



Investing in nature-based solutions

State-of-play and way forward for public
and private financial measures in Europe

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1 Foreword

Healthy ecosystems play a key role in regulating our climate. Yet, while nature is our greatest ally in the fight against climate change, it is being destroyed at an unprecedented rate. The nature and the climate crises are inextricably linked. We cannot tackle one without addressing the other.

We know that nature's significant potential to alleviate global challenges is undervalued, untapped and under-resourced. Nature-based solutions, whether traditional or innovative, provide us with almost a quarter of the most cost-effective climate actions and help biodiversity to thrive, yet they are still on the margins of global finance. The challenge of scaling up nature-based solutions is clear and cannot be accomplished without the active support of the private sector in partnership with the public sector.

This report, by the European Investment Bank's Innovation and Digital Finance Advisory Division, is the culmination of a key strategic partnership with the European Commission, aimed at fostering nature-based solutions to climate change and reversing biodiversity loss. It assesses the current state of deployment of nature-based solutions in Europe — in large part supported by the EU budget — and draws lessons from our joint implementation of the pioneering Natural Capital Financing Facility pilot programme, which ran from 2015 to 2022. In particular, the report makes recommendations to increase support for nature-based solutions at scale across our continent's varied landscape, from forests and cities, to coastlines and cultivated fields.

The path ahead of us, to protect and restore nature and improve our resilience to climate change, is complex but promising. It is also full of opportunities. As the European Union's climate bank, we are taking up the challenge, in close cooperation with the European Commission and in support of the European Green Deal. We invite you to be part of the solution, with nature.

Ambroise Fayolle, Vice-President, European Investment Bank

2 Executive Summary

The European Commission defines nature-based solutions as “Solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions.” Nature-based solutions must therefore benefit biodiversity and support the delivery of a range of ecosystem services.

In 2022 the United Nations General Assembly countries adopted a resolution on nature-based solutions¹ which includes the framing of the concept and a multilaterally agreed definition: Nature-based solutions are actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services and resilience and biodiversity benefits.

Nature-based solutions are both a means of addressing socio-economic challenges through biodiversity conservation and restoration and building resilience to the consequences of climate change through mitigation and adaptation using natural processes. The defining premise of wishing to increase the uptake of nature-based solutions is that encouraging and adopting nature in solutions to society’s challenges is expected to be superior to the use of alternatives, due to the multiple benefits that they provide, and/or their lower cost over the long term.

Nature-based solutions is nevertheless a broad term with a number of different definitions and interpretations, some of which, for instance, require a net positive outcome for nature. For the purpose of mapping their use throughout Europe in this report, nature-based solutions are to be understood as on-the-ground interventions that benefit different ecosystems and landscapes under pressure and that generate a series of environmental (co)-benefits.

Objective of the Report

Humankind’s dependence on functioning natural processes cannot be overstated, although it is largely taken for granted. In economic terms, more than half of the world’s total gross domestic product (GDP) is estimated to be moderately or highly dependent on nature and biodiversity. Agriculture, food and beverages, and construction are the largest economic sectors dependent on nature, generating \$8 trillion in gross value added per year. The World Economic Forum estimates that investment in nature-based solutions needs to at least triple in real terms by 2030 and increase fourfold by 2050 if the world is to meet its climate change, biodiversity and land degradation targets. This acceleration would equate to cumulative total investment of up to \$8.1 trillion, and a future annual investment rate of \$536 billion.

The main challenge of financing the increased uptake of nature-based solutions is that the majority of nature’s benefits currently have no financial market value, despite the fact that nature underpins our collective survival and prosperity. In the policy discourse on nature-based solutions, there is little discussion about the key structural challenge stemming from the “public good” dimension of such investments, which fundamentally reduces the incentive for the private sector to invest. This both explains the status quo and provides a road map for expanding the use of nature-based solutions from its current low base, where it is largely fostered and paid for by the public sector, by attracting greater private sector involvement and allowing for a greater range of funding and financing mechanisms. If the necessary conditions can be established, nature-based solutions could represent an opportunity for private sector investment in the pursuit of sources of revenue that would bring the benefits of increased resilience and lower costs.

