services, the paper outlines three strategies for scaling up finance for (regulating) ecosystem services. The aim is to contribute to the ongoing (international) dialogue on financing

[31] Biodiversity Footprint I ASN Bank

[32] Finance In Support of Nature – will be published in 2024 on government.nl

biodiversity, and to stimulate further exploration of solutions that use ecosystem services as a basis for scaling up finance and bridging the current funding gap for nature.

2. Getting to know ecosystems and their services

2.1. Three types of ecosystem services

Ecosystems differ across the world. Examples of types of ecosystems include forests, freshwater rivers, peatlands, wetlands, grasslands and many more. All of these ecosystems provide ecosystem services. Forests for example store vast amounts of carbon and moderate the climate. Therefore, they are a defence against global warming. Freshwater ecosystems shield coasts against tsunamis and erosion and moderate water flows. Peatlands control water supplies and prevent floods and droughts, while grasslands provide hotspots for endemic and often threatened species. Many of these ecosystems are also culturally enjoyed by people.

The best-known categorizations of the ecosystem services that all of these different ecosystems provide, is the Common International Classification of Ecosystem Services (CICES)[33]. It consists of three categories of ecosystem services that contribute either directly or indirectly to human well-being:

1. Provisioning ecosystem services

Provisioning ecosystem services include the provision of materials and energy needs for the range of products humans directly obtain from ecosystems. It includes food, fresh water, fuel (such as dung, wood, twigs, and leaves), fiber (grasses, timber, cotton, wool, silk), biochemicals and pharmaceuticals (medicines and food additives), genetic resources (genes and genetic information used for plant breeding and biotechnology) and ornamental resources (skins, shells, and flowers). Provisioning ecosystem services, such as crop yields or livestock production, primarily occur at the more local scale, often within the confines of an individual agricultural lot. This is where the tangible, immediate benefits of food, water, fiber, and other raw materials are directly realized.

2. Cultural ecosystem services

Cultural ecosystems services are the non-material benefits humans obtain from ecosystems, recreational benefits such as aesthetic pleasure are created in a particular urban park. These benefits include recreation, esthetic values, and spiritual enrichment. Cultural ecosystem services stem from the interactions humans have with different environmental spaces, such as woods or parks, and the activities, such as walking and cycling, they undertake in these spaces. These interactions give rise to a variety of well-being benefits.

3. Regulating ecosystem services

Regulating ecosystem services regulate and support ecosystem processes, including maintaining the gaseous composition of the atmosphere, regulating both local and global climate (temperature, precipitation, winds, and currents), controlling erosion, regulating the flow of water, purifying water and decomposing waste, regulating diseases, controlling crop/livestock pests and diseases, pollinating plants, offering protection against storms (forests and woodlands on land, mangroves and coral reefs on coasts) and recycling nutrients. Regulating ecosystem services such as water quality or climate regulation operate at larger (landscape) scales, extending beyond single properties or lots. For instance, water purification processes carried out by wetlands can positively influence the quality of water in entire watersheds, while climate regulation by the Amazon and the oceans even has global implications. Figure 3 visualizes the three types of ecosystem services and examples of these services.

[33] Common International Classification of Ecosystem Services

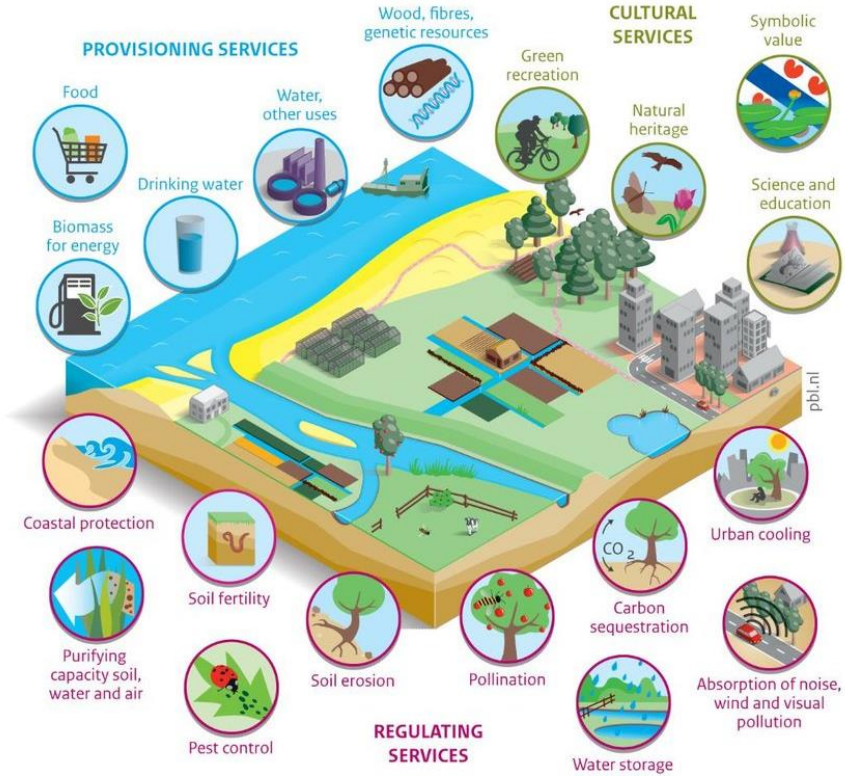


Figure 3: Examples of the three types of ecosystem services (PBL, WUR CICES, 2014)

Box 4 describes the discussion on the different types of ecosystem services and the role of habitat services.

Box 4: Other types of ecosystem services

There is discussion on the types of ecosystem services. Some organizations distinguish other types of ecosystem services as well. For example, the existence of habitat services is under discussion. These are defined as the "*benefits of ecosystems providing space (habitat) to allow the proper functioning of evolutionary processes needed to maintain a healthy gene pool, and by providing essential habitats in the life cycle of migratory species*" by the Ecosystem Services Valuation Database. Habitat services are referred to as having non-use value and are more difficult to express in monetary value which has led to a lot of discussion among academics and statisticians. One example of a habitat service is the intrinsic value of nature: nature has a right on its own basis to exist, regardless of the concrete benefits people receive from nature. While forests provide habitats for species such as deer and birds, cities and farmland provide habitats for humans. Human health depends upon ecosystem services since they are requisite for good human health and productive livelihoods. As of yet, human health is not recognized as an independent ecosystem service, although some scholars would categorize it as a cultural ecosystem service. Research is being done into the relationship between nature and people's physical and mental well-being, which can be associated with its proximity to green or blue spaces in both urban and rural settings. As a result, ecosystem degradation can have significant direct human health impacts if ecosystem services are no longer able to meet social needs.