The objective of this report is to take stock of the current use of nature-based solutions in the European Union by identifying the operational and financing challenges faced by projects in different landscapes and ecosystems (such as in urban, forestry, agricultural, wetland, river/lake and marine/coastal

¹ UNEP/EA.5/Res.5: <https://wedocs.unep.org/bitstream/handle/20.500.11822/39864/NATURE-BASED%20SOLUTIONS%20FOR%20SUPPORTING%20SUSTAINABLE%20DEVELOPMENT.%20English.pdf?sequence=1&isAllowed=y>

environments) and to set out some possible solutions. The analysis is based on publicly available sources of information, supplemented by access to key databases of active nature-based projects in Europe and extensive consultations with a range of stakeholders throughout 2022. The analysis is supplemented by key lessons learned from the EIB's implementation of the Natural Capital Financing Facility (NCF) pilot programme since 2015, in close partnership with the European Commission. The report concludes with key recommendations from a finance perspective to support the future uptake and scaling up of nature-based solutions in the European Union.

Current use and potential scale of nature-based solutions in the EU

An extensive review of existing databases and online information was carried out in order to understand the current state and diversity of nature-based solutions in the European Union. The databases compiled covered a total of 1 364 projects with on-the-ground implementation within the European Union and the United Kingdom, the largest collection of information on nature-based projects in the European Union of which the authors are aware. Nevertheless, there are significant gaps in the data (also widely referenced in the literature on nature-based solutions globally), thus the conclusions that can be drawn are more qualitative in terms of the types of projects being implemented and the total scale. In some landscapes, the potential for nature-based solutions coincides with the overall potential for ecosystem restoration. The following conclusions can be drawn:

- **Public funding dominates financing for nature-based solutions** (in line with the published literature). Only 3% of the projects identified report private sector financing that covers more than 50% of a project's total cost.
- **Projects based on nature-based solutions are typically small in scale.** Based on the data collected, 72% of projects cover less than 1 km² and 81% have investment costs of less than €10 million (44% reported costs below €1 million)².
- **The current rate at which nature-based solutions are being implemented is slow.** In most ecosystems (as defined in the report), the expected scale of their use over the next decade is significantly lower than their potential, based on ecosystem conditions.
- **The agricultural landscape/ecosystem is unique in terms of the funding available.** There is currently sufficient funding available for nature-based solutions through the common agricultural policy (CAP) to finance many more potential opportunities for nature-based solutions in the European Union and their related benefits. However, significant questions remain about the efficiency and effectiveness of current expenditure for nature-based solutions from this funding source.

Below is an indication of the scaling potential across the different ecosystems/landscapes, summarising some of their key characteristics.

² The large share of urban projects in the database may be the reason for the disproportionate number of smaller projects.

Figure 1 Summary of the potential for upscaling nature-based solutions (NBS) by ecosystem

High opportunity for NBS growth	<p>Urban</p> <ul style="list-style-type: none"> • Many policy instruments are readily available for urban nature-based solutions (e.g. use of building codes to encourage/require green roofs) • High population density results in a greater number of people deriving benefits from nature-based solutions, which in turn can enhance demand • Examples: urban heat and flood mitigation, aesthetic greening 	<p>Forestry</p> <ul style="list-style-type: none"> • Strong potential for revenue streams through carbon credits and ecotourism revenues • Poorly managed commercial forests provide a significant opportunity for nature-based solutions, through the potential for enhanced carbon sequestration and for nature-based actions to achieve policy goals (such as the EU Nature Restoration Law targets) • Key challenge: risk profile of long-term maturity rates linked to the slow growth rates of plantings 	<p>Agriculture</p> <ul style="list-style-type: none"> • Significant potential for NBS funding through the common agricultural policy (CAP) • Such funding could be directed towards current NBS instruments under the CAP that are underused, or additional nature-based solutions through CAP reform • CAP reform can also reduce negative incentives that undermine nature-based solutions
Medium opportunity for NBS growth	<p>Rivers and lakes</p> <ul style="list-style-type: none"> • Lack of incentives for private investment due to the public good nature of benefits derived from these ecosystems (biodiversity improvements are difficult to finance privately) • However, the water management sector can invest in nature-based solutions to meet regulatory requirements and recoup costs from customers 	<p>Wetlands</p> <ul style="list-style-type: none"> • Peatland and wetland areas have significant carbon storage potential • Such ecosystems often overlap with agricultural landscapes, and their absolute area is relatively small due to historic land take actions 	
Low opportunity for NBS growth	<p>Marine and coastal</p> <ul style="list-style-type: none"> • Very few privately owned sites hinders the opportunity and incentive for private investment • Significant knowledge gaps mean that identifying areas in poor condition (and thus likely to be subject to demand for nature-based solutions) is challenging • A key driver for future nature-based solutions is public investment in risk reduction measures (flood risk, coastal erosion) • Restoring seagrass, kelp forests and coastal wetland areas for carbon sequestration and biodiversity are potential areas of growth 		

Financial Incentives, Barriers and Players

There is a public good dimension to nature-based solutions, as they are natural processes offering non-excludable benefits and co-benefits. Implementing and financing nature-based solutions is subject to a range of specific market failures and barriers, including information shortfalls (due to the lack of data on the benefits and trade-offs of nature-based solutions, skills and expertise shortages, and a lack of awareness among the general public), a failure to coordinate across public agencies, high transaction costs, long timeframes for financial returns and higher risk profiles than other comparable investment options.

Under the right conditions, public utilities (especially water utilities) and corporations would be well positioned to allocate capital to nature-based solutions. In most cases, their incentives align, as they have long investment timeframes in their core business and significant amounts of capital to deploy. Direct land ownership or significant influence over land in many cases would enable them to directly operate in the target areas. Importantly, the adoption of nature-based solutions can be justified through alignment with their long-term strategic considerations, for instance resilient supply chains reliant on natural systems or a social licence to operate, and their capacity to leverage customers' ability and willingness to pay either on a regulatory or voluntary basis.

Where the benefits of implementing nature-based solutions for the private sector do not exceed the costs, increased private sector investment to generate a return will require one or more of the following:

- **A change in market structures**, including regulatory interventions to provide direct incentives for private entities to either deploy nature-based solutions or to reduce the environmental impact of their economic activities;
- **The development of private markets for public goods**, such as extending carbon credit markets to cover biodiversity enhancement or pollution abatement, acknowledging the significant challenges in defining such certificates/credits and administering such markets;
- **Co-financing**, to blend public funds for the public benefits and private funds for the private benefits of investments in nature-based solutions.

To help nature-based projects generate revenues and unlock commercial sources of repayable finance, the study has identified specific sources of financial value creation to be considered, either in the form of revenue streams or financial value creation at project level:

- **Credits:** Selling credits related to the management of nature-based projects can generate significant returns and enable them to scale up. The most relevant are:
 1. Carbon credits
 2. Biodiversity credits (premium credits)
 3. Wetland credits
 4. Other credits (blue or other specific theme-related credits)
- **Insurance premiums:** In the form of parametric or community insurance and local/regional agreements. Agreements with insurance companies to reduce insurance premiums can free up finance for further investments in nature-based solutions.
- **Cost reduction:** This can be done through better resource management, reduced physical risk, and avoided operation and maintenance costs that can be modelled upfront, including key indicators for contracting the provision of nature-based solution services.
- **Product and commodity sales:** Including timber, produce and tourism.
- **Ecosystem service tax:** Lobbying for specific local or national taxes that will provide a revenue stream for specific nature-based projects to operate once established.

Identifying these revenue streams or cost reduction mechanisms can be helpful both for financiers to select the most promising projects and for project managers and developers to become more financially independent while scaling their operations.

A survey of more than 200 public and private investment professionals as well as project developers and managers was carried out, including 58 interviews. Despite expressing a deep interest in nature-based projects, private entities are still far from committing to large-scale capital deployment. It was confirmed that the vast majority of the capital allocated to nature-based solutions comes from public sources of funding — a combination of grants from the European Union or philanthropic sources and local or regional funding. From discussions with banks, asset managers and insurance companies, it was found that the typical EU-based investment in nature-based solutions is relatively small in financial terms, averaging less than €2 million per project. This is also confirmed by another recent survey carried out by the European Investment Advisory Hub in collaboration with the Natural Capital Financing Facility among EU financial intermediaries.

Nature-based solutions face a number of specific financial barriers that restrict the financial sector's involvement in projects in the European Union, namely:

- **Small individual investment size, and the scarcity and complexity of projects:** This makes it difficult for lending institutions to find an efficient approach that can cover costs and generate a profit.
- **Long investment horizons:** Investors in nature-based solution projects generally need to wait for a very long time (five to ten years or more) to start reaping the benefits of their investments. This is often linked to natural growth rates, but can discourage some financial entities, especially smaller ones, from entering the field.
- **The relatively higher cost of projects in the European Union:** This requires nature-based projects in the European Union to raise higher amounts of capital to remain in operation and attract investment capital, influencing investors' geographical focus. Outside the European

Union, investors in nature-based solutions tend to concentrate on the so-called Global South (Latin America, South-East Asia and Central Africa), where land, labour and material costs, as well as taxes and additional expenditures, are lower.