Both the concept of habitat services and the Nature Positive Initiative focus more on species than on the state of an ecosystem. The Nature Positive Initiative aims to create a measurable 2030 global goal for nature by using metrics such as species richness, distribution, abundance instead of ecosystem services. While recognizing the importance of species for the health of nature, this paper takes a different approach by taking ecosystem services as a basis and is therefore not completely in line with the Nature Positive Initiative. Additionally, due to the ongoing discussions related to habitat services, this paper only uses the three main types of ecosystem services (provisioning, cultural and regulating). Habitat services are therefore seen as regulating ecosystem services for the remainder of this paper.

Reference: ESVD (n.d.) and Nature Positive Initiative (n.d.)

2.2 Interaction between ecosystem services

All three types of ecosystem services are strongly interconnected. Regulating ecosystem services, play a vital role in ensuring the quality of provisioning and cultural ecosystem services. Pollination for example is crucial for the production of crops. Without adequate pollination, food production and availability might be negatively affected. Likewise, climate regulation provided by forests and oceans helps maintain suitable environmental conditions for agriculture and fisheries. The control of pests and diseases by natural predators and disease-regulating microorganisms is essential for protecting crops and livestock, which are important provisioning ecosystem services for food production. In short, the health and biodiversity of ecosystems, as facilitated by regulating services, underpin the long-term sustainability and resilience of provisioning and cultural ecosystem services.

Simultaneously, the over-extraction and optimization of provisioning ecosystem services, such as excessive logging, overfishing, or intensive agriculture, can have detrimental impacts on the quality of regulating ecosystem services. For instance, the excessive use of fertilizers and pesticides can reduce the amount of pollinators, affecting their ability to pollinate crops. Similarly, activities like deforestation and urbanization can lead to increased runoff and soil erosion, which can contaminate water bodies with sediments and pollutants. This impacts the water quality and can undermine the ability of aquatic ecosystems to regulate water purification processes, making it more difficult to provide clean water for human use. And over-extraction of provisioning ecosystems and their services can exacerbate climate change through practices like deforestation, which reduce carbon sequestration and disrupt climate regulation. Such impacts can lead to more extreme weather events and threaten the resilience of ecosystems in providing and cultural services like food production and tourism.

The relationship between ecosystem services demonstrates that efforts to prioritize and over-extract the supply of one or multiple provisioning or cultural ecosystem services, can negatively affect the quality of regulating ecosystem services. Maximizing provisioning ecosystem services, such as agricultural yield or timber production, can yield short-term economic benefits. However, this often comes at the expense of the quality of regulating ecosystem services and long-term sustainability. Overexploitation can lead to resource depletion and environmental degradation, ultimately undermining the future availability and quality of both provisioning, cultural and regulating services.

2.3 Publicly and privately financed ecosystem services

The three types of ecosystem services differ in terms of how they are financed. Provisioning and cultural services provide tangible benefits, such as wood or aesthetics. These ecosystem services are often financed and managed by local actors, such as farmers and landowners, due to the direct benefits these services offer to their operations and livelihoods. Farmers invest in practices like crop cultivation and livestock management to optimize these services, as they directly reap the rewards in the form of agricultural yields and economic returns. Another example is a private drinking water company that profits from producing drinking water. Cultural ecosystem services are also sometimes privately financed. Individuals and organizations invest in activities like ecotourism, recognizing the personal and communal enrichment derived from these services. For example, a bike rental company profits from tourists who rent bikes in national parks.

But the benefits of regulating services are often invisible or intangible. Forests, for example, are a provider of timber and mangroves protect villages and communities against storms. While timber and fish are tangible benefits, protection against climate change and extreme storms is appreciated only when the mangroves have been degraded. Regulating ecosystem services are mostly hidden from view and are often "silent" according to the Dasgupta Review[34]. Regulating ecosystem services are therefore often considered public goods benefiting broader society. They often lack a direct revenue model, making them less attractive for private investment. Consequently, they are mostly financed and managed by governments and public entities to ensure equitable access to these essential services for the common good. For example, water authorities finance water quality

[34] The Economics of Biodiversity I The Dasgupta Review

and national governments make funds available for carbon sequestration and national parks that offer coolness and noise absorption and many more services.

Regulating ecosystem services can be seen as a public good. All actors in a specific location are dependent on a regulating ecosystem service such as water quality. Because of this, regulating ecosystem services do not have a direct revenue model, and they are managed (and financed) by public authorities and local communities. It is also important to note the role of indigenous peoples and local communities (IPLCs). A collaborative study compiled by conservation organizations and experts showed that IPLCs are vital custodians of the world's remaining natural landscapes. At least 32% of global land and associated inland waters is owned or governed by IPLCs, either through legal or customarily-held means[35]. Sixty-five percent of IPLC lands have zero to low levels of human modification, meaning they are natural to semi-natural lands that are no more than 10% modified by intensive human impacts. It is likely that these intact ecosystems are also playing a significant role in climate change mitigation and other regulatory processes. IPLCs therefore warrant appropriate recognition of their rights and governance authority as well as support to equitably and effectively participate in these global efforts.

2.4 Ecosystem services: differences in scale and time

Ecosystems vary greatly in scale. There are local ecosystems such as small forests, parks and grasslands. At a larger scale, tropical rainforests and deserts influence climate patterns and sequester carbon. Water purification processes carried out by wetlands can positively influence the quality of water in an entire watershed, while climate regulation by forests and oceans even has global implications. At the largest scale, the Earth itself functions as an ecosystem, with the ocean governing global processes like climate regulation and water cycles.

Provisioning ecosystem services, such as crop yields or livestock production, primarily occur at the local scale, often within the confines of an individual agricultural lot. This is where the tangible, immediate benefits of food, fiber, and raw materials are directly realized. Similarly, recreational benefits such as aesthetic pleasure are created in a particular urban park. A farmer can improve regulating ecosystem services such as water quality and soil quality on their own property. But if a neighboring farmer still uses pesticides, some ecosystem services of the first farmer can still be negatively impacted. In contrast, regulating ecosystem services such as water quality or climate regulation operate at a larger landscape scale, extending beyond single properties or lots. These services and their benefits often transcend individual properties. Regulating ecosystem services therefore require a 'landscape approach' in which local landowners, communities and users work together to ensure the quality of these services. Local communities are often custodians of natural areas and play a key role in their successful conservation. They also rely in unique ways on the different types of services that ecosystems provide to them. Box 5 describes the need for a landscape approach and the work that has been done in this field by coalitions such as 1000 Landscapes for a Billion People[36].