- **Regulatory hurdles and uncertainties:** Regulatory hurdles range from the lack of regulatory standardisation and the exclusion (so far) of some sectors from regulatory initiatives (such as the EU taxonomy) to regulatory silos impeding the pooling of funding and financing. Moreover, future EU-level rules to encourage the use of nature-based solutions, such as carbon farming, leave the role of finance relatively unclear, as promoters will be primarily focused on EU subsidies.
- **The availability and allocation of grants:** Early-stage grants currently tend to be awarded to research initiatives rather than projects that have the potential to generate revenues and become financially autonomous and scale up over time.

Project Development and Financial Structuring

Valuing nature, specifically assigning a cost to natural capital consumption or depletion (which currently exists mostly in the form of CO₂ emissions allowances), and estimating the benefits of nature and ecosystem services is associated with a number of difficulties. This makes the adoption of nature-based solutions to preserve nature harder to justify in financial terms and difficult to design, as they need to cater to multiple stakeholders and beneficiaries. The worldwide review of successful case studies highlights some crucial observations:

- **A large number of nature-based projects are not financed by a single financial product.** Instead, they are financed by a combination of different products, involving larger debt issuances (>\$15 million) by numerous backers.
- Instead of a one-size-fits-all instrument for nature-based solutions, successful case studies show that **tailored structures**, combining different funding, financing and revenue streams for various operations, are the most effective strategy.

The three main financing/funding tools used by development finance institutions and private entities for nature-based solutions in the European Union are:

- **Grant instruments:** Alongside direct public funding, these are by far still the most common tool used. They enable innovation and the development of new sectors, and can cover revenue shortfalls.
- **Loans (market-rate and concessional loans):** Market-rate loans are mostly used by private institutions, whereas concessional loans are granted by development finance institutions, governments or municipalities. From a project point of view, there is a risk that the beneficiaries will be unable to make regular repayments on the loan.
- **Equity instruments:** Equity instruments have the advantage of flexible cash flows (such as timber sales timed to market), but are less commonly used than grants and debt instruments. This is unlikely to change given the risk-adjusted returns sought by most equity investors as well as the lack of scalability and liquidity of many investments in nature-based solutions.

Other instruments available are mostly used outside the European Union but could become increasingly relevant in Europe. These include loans with equity features that provide a tailored distribution of risks and revenues. They also address concerns about the illiquidity of certain investments in nature-based solutions, and restrictions on the ability to hold ownership in the form of common equity. Some financiers have been exploring mixed equity instruments (for instance convertible loans to hedge such risks). Certain instruments could become more relevant as the level of investment in nature-based solutions grows, such as thematic bonds, sustainability-linked bonds (SLBs) and the use of carbon credits as collateral to access loans.

Importantly, the small size of projects raises the question of potential mechanisms for aggregating them and in particular de-risking at portfolio level. While generalist and complex portfolios are unlikely to be financially viable, requiring a subsidised approach, specialised vehicles and funds can be more efficient within certain sectors.

Outside the European Union, first loss instruments with public or philanthropic funding have been used for de-risking, in a similar way to investments supporting innovation or small and medium enterprises, but evidence from the survey of financial intermediaries in the European Union shows that the pipeline of nature-based projects is small and that the critical mass needed to support a portfolio approach does not currently exist.

Nature-based solutions face a number of specific barriers at the project development stage that need to be addressed to create a larger pipeline of potential projects:

- **The systemic issue of land availability, as well as cost and eligibility:** Access to and control over contiguous land is a necessary condition for investing in nature-based solutions. Major or strategic land acquisitions can face political/community resistance, and are often the biggest upfront cost in privately financed projects. Moreover, such costs are often considered to be ineligible for financing from publicly owned lenders, including the EIB. Easements with financial aspects, as they are known in the United States, allow remuneration or tax rebates for permanent changes in land use, but these are not widely used or considered sufficiently robust in many EU jurisdictions.
- **Regulatory hurdles:** Project developers and managers suffer from regulatory silos in certain sectors, requiring coordination and cooperation, which can be difficult and costly.
- **Long development/lead times:** In the absence of supportive regulation, the complexity of stakeholders, the hybrid nature of solutions, and often the need to provide multiple co-benefits, can add to the lengthy stakeholder facilitation and negotiation process. Few private sector promoters have the resources or investment horizon to drive and fund such processes.
- **Capacity constraints:** Insufficient human resources and technical expertise at project level, especially financial knowledge, restrict the development of complex nature-based projects or projects by small promoters. They may need to rely on external consultants to help them develop bankable projects, while this specific expertise is only just developing in the market. In some cases, the main bottleneck is a lack of resources to make supporting expertise available to developers on the ground that already have the local knowledge and existing relationships with stakeholders and communities.
- **Grey infrastructure as the default:** The current technical and political environment tends to favour “grey” solutions over green infrastructure, even when green infrastructure (which include nature-based solutions) would be the most cost-effective solution.