Box 5: The need for a landscape approach

The preservation of regulating ecosystem services thus asks for management on a landscape scale. For this lessons can be drawn for the work done on Integrated Landscape Management (ILM). ILM is a way to manage multi-project, multi-sector investment portfolios and encourages synergies between investments to generate impacts at scale across multiple landscape objectives. In this way, unsustainable trade-offs between policy goals are avoided and coherent policy is ensured. According to 1000 Landscapes for a Billion People, a landscape approach is an integrated, place-based approach to biodiversity restoration, conservation and sustainable use. It explicitly recognizes the social, economic, and ecological complexity of landscapes and can address how all stakeholders can contribute to the sustainable use of ecosystem services and how much resources each landowner can use, which requires landscape governance, integrated landscape management and the policies that support it. By facilitating shared leadership and collaborative decision-making by all stakeholders in a landscape, EcoAgriculture Partners supports 1000 Landscapes for a Billion People in empowering agricultural communities to manage their lands to enhance livelihoods, conserve biodiversity and ecosystem services, and produce sustainably.

Reference: Shames et al. (2023)

[35] The state of Indigenous Peoples' and Local Communities' lands and territories

[36] EcoAgriculture Partners

In addition to scale, time is a factor to consider for the three types of ecosystem services. Felling trees can be done within a few days or weeks, depending on the size of the forest, while restoring forest ecosystems will take much longer. And while restoration activities can often place a degraded ecosystem on an initial trajectory of recovery relatively quickly, full recovery can take years, decades, or even hundreds of years. For example, while a forest restoration process can be initiated by planting trees, for full recovery to be achieved, the site should be a fully functioning forest with mature trees. If there were 500-year-old trees in the forest that was destroyed, then the restoration should logically take hundreds of years to achieve full recovery.

The same reasoning can be applied to the ecosystem services. Provisioning and cultural ecosystem services offer benefits that can be enjoyed within a short timeframe. These services, like food provision or aesthetic enjoyment, yield quick results. On the other hand, regulating services operate on longer timescales. As a result, their effects are often seen over the long term. For example, natural processes that maintain water quality can take years or decades to reach a balanced state. Similarly, carbon sequestration occurs across various timescales depending on the ecosystem involved. In natural systems like forests, trees sequester carbon as they grow, but the time taken to accumulate substantial carbon stores can span decades. Different ecosystems and organisms sequester carbon at varying rates—some, like wetlands or certain soil types, can sequester carbon more rapidly than others. Box 6 describes the role of time in investing in nature.

Box 6: Short-term versus long-term interests in investing in nature

When it comes to investing, financial institutions and investors traditionally focus on immediate gains and profits, often prioritizing short-term shareholder interests over long-term growth and sustainability. As shown by the report Make Nature Count 2.0, conventional discounting practices usually depreciate ecological resilience, wrongly implying that nature's value diminishes over time. While it is common practice to depreciate regular investments over time, restoring nature builds value over time, increasing ecosystem resilience and benefiting biodiversity. By placing investing in nature in the current economic system of depreciating value over time, our economic practices do not match ecological reality. To accurately reflect nature's value and to incentivize nature positive investments, we need to reconsider and move beyond existing discounting practices, for example by using 0% discount rates or even negative rates.

Reference: de Jong, van 't Hoff, Siebers & de Groot (2023)

2.5 The different monetary values of ecosystem services

The types of ecosystems services have a different monetary value. The Foundation for Sustainable Development (FSD) manages the Ecosystem Services Valuation Database (ESVD) which is a follow-up to the Economics of Ecosystems and Biodiversity (TEEB) which contained 1,300 data points from 267 case studies on the monetary values of ecosystem services across all biomes[37].The ESVD is the largest publicly available database with standardized scientific monetary values of ecosystems and their services per location. The values in the ESVD are derived from scientific peer-reviewed studies and should be seen as a language for the order of magnitude of impact that this ecosystem service have on its beneficiaries and not as a way to straightforward money in the bank or a tradable commodity on the market. and contains As of 2024, the ESVD contains over 9,500 data points from over 1100 studies distributed across all biomes, ecosystem services and geographic regions[38]. The database is continuously growing and expanding its number of data points. The ESVD is being used by organizations such as the Food and Agriculture Organization of the United Nations (FAO), the Global Environment Facility (GEF), the Dutch Bureau of Statistics (CBS) and the Dutch National Institute for Public Health and the Environment (RIVM).

[37] Update of global ecosystem service valuation data I ESVD

[38] Our Database I Ecosystem Services Valuation Database

The monetary valuation of ecosystem services can help governments, NGOs and financial institutions to meet targets outlined in the GBF[39]. For target 8 on minimizing the impacts of climate change on biodiversity and building resilience through NbS ecosystem services assessments can highlight the role of ecosystems in climate regulation and the provision of services that contribute to climate change mitigation and adaptation. Understanding these services can guide strategies to minimize climate change impacts on biodiversity. The same applies for target 11 on restoring, maintaining and enhancing nature's contributions to people through nature-based solutions. Ecosystem services valuation can highlight the importance of intact ecosystems in providing essential services to communities, such as clean water, fertile soil, and climate regulation. Finally for target 19 and specifically target 19d on optimizing co-benefits and synergies of finance targeting the biodiversity and climate crises, ecosystem services valuation can attract financial resources by showcasing the economic value of biodiversity and the services it provides.

An example of monetary valuation of ecosystem services is the Make Nature count project of the ESVD and the ASN Bank. In a 2021 partnership, they aimed to explore how monetary valuation of ecosystem services data can inform financial institutions' decision-making processes[40]. The ESVD conducted ecosystem services assessments for four "positive impact" ASN projects in the Netherlands, Madagascar, Paraguay, and Nicaragua all investments current agricultural practices versus agroforestry and reforestation scenarios. The Make Nature Count study focused on assessing changes in provisioning ecosystem service and their monetary value between the baseline scenario (continuation of current agricultural practices) and a reforestation scenario.

The study showed that when the reforestation project would take place, the provisioning ecosystem services would have a value of 1.600 Int dollars per year, the cultural ecosystem services 22.800 Int 2020 dollars per year, and the regulating ecosystem services 87.600 US dollars per year (based on 40 hectares)[41]. This indicates an increase in monetary value of ecosystem services when agricultural land would be transformed into a forest. The higher monetary value is mostly driven by the substantial value of regulating services like air quality regulation, climate stabilization, groundwater replenishment, habitat preservation, and recreational benefits.

Table 1: Monetary value of current agricultural use compared to turning the area into forest. Total area 40ha, values in $2020/year

Services	Scenario 1: Current agriculture	Scenario 2: Future forests	Difference
Provisioning services	**93.2 K**	**1.6 K**	**-91.6 K**
Food	$0	0.03 K	0.0 K
Water	$0	$0	$0
Raw materials	93.2 K	1.5 K	-91.6 K
Genetic resources	$0	$0	$0
Medicinal resources	$0	$0	$0
Ornamental resources	$0	$0	$0
Regulating services	**$0**	**87.6 K**	**87.6 K**
Air quality regulation	$0	63.2 K	63.2 K
Climate regulation	$0	12.2 K	12.2 K
Moderation of extreme events	$0	0.2 K	0.2 K
Regulation of water flows	$0	4.8 K	4.8 K
Waste treatment	$0	$0	$0
Erosion prevention	$0	7.1 K	7.1 K
Maintenance of soil fertility	$0	$0	$0
Pollination	$0	$0	$0
Biological control	$0	$0	$0
Habitat services	**$0**	**99.7 K**	**99.7 K**
Maintenance of life cycles	$0	$0	$0
Maintenance of genetic diversity	$0	$0	$0
Existence. bequest values	$0	99.7 K	99.7 K
Cultural services	**0.1 K**	**22.8 K**	**22.7 K**
Aesthetic information	0.01 K	$0	-0.01 K
Opportunities for recreation and tourism	$0	14.8 K	14.8 K
Inspiration for culture. art and design	0.1 K	$0	-0.1 K
Spiritual experience	$0	$0	$0
Information for cognitive development	$0	8.0 K	8.0 K
Total	**93.3 K**	**211.7 K**	**118.4 K**

[39] Valuation of ecosystem services : a comparative study between projects in the Netherlands, the United Kingdom and Ireland - will be published in 2024 on government.nl

[40] Make Nature Count I Foundation for Sustainable Development & ASN Bank

[41] Make Nature Count I Foundation for Sustainable Development & ASN Bank

This higher valuation for regulating ecosystem services reflects their vital role for both humanity and the ecosystem's overall well-being. While reforesting agricultural land would reduce the food production quantity and related benefits, it does contribute to air quality regulation, climate buffering, groundwater replenishment and numerous other ecosystem services paid for and enjoyed by others. Taking the perspective of ecosystem services also showed how investment choices through their impact on the value of different ecosystem services, affect various stakeholder groups. The provisioning ecosystem services that are traded in markets, primarily benefit private stakeholders while regulating ecosystem services have advantages for as well private and public actors.

The data of the ESVD was also used in a study by Profundo on the impact the investments of Rabobank in Brazil between 2002 and 2022. Over the past 23 years, Rabobank's financial support to Brazilian forest-risk sectors, including financing the Dutch livestock industry that depends on Brazilian soy, has increased sevenfold to € 8.8 billion in 2022 and generated € 717 million in accumulated gross profits based on € 1.9 billion in net interest income. However, the estimated environmental, health, and social damage caused by these financial flows to Brazilian forest-risk sectors is much higher: at least € 66 billion. Rabobank's financing of activities outside Brazil and the Netherlands that might also have an impact on Brazilian forest footprint were not considered. This implies that the estimates are probably 'conservative'. Rabobank did not pay for these costs but externalized them to society. However, the estimated environmental, health, and social damage caused by these financial flows to Brazilian forest-risk sectors is very high. When only taking ecosystem services into account, the authors calculated a value of € 5,328 per hectare per year (assumption: 1 US dollars = 0.99 euros) for tropical forests based on the ESVD data. When taking into account the social costs if forests are not restored, the loss of biodiversity is estimated to be 142.7 billion euros[42].

In short, these results show that regulating ecosystem services have a very high value, due to their vital role for both humanity and the ecosystem's overall well-being. There is a growing acknowledgment of the significant economic value provided by regulating ecosystem services, due to major dependencies on these ecosystem services.

2.6 Visual of the characteristics and relations of ecosystem services

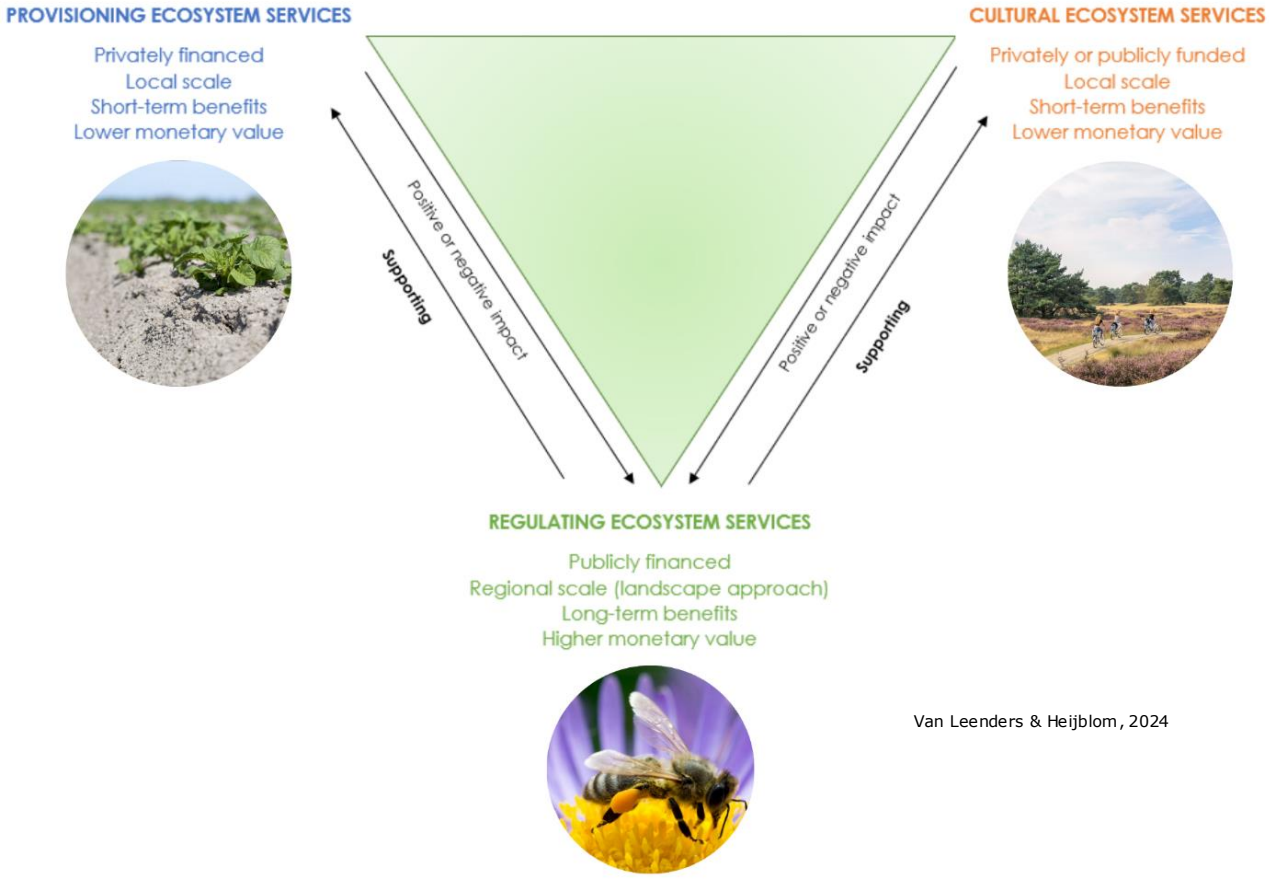
Figure 4 summarizes the information provided in the previous paragraphs. The figure presents the three main types of ecosystem services and how they are interconnected and dependent on each other.