Main recommendations

The recommendations can be split into two main groups: financial recommendations and policy recommendations.

Policy, regulatory and institutional recommendations

- To deliver the scale of private sector investment desired by EU policy targets, governments should introduce regulations stipulating mandatory action (with financing drawn from lenders or capital markets, repayable from taxes and/or user fees) or increase the profit incentive for private sector participants to invest in nature-based solutions, due to the “public good” nature of such investments. Government intervention to provide stronger incentives could take three broad forms and be made at local, national and EU level:
 1. **Reward structures:** Reward structures provide financial payments for delivering nature-based projects, such as payments for ecosystem services (PES). These payments will encourage the private sector to implement nature-based solutions but may not significantly increase private investment (as the majority of funding may remain public).
 2. **Punishment structures:** Typically involving regulatory interventions, these punish private entities that do not consider nature-based solutions in their investment decisions, for example urban building codes that require new buildings to have green roofs.
 3. **Cap and trade markets:** These have regulatory underpinnings, such as regulatory limits on emissions or biodiversity loss, but allow trade between market participants to reduce the cost of achieving policy goals such as reducing carbon emissions and pollution and enhancing biodiversity.

- **The European Commission should mainstream nature-based solutions in EU legislation.** This would provide a key opportunity to influence their implementation. For example, the Commission could propose that nature-based options be considered before selecting pure grey infrastructure solutions in legislation such as the Floods Directive, or for stormwater management through the Urban Wastewater Treatment Directive.
- In addition, **regulation and financial instruments** (sharing outcome risk) could be developed to facilitate cooperation and co-financing among public entities to enable cross-sector project design and funding, in particular innovation in public-public and public-private cooperation. This could include creating a new class of regulated entity that would act as an intermediary between various services and authorities. It would be tasked with channelling multiple funding sources to nature-based solution programmes that would provide multiple co-benefits within urban and rural landscapes.
- **The common agricultural policy** could be reformed to more directly fund nature-based solutions in agricultural landscapes and reduce negative incentives for agricultural expansion into marginal agricultural areas. This is a prime policy opportunity, given the uniquely large scale of the policy's funding.

General financial recommendations

- **Provide early-stage capacity building and investment support** (including financial technical assistance). This could include:
 1. concessional loans and pay-for-results grants (for example, following the Reducing Emissions from Deforestation and Forest Degradation + (REDD+) model for landscapes);
 2. debt issuance through the securitisation of natural capital already owned by projects, using this as collateral for loans (land, CO₂ emissions, produce production);
 3. risk sharing/guarantees for projects that are most likely to receive co-funding from private institutions.
- **Support corporates** in the form of loans, including performance-linked loans, or guarantees to help fund or co-fund corporate investment in nature-based initiatives.
- **Diversify and bundle instruments.** Use multiple instruments and combine the synergies between different providers and instruments under one offering. The EIB and the European Commission could facilitate closer collaboration with multiple entities in the market such as development finance institutions in the relevant Member States, private investors and NGOs to support the development of nature-based projects throughout their seed and growth periods.
- **Offer a diverse range of grants and partnerships.** Offer grants with new criteria to encourage revenue-generating nature-based projects. Grants and equity could then be used to support innovative partnerships (public-private, public-public or private-private), which could unlock multiple revenue and benefit streams.
- Develop financing instruments to facilitate land restructuring, the acquisition/resale of land to create easements for nature-based projects, and the establishment of land trusts and/or nature restoration developers.
- Develop **de-risking** mechanisms for the key risks and characteristics of projects incorporating natural processes. These could include guarantees and contingent debt with insurance features, including portfolio de-risking.
- **Create mechanisms to overcome the limitations facing institutional investors** capable of taking on long-term financial commitments (such as insurance companies and pension funds) when considering investments in nature-based solutions, which are typically **illiquid** and have **long** investment horizons.

Conclusions and potential for intervention with EU financial instruments

The market mechanisms required for scaling nature-based solutions in the European Union are not currently available. Nevertheless, a diverse range of sectors is currently working on providing nature-based solutions, with varying degrees of potential. Regulation and subsidy reforms will be needed to create new incentives and remove support for the further erosion of nature, as well as to create new markets and revenues. Systemic and strategic issues, such as competition for land and water resources, will also need to be addressed. The need for climate resilience will become both an important driver and

design parameter for nature-based solutions. For nature-based solutions to become mainstream, their co-benefits and nature-related risks will need to be made clearer to guide investment decisions.

To accelerate the adoption of nature-based solutions to a range of societal challenges, there needs to be a regulatory agenda and an improved understanding of their benefits in order to foster innovative approaches and cooperation, as well as support for sectors with integrated planning.

Policies and regulations being introduced in support of nature-based solutions would need to be accompanied by tailored financial measures. The absence of a strong market driver means that there is a need for a coherent continuum of policy-driven instruments to cater for the entire range of project maturities, stages, sizes and risks. A more coordinated approach to investment grants, subsidies and repayable finance is needed to encourage deal flow, boost innovative examples, and overcome revenue gaps. Parallels can be drawn from other fields such as greenfield infrastructure and venture capital finance, which have funding and financing strategies for their different stages of development and growth.

In particular, there is an unmet demand for financing for innovative early-stage proposals and partnerships. This requires a combination of suitable seed/early-stage financing using a range of financial products and advisory support with flexible eligibility criteria that standard intermediated structures for smaller projects and businesses cannot realistically offer. Nevertheless, there are emerging innovative aggregators for land-based investments that will benefit from the bespoke de-risking of their portfolios, sharing risks on carbon payments or other novel revenue streams.

There is potential to partner with individual sectors and take advantage of the general corporate sustainability drive, with targeted, tailored conditions and advisory support to increase, improve and accelerate the incorporation of natural processes in planned interventions and supply chains, within the framework of larger financing transactions. As an emerging theme for the financial sector, there is potential for collaboration among financial institutions to increase familiarity with nature-based solutions and gain an understanding of their risks.

Based on the EIB's experience in implementing the Natural Capital Financing Facility (NCF) and other policy-driven instruments, and the opportunity to pursue nature-based solutions under the InvestEU programme (75% being implemented by the EIB), including advisory services through the InvestEU Advisory Hub, the following could be considered by the Commission and the Bank:

Increasing nature-based solutions and biodiversity-enhancing investments within the Bank's regular operations:

- Offering advisory services to promoters linked to flexibility for enhancing, increasing and implementing nature-based solutions within larger financing transactions, cooperating with the European Commission to develop guidance, with a particular focus on sectors that have the highest impact and investment potential.
- In particular, taking advantage of demand for nature and climate action among European corporates (typically larger and medium-sized creditworthy entities) driven by supply chain considerations and climate/sustainability pledges.
- Enhancing the natural capital/biodiversity dimension of advisory services focused on the environmental sustainability of financial intermediaries under the InvestEU programmes established for this purpose.
- Creating a new streamlined blending facility to provide a concessional financing element for aspects of projects that include nature-based solutions.

Building a financing continuum:

- Creating a new concessional instrument (primarily to bear equity-type risk in the form of "patient" debt, given illiquidity and avoidance of equity ownership) for small, innovative and early-stage projects, small and medium enterprises, partnerships with potential for partial financial autonomy and project aggregators. This instrument could have its own tailored eligibility criteria, beyond the EIB's and the European Commission's normal operating and governance framework, but complementary to/embedded within the EU grant support system (learning also from the implementation of the European Innovation Council Fund). This could be combined with an accelerator/advisory services component.

- Deploying existing thematic finance (InvestEU higher risk coverage) for innovative aggregators in land-based sectors, with sufficient size and ability to remunerate risk (for instance from carbon credits and other credits as they emerge on a more reliable basis).

Taking advantage of opportunities to develop **industry-level partnerships, for example:**

- With the insurance sector, given the level of sophistication involved in pricing natural hazard and climate risks.
- Among banks with high nature/climate exposures, such as those that work closely with the agricultural sector, as there is an opportunity to develop a track record for emerging regenerative practices, metrics and monitoring for biodiversity.
- With key NGOs and other players to provide pipeline visibility from an early stage of project development.