Regulating ecosystem services are often seen as 'public' services that everyone can access and use and are therefore financed by public authorities. The other types are often financed by private actors such as farmers. Regulating ecosystem services are also localized. All ecosystem services exist in different locations and are site-specific. They occur at a more regional scale than provisioning and cultural ecosystem services and therefore require a landscape scale. All relevant actors in the landscape need to work together to ensure the proper functioning of the regulating ecosystem service. In this way, benefits are shared between stakeholders such as landowners, financials, local communities and indigenous peoples.

The benefits of regulating ecosystem services occur over a longer time period than those of provisioning and cultural ecosystem services and they need more time to be restored. Regulating ecosystem services are essential for the continued existence of provisioning and cultural ecosystem services. Therefore, regulating ecosystem services are often given a higher monetary value than provisioning and cultural ecosystem services. These high values of regulating ecosystem services as determined by scientific research reflects their vital role for both humanity and the ecosystem's overall well-being.

[42] € 0.7 billion in profits, € 66 billion in damages Rabobank's destructive financing of deforestation in Brazil I I Profundo

Figure 4: Relationships between types of ecosystem services and the scale on which they occur (Van Leenders & Heijblom, 2024).



Van Leenders & Heijblom, 2024

3. Strategies for scaling-up payment for regulating ecosystem services

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The previous chapter described three types of ecosystem services: provisioning, cultural and regulating ecosystem services. All types of ecosystem services are interconnected and differ in terms of monetary value, scale and time. Regulating ecosystem services are valued higher monetary terms and occur and on a more regional scale and accrue over a longer time-period. As a result, the provisioning ecosystem services are also financed by public entities, while the other ecosystem services are more often financed by private parties. Finally, regulating ecosystem services are often more highly valued by scientists because of their vital importance for the other types of ecosystem services and human health. Because of this high monetary value, we will focus our efforts on finding solutions that benefit regulating ecosystem services.

3.1 Different strategies for scaling-up PES

Based on the relationships and characteristics of ecosystem services we present three strategies to scale-up the payment of regulating ecosystem services.

A. Creating nature positive markets for provisioning and cultural ecosystem services.
B. Creating coherence and synergies between publicly financed regulating ecosystem services.
C. Blended finance strategies based on the interconnectedness of ecosystem services.

Strategy A: creating nature positive markets for provisioning and cultural ecosystem services

Nature positive has become a buzzword in for sustainable frontrunners in the financial sector. On an international level, the use of concepts such as nature positive and biodiversity positive has grown exponentially. The World Economic Forum[43] defines nature positive as *"enhancing the resilience of our planet and societies to halt and reverse nature loss"*. According to the Nature Positive Initiative[44], the term can be defined as "*to halt and reverse nature loss by 2030 on a 2020 baseline, and achieve full recovery by 2050*"[45]. Different categories of metrics have been developed by which to measure nature positive contributions and outcomes. Some metrics are based on species richness, distribution, abundance and extinction risk, extent and ecological integrity of habitat and migration patterns. Examples include the Mean Species Abundance (MSA), a metric that is an indicator of local biodiversity intactness. MSA ranges from 0 to 1, where 1 means that the species assemblage is fully intact, and 0 means that all original species are extirpated (locally extinct). Other examples are the Species Threat Abatement and Restoration Metric (STAR) and the Integrated Biodiversity Assessment Tool (IBAT). The definition proposed by the Nature Positive Initiative is supported by organisations such as WWF, The Nature Conservancy, IUCN, Capitals Coalition and the Taskforce on Nature-related Financial Disclosures (TNFD).[46] The definition was also used by the Netherlands Environmental Agency (PBL) in their report on exploring nature positive pathways[47].

Instead of defining nature positive through species, we propose a definition based on the impact on regulating ecosystem services. Box 8 describes our proposal to start a dialogue on whether it is possible to base a definition on ecosystem services because of their vital importance for both ecosystems, habits for animals and for and human health and their local character. As mentioned previously, the Nature Positive Initiative aims to create a measurable target for nature by 2030 by focusing on metrics related to species. While recognizing the importance of individual species for

[43] What is 'nature positive' and why is it the key to our future? I WEF
[44] Nature Positive Initiative
[45] The definition of nature positive I Nature Positive Initiative
[46] Nature Positive Initiative launches to promote the integrity and implementation of the Global Goal for Nature I WWF
[47] Exploring Nature positive Pathways I PBL

the health of nature, this paper takes a different approach by taking ecosystem services as a basis and is therefore not completely in line with the Nature Positive Initiative.

Box 8: Using ecosystem services to define the term 'nature positive'

The definitions of the term 'nature positive' described previously are not yet well-defined. Based on our efforts to benefit regulating ecosystem services we suggest the following definition:

> *A project or investment is 'nature positive' when it positively affects at least three regulating ecosystem services. And similarly, a project or investment is 'harmful' if it harms regulating ecosystem services.*

We argue that regulating ecosystem services should be taken as a basis for the definition of nature positive because they are essential for the continued existence of provisioning and cultural ecosystem services. Therefore, regulating ecosystem services are often given a higher monetary value than provisioning and cultural ecosystem services (see work with the ESVD)

We propose the definition to require at least three regulating ecosystem services and not one, because optimizing the quality of only one regulating ecosystem service could result in possibly harmful trade-offs with others. Think of only CO2-storage with no consideration for water quality. Requiring at least three ensures that the connection between ecosystem services has to be part of the nature positive strategy. To require positive impact on at least regulating ecosystem services without further specification on the other hand, allows for choosing what is needed in a specific location. For such a definition still further research and collaboration is needed it comes measurement and data of positive or negative impact on the regulating ecosystem services.

A definition for Nature Positive based om regulating ecosystem services also takes the locality of nature into account. Different regulating ecosystem services exist in different locations and are site-specific. In addition, regulating ecosystem services occur at a more regional scale than provisioning and cultural ecosystem services. A positive impact on regulating ecosystem services therefore often require a landscape approach and collaboration on a more regional scale.