The further development of nature-based solutions and nature financing would benefit from continued EU backing through market overviews, financial support and advisory services, providing continued visibility and tracking across instruments and sectors. There is still a need to learn, share and adjust the overall approach in order to scale up nature-based solutions across Europe.

3 Introduction

Nature-based solutions (NBS) are increasingly being recognised for their potential to help address the twin challenges of climate change and biodiversity loss, in Europe and elsewhere around the world. Within the European Union, the implementation of nature-based solutions across all landscapes is considered key to achieving the ecosystem restoration goals of the EU Biodiversity Strategy for 2030. Nature-based solutions are also believed to be essential for achieving climate change mitigation goals and as a way to adapt to climate change.

Studies show that the current scale of investment in biodiversity protection and enhancement is insufficient to reach the European Union's ambitions goals for biodiversity by 2030, and that a significant increase in investment will be required from both public and private sources over the remainder of this decade and beyond.³ As a result, an increase in private investment in nature-based solutions is expected, through private finance (for example, investors in financial markets) and through direct investment in nature-based solutions by private sector entities (such as farmers, property developers or water companies). This is attracting significant interest from policymakers and the sustainable finance community. To date, the vast majority of investment in nature-based solutions has been publicly funded. A better understanding of private financing for nature-based solutions is needed, including the barriers that it faces and how it could play a greater role.

This report explores such questions, beginning with an analysis of the current scale of investment in nature-based solutions in the European Union. It then assesses the market features of nature-based solutions across different landscapes, and looks at the financial sector players that invest directly in nature-based projects, concluding with financial, policy and regulatory recommendations for future nature-based projects.

3.1 Defining nature-based solutions

Nature-based solutions is a broad and amorphous term that in essence responds to the predominant tendency of societies to address some social challenges using constructed assets from materials like concrete and steel ("grey solutions"), which are designed to manage nature for human benefit. As engineered solutions, grey solutions have certain advantages such as precision and reliability, and sometimes cost. But they also have many disadvantages, including their impact on ecosystems, their inability to adapt to changing circumstances, and their vulnerability in the face of a changing climate.

The defining premise of nature-based solutions is that encouraging and adopting nature in solutions to society's challenges will prove to be superior due to the multiple benefits that they provide and their potentially lower cost over the long term.

At the fifth session of the United Nations Environment Assembly (2022), countries adopted a resolution on nature-based solutions (UNEP/EA.5/Res.5⁴), which included a multilaterally agreed definition:

"... nature-based solutions are actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services and resilience and biodiversity benefits. ..."

This definition brings in elements of the definition given by the European Commission (2015), *"Solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through*

³ For example, see: European Commission, Directorate-General for Environment, Nesbit, M., Whiteoak, K., Underwood, E., et al. (2022). Biodiversity financing and tracking: final report. Publications Office of the European Union. <https://data.europa.eu/doi/10.2779/950856>

⁴ <https://wedocs.unep.org/bitstream/handle/20.500.11822/39752/K2200677%20-%20UNEP-EA.5-Res.5%20-%20Advance.pdf?sequence=1&isAllowed=y>

*locally adapted, resource-efficient and systemic interventions*⁵ and the definition given by the International Union for Conservation of Nature — IUCN⁶ (2016), which states that nature-based solutions are “actions to protect, sustainably manage, and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.”

One way to interpret these definitions of nature-based solutions is that they are investments that address a societal need while concurrently providing additional benefits to nature. For example, an urban park that is designed to flood during heavy rainfall provides a flood mitigation service that might otherwise be provided by concrete channels to quickly remove flood water, while also providing a habitat for biodiversity and an aesthetic natural environment for the community to enjoy.⁷

The challenge that this broad definition creates in practice for identifying and measuring the scale and scope of investment in nature-based solutions is discussed further below.

3.2 Project objective, scope and approach

The overall objective of this assignment is to identify and assess the access-to-finance conditions for innovative nature-based projects in the European Union. This includes identifying market failures, barriers and bottlenecks to their implementation, and offering recommendations on how to improve financing solutions (including technical assistance) in order to accelerate the market uptake of nature-based solutions.

The geographic scope of interest is simple to define as the physical boundaries of the European Union plus the United Kingdom. However, the conceptual scope of nature-based solutions is very difficult to define — there is no definitive list of “official” actions, and they occur across sectors and landscapes at different scales and for a multitude of purposes. While imperfect, the term “ecosystem restoration” is a useful synonym in most contexts with the definition of nature-based solutions contributing to nature and natural features.⁸ Other terms used in specific contexts and sectors include green/blue infrastructure, natural water retention measures, ecosystem-based adaptation, and ecosystem-based disaster risk reduction.