In a manifest published in 2020, 11 CEOs of Dutch companies urged the Dutch government to facilitate nature-positive markets. They stated that when the economy should be seen as a natural ecosystem and that certain sectors can provide nature positive solutions for other sectors that deal with structural problems[48]. Box 7 describes the role of the government in creating nature positive markets.

An example of a nature positive practice is of the Dutch insurance company a.s.r. who owns 30.000 hectares of land and leases that out to farmers[49]. This example takes into account the longer timeframe and scale of regulating ecosystem services such as soil quality. a.s.r. has developed the 'Open Bodemindex' (OBI) in close cooperation with its coalition partners Rabobank and Vitens. By measuring indicators like organic matter and biodiversity, the OBI encourages farmers to enhance soil quality, which is crucial for ecosystem services like nutrient cycling and water filtration. It incentivizes sustainable practices such as crop rotation and reduced chemical use, leading to improved soil health and biodiversity. By linking insurance products to soil health, a.s.r. aligns financial incentives with ecological outcomes, fostering broader adoption of sustainable farming and supporting the long-term sustainability of vital ecosystem services.[50]. Farmers are given a score that is assigned to a plot of land based on existing soil analyses over a series of 10 years. Farmers who actively improve their OBI score are rewarded with a discount on the lease they pay for their agricultural lands. Farmers are also encouraged to work together to improve the soil quality for a larger amount of land as to avoid trade-offs between landowners.

[48] Manifest Een natuurpositief Nederland als lonkend perspectief
[49] Five questions about the Dutch Farmland Fund
[50] Documentatie I Open Bodem Index

Box 7: The role of the government in creating nature positive markets

Nature positive markets require the government to act as a green commissioner and enabler. The government could stimulate market demand for nature positive products through policies aimed at using for example FSC-certified timber in public construction projects and actively promote the use of these certificates in private sector endeavors. Certifications are crucial tools for assessing quality and demonstrating competence, often based on external evaluations or approvals from reputable certification systems or organizations. These systems contribute to qualified assessments of standard quality, helping buyers or consumers navigate markets more easily and make more informed decisions. Governments should however be aware of possible greenwashing by companies.

In addition to developing nature positive markets through certification, governments can also consider true pricing as a tool to create nature positive markets. The true cost of a product is calculated from its manufacture plus the cost of the negative external impact its production has on society and the planet. Externalities could include greenhouse gas emissions, declining biodiversity, exploitation of communities, and ecosystem degradation. Externalities are currently not being paid for by the sectors that produce them. True pricing provides an integral picture of the economic and sustainability costs of the production and consumption of products. It helps producers to produce as sustainably as possible, creates awareness amongst consumers to choose the right product, and assists government agencies and public bodies in stimulating the economy and transition towards sustainability.

References: Frontiers in Sustainability, n.d.; WUR, n.d.

Strategy B: creating coherence and synergy in public finance based on regulating ecosystem services

Governmental ministries and agencies often lack consistency in policies and operate in silo's when it comes to nature. The second strategy is for scaling-up payment for regulating ecosystem services is therefore the creation of coherence and synergies in public finance. Coherence can be organized by governments scrutinizing the harmful impacts on ecosystems and their services of their own public financial flows and start redirecting them. Each year, the world is spending at least 1.8 trillion US dollars a year, equivalent to 2% of global GDP, on subsidies that are driving ecosystem degradation[51]. These subsidies include government aid for the agriculture, energy, and fisheries sectors with a focus on over-extracting the provisioning ecosystem services. These public financial flows must be redirected from harmful to regulating ecosystems and become nature positive.

This is in accordance with Target 18[52] of the Global Biodiversity Framework (GBF). All signatory countries should identify public financial incentives, including subsidies, that are harmful for biodiversity by 2025. They should also substantially and progressively reduce these incentives by at least 500 billion US dollars per year by 2030, starting with the most harmful incentives, and scale up positive incentives for the conservation and sustainable use of biodiversity. Ecosystems health and the quality of ecosystem services could be used as a Key Performance Indicator (KPI) to determine whether an incentive is harmful or not.

Another strategy to scale-up payment for regulating ecosystem services is the bundling of public funds to create synergies. When funding is focused on more than one regulating ecosystem service, efficient resource allocation is ensured and trade-offs between ecosystem services are avoided that might negatively affect regulating ecosystem services. This is especially relevant for tackling both the climate and biodiversity crises at the same time. In existing Payments for Ecosystem Services (PES) schemes, prominent regulating services include carbon sequestration, water purification and soil quality. These services are important for mitigating climate change and enhancing biodiversity making them key targets for conservation and financial incentives in PES initiatives.

This is reflected in an example from the Netherlands. The Netherlands Ministry of Infrastructure and Water Management spends approximately € 125 million on water quality through the Deltafonds in the years 2022-2028. In the landscape, all major urgent challenges come together:

[51] Financing Our Survival Brief I Business for Nature

[52] Target 18 I GBF

housing, nitrogen and nature, the energy transition and climate adaptation. These tasks, transitions and adaptations take up a lot of space in the Netherlands. Since all these things are also interrelated, the solutions for spatial design must serve multiple tasks as much as possible. The 'Water and Soil as leading' policy can be used to connect these challenges. The Deltafonds was installed to achieve the goals set out in the Deltaprogramma, which outlines goals to prevent flooding, ensure sufficient fresh water, and contribute to a climate-proof and water-robust design. Therefore, it creates synergy in public funding for regulating ecosystem services such as water quality, carbon sequestration, soil quality and water quality. It is the role of the Deltaprogramma to clearly describe what the long-term climate challenges are, including at supra-regional level, and to stimulate dialogue between all partners. The aim here is to not exceed the boundaries of the water and soil system, so that the use of space remains sustainable. Spatial choices based on water and soil can provide the right frameworks and preconditions for what needs to happen regionally. The Deltaprogramma also underlines the necessity of natural climate adaptation measures (Nature-based Solutions) that can be designed in such a way that they do not only serve for climate adaptation but also other purposes. For example, think of a natural water storage that can also be used for recreation.

Another example in the Netherlands of a public fund that bundles the financing of regulating ecosystem services is the Transitiefonds Landelijk Gebied (€ 24 billion)[53]. This fund aimed to (1) reduce the deposition of nitrogen on for nitrogen sensitive habitats in Natura 2000 sites, (2) reduce greenhouse gas emissions and capture carbon (3) achieve nature conservation objectives for Natura 2000 sites and the conservation or restoration of animal and plant species that occur naturally in the wild in the Netherlands and (4) protect and improve the chemical and environmental state of water systems. The fund is directed at financing of multiple regulating ecosystem services, such as water quality, pollination, carbon sequestration, and climate regulation by bundling public funding and creating synergy between ministry departments. Proposals for this fund can be developed with support of the Dutch Nationaal Programma Landelijk Gebied[54], which includes targets for nature, nitrogen, water, and climate on a regional or landscape scale.

These examples show how aligning and spatially coordinating policies and public investments on the landscape the regulating ecosystem services, can achieve synergies in the financing of regulating ecosystems.

Strategy C: blended finance for regulating ecosystem services

The third strategy for scaling-up is based on combining privately financed provisioning and cultural ecosystem services and publicly paid regulating ecosystem services; a blended finance strategy. Target 19 of the GBF specifically calls for the implementation of PES programs, that could be financed through blended finance schemes[55]. By combining public and private capital, blended finance can help to spreads perceived financial risks associated with longer-term investments in regulating ecosystem service projects. It helps to ensure that continued revenue streams are generated over a longer period of time, allowing for the continued support and management of vital ecosystem services.

An example from the UK government of blended finance for ecosystem services is the Landscape Recovery Scheme, which funds landscape scale projects through bespoke, long-term agreements that extend beyond 20 years[56]. The Landscape Recovery is one of the three Defra Environmental Land Management (ELM) schemes, alongside the Sustainable Farming Incentive and Countryside Stewardship. All three schemes support farmers to deliver clean water, thriving plants and wildlife, climate change adaptation and mitigation and healthy soils.

The Landscape Recovery projects deliver a range of outcomes, with a focus on net zero, biodiversity and water quality. The scheme aims to support landscape-scale land-use change for the long-term with funding from both public and private sources, producing environmental and climate outcomes through habitat and ecosystem restoration. The scheme focuses on regulating ecosystem services, such as carbon sequestration, air and water quality but also cultural

[53] Transitiefonds Landelijk Gebied I Rijksoverheid
[54] Nationaal Programma Landelijk Gebied I Rijksoverheid
[55] Global Biodiversity Framework Target 19 I GBF
[56] Landscape Recovery: sharing the successful projects I Defra

ecosystem services such as heritage. Blended finance is one of the distinguishing features of this scheme. Applicants should submit a Blended Finance Plan – a document that contains details of the project costs, private investment and revenue, what public funds are needed, and the structure of public funds. Private actors that are involved are mostly local organisations that enjoy place-based benefits. Round one and two of the scheme include over 60 running projects that are both farmer-led and NGO-led.

Other examples of blended finance for nature are included in a paper by Wolfs Company, commissioned by the Netherlands Ministry of Agriculture, Fisheries, Food Security and Nature[57]. Examples are the Seychelles Blue Bond, Rewilding Europe Capita land Ecotrust. This report showed that the context-specific nature of ecosystem services related projects makes the development of domestic markets for blended finance necessary to structurally mobilize private financing for ecosystem services. The examples and best practices of applied blended finance for nature included in this paper vary greatly in terms of their size, deployment mechanisms used, thematic scope, types of projects financed, geographic focus, and stage of development.

3.2 The different strategies visualized

Based on the visualization in figure 3 we would like to bring it all together by adding the different strategies for scaling-up in figure 6. The figure shows that that by creating nature positive markets for provisioning and cultural ecosystem services, the negative impact of over-exploiting these services will be reduced. This also calls for KPIs for regulating ecosystem services. Furthermore, it shows that one can create coherence and synergy between publicly financed regulating ecosystem services by bundling public funds to avoid trade-offs between sustainability themes such as climate, biodiversity and water. Finally, by engaging financial institutions that require long-term investments, the pressure of over-exploiting provisioning and cultural services is reduced. As a result, their impact on regulating ecosystem services is also minimized.

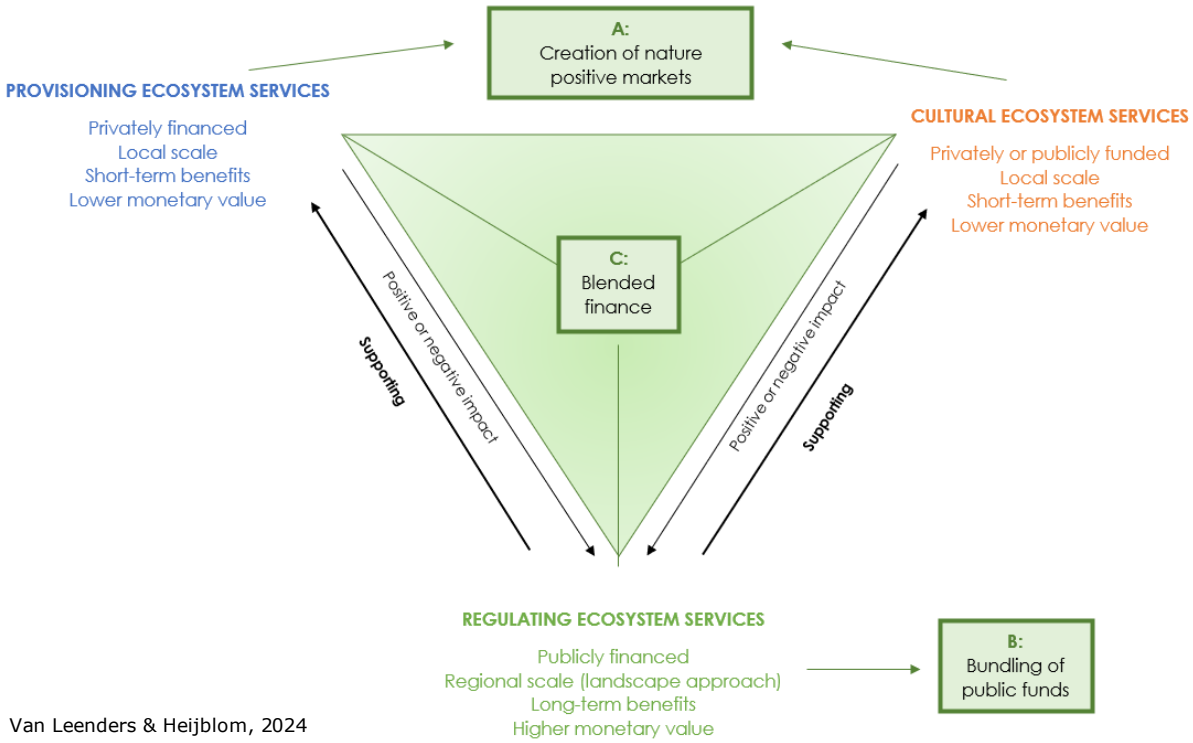

Figure 6: Types of ecosystem services and accompanying finance strategies (Van Leenders & Heijblom, 2024).

[57] Developing blended finance capacity for nature on a national level

4. Concluding remarks and recommendations

In this paper we have described and visualized some of the characteristics of ecosystem services that can be of use in thinking how to scale up payment for especially regulating ecosystem services. Ecosystem services have drawn new attention the last few years from governments, private actors and knowledge institutes. Ecosystem services are intricately linked to other nature-related concepts, such as nature-based solutions and play a crucial role in solving both the climate and biodiversity crises.

In the paper we discussed the different types of ecosystem services and how they differ in terms of their connectedness, ways of more private or publicly funded, their scale and timeframe and the differences in monetary value. Based on these differences, three strategies are proposed for scaling up payment of regulating ecosystems. These strategies are based on actions that both the private and public sector can take separately, as well as in collaboration with each other through blended finance strategies. Especially for the regulating ecosystem services, a landscape approach is key due to their regional scale. These are:

A. Creating nature positive markets for provisioning and cultural ecosystem services.
B. Creating coherence and synergies between publicly financed regulating ecosystem services.
C. Blended finance strategies based on the interconnectedness of ecosystem services.

We would like to conclude with two sets with remarks. The first set concerns the scaling-up strategy of PES. The second set consists of a list of more general recommendations.

On a strategy for scaling-up PES we would like to conclude with the following remarks:

- Use knowledge on the connections, relations and characteristics of ecosystem services as the starting point of developing a strategy.
- Have a keen eye for the differences in public and private funding. Different stakeholders have a specific role to play in the three strategies: private actors in the more market based strategy, public funders for more positive impact with government budget and combination of both for the blended finance strategy.
- For the strategy on nature positive markets look how PES can support new markets combination and product innovation like biobased and local markets.
- For the strategy on coherence in public funding, start by looking for synergies with other sustainability themes through regulating ecosystem services such as soil biodiversity, climate adaptation and water management. Bundle funding sources and use them more efficiently.
- Blended finance schemes for regulating ecosystem services can help mobilize the private sector and scale up PES.
- Use KPIs to monitor regulating ecosystem services that are already out there like the Open Bodem Index for soil quality.

Our more general recommendations for the broader policy context are:

- Ecosystem services are intricately linked to other nature-related concepts, such as nature-based solutions. Implementing nature-based solutions can play a crucial role in solving both the climate and biodiversity crises and knowledge on the related ecosystem services can help to find funding of the right partners on the right scale for these solutions .
- The landscape scale of many regulating ecosystems calls for more regional approach for scaling-up PES strategies. And the investment horizon should mirror the time it takes to restore a certain ecosystem service. We advise to start with 15 years.
- The concept and monetary value of regulating ecosystem services can help to inform decision-making processes for both policy makers and financial institutions. Insights into the monetary value of ecosystem services can guide more concrete PES schemes.
- The concept of regulating ecosystem services can help to define ‘nature positive’. A project or investment should positively affect at least three regulating ecosystem services because it ensures that synergy between ecosystem services is reached. Optimizing the quality of only one regulating ecosystem service would result in possibly harmful trade-offs. A project

or investment should positively affect at least three regulating ecosystem services because it allows for choosing what is needed in a specific location

- Ecosystem services can help in designing National Biodiversity Finance Plans (NBFPs). The high monetary value of regulating ecosystem services can justify investments in conservation and restoration and can prioritize landscapes with high ecological value. Integrating PES into national policies ensures that biodiversity considerations are embedded across sectors, aligning financial flows with sustainability goals and enhancing the effectiveness of biodiversity financing strategies.

We would like to thank everyone who has given feedback on this paper and hope it will provide food for thought. We are interested in having a discussion on the contents of this paper, so please let us know if you have any questions or comments. You can reach us at caroline.vanleenders@rvo.nl and deborah.heijblom@rvo.nl.

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Annex 1

23 ecosystem services identified by TEEB

	Ecosystem Service	ES Code	Ecosystem Sub-Service	ESS Code
Provisioning	Food	1	Fish	11
			Meat	12
			Plants / vegetable food	13
			NTFPs [food only!]	14
			Food [unspecified]	15
			Other	16
	Water	2	Drinking water	21
			Industrial water	22
			Water Other	23
			Irrigation water [unnatural]	25
			Water [unspecified]	26
	Raw materials	3	Fibers	31
			Timber	32
			Fuel wood and charcoal	33
			Fodder	34
			Fertiliser	35
			Other Raw	36
			Raw materials [unspecified]	37
			Sand, rock, gravel	38
			Biomass fuels	39
	Genetic resources	4	Plant genetic resources	41
			Animal genetic resources	42
			Genetic resources [unspecified]	43
	Medicinal resources	5	Biochemicals	51
			Models	52
			Test-organisms	53
			Bioprospecting	54
	Ornamental resources	6	Decorative Plants	61
			Fashion	62
			Decorations / Handicrafts	63
			Pets and captive animanls	64
Regulating	Air quality regulation	7	Capturing fine dust	71
			Air quality regulation [unspecified]	72
			UVb-protection	73
	Climate regulation	8	C-sequestration	81
			MDS-production	82
			Climate regulation [unspecified]	83
			Microclimate regulation	84
			Gas regulation	85
	Moderation of extreme events	9	Storm protection	91
			Flood prevention	92
			Fire Prevention	93
			Prevention of extreme events [unspecified]	94
	Regulation of water flows	10	Drainage	101

			River discharge	102
			Natural irrigation	103
			Water regulation [unspecified]	104
	Waste treatment	11	Water purification	111
			Soil detoxification	112
			Abatement of noise	113
			Waste treatment [unspecified]	114
	Erosion prevention	12	Erosion prevention	121
	Maintenance of soil fertility	13	Maintenance of soil structure	131
			Deposition of nutrients	132
			Soil formation	133
			Nutrient cycling	134
	Pollination	14	Pollination of crops	141
			Pollination of wild plants	142
			Pollination [unspecified]	143
	Biological control	15	Seed dispersal	151
			Pest control	152
			Disease control	153
			Biological Control [unspecified]	154
Habitat	Maintenance of life cycles	16	Nursery service	161
			Refugia for migratory and resident species	162
	Maintenance of genetic diversity	17	Biodiversity protection	171
Cultural	Aesthetic information	18	Attractive landscapes	181
	Opportunities for recreation and tourism	19	Recreation	191
			Tourism	192
			Ecotourism	193
			Hunting / fishing	194
	Inspiration for culture, art and design	20	Artistic inspiration	201
			Cultural use	202
			Inspiration [unspecified]	203
	Spiritual experience	21	Spiritual / Religious use	211
	Information for cognitive development	22	Science / Research	221
			Education	222
			Cognitive [unspecified]	223
	Existence, bequest values	23	Existence value	231
			Bequest value	232