3.3 Report structure

The report is structured as follows:

- Analysis begins in Section 4 with an overview of the current and potential landscape of nature-based solutions in the European Union. This section presents a consolidated overview of all the data collected on nature-based solutions in the European Union, highlighting where significant limitations in the data exist.
- Section 5 of the report explores nature-based solutions at the ecosystem/landscape level, considering the specific context of each ecosystem and the market features that each possesses. This provides greater detail on the specific types of interventions undertaken in each ecosystem, to help the reader understand what nature-based solutions look like on the ground in specific contexts.
- Section 6 assesses the current state of the market for nature-based solutions, and potential market trends from the perspective of the financing sector.
- Section 7 assesses the barriers to the development of the market for nature-based solutions.
- Section 8 compiles nature-based revenue streams for project selection.

⁵ https://ec.europa.eu/info/research-and-innovation/research-area/environment/nature-based-solutions_en

⁶ https://portals.iucn.org/library/sites/library/files/resrecfiles/WCC_2016_RES_069_EN.pdf;
<https://www.iucn.org/news/europe/202007/iucn-global-standard-nbs>

⁷ An example: <https://storymaps.arcgis.com/stories/de464dbdeb8940a599345361174333d0>

⁸ Where an ecosystem is categorised as being in poor condition, it can be expected that additional demand for nature-based solutions exists within that ecosystem.

- Section 9 provides recommendations on financing, policy and regulation with a view to increasing private investment in nature-based solutions.
- Section 10 reviews the EIB's experience in implementing the Natural Capital Financing Facility (NCF) between 2015 and 2022.

4 The current landscape and potential scale of nature-based solutions in the European Union

This section presents the data available on nature-based solutions in the European Union. As noted above, the definition of nature-based solutions is broad, resulting in a large array of intervention types that differ by ecosystem/landscape, but also by size within and between categories. For example, an urban park restoration project that traps stormwater for natural filtration and flood mitigation could include any number of other natural solutions, while physical and financial scale could differ by orders of magnitude. As a result, simply counting the number of projects or areas may fail to fully capture the scale of investment in nature-based solutions.

Furthermore, the data on the financial scale of nature-based projects in the European Union is incomplete, meaning that they cannot give a full picture of the level of investment.

Nevertheless, it is useful to compile all the data available on nature-based solutions in the European Union, as a consolidated overview does not, to the authors' knowledge, exist.

Data overview

To compile an overview of nature-based projects in the European Union, the project team searched databases and other online sources for any information about nature-based projects involving physical interventions (therefore excluding “capacity-building”, education or awareness-raising projects). The team reviewed 28 databases, directly contacted a number of database owners (particularly the Urban Nature Atlas⁹, Oppla¹⁰, Biodiversa¹¹ and the NWRM Platform¹²), engaged with Horizon 2020/Horizon Europe projects, and performed additional online searches. They gathered data describing a total of 1 364 physical nature-based projects in the European Union and the United Kingdom carried out since 2000. The projects were largely self-described as nature-based solutions through their respective databases, but additional terms were also used to search for projects (such as “ecosystem restoration”, “green/blue infrastructure” and “ecosystem-based adaptation”).

The projects identified were categorised into six ecosystem types based on the seminal MAES study¹³. This was done not only due to data availability constraints (the largest source of ecosystem reporting stems from Habitats Directive obligations, which broadly uses a form of the MAES ecosystem classification), but also because it provided a logical delineation of nature-based actions relevant to specific contexts. The terms “ecosystems” and “landscapes” are used interchangeably throughout this report and are also applied to artificial environments such as urban or heavily modified agricultural areas. Given that nature-based solutions are inherently human-centric (i.e. actions undertaken to enhance the delivery of ecosystem services, which in turn benefit human well-being), it can be deduced that supporting the implementation of nature-based solutions requires human-centric structures encompassing land-use planning and financial markets to configure landscapes to their benefit.

Before analysing the data, it is worth repeating that significant gaps exist in the information gathered through this process. In many cases, this is because of gaps in the original source data that the project team were unable to fill. For example, information was missing on physical scale (30% of projects did not report this data), identified impact (98% of projects), financial investment size (57% of projects), investor splits (82% of projects), financing instruments (30% of projects) and land tenure (49% of projects).

⁹ <https://una.city/>

¹⁰ <https://oppla.eu/>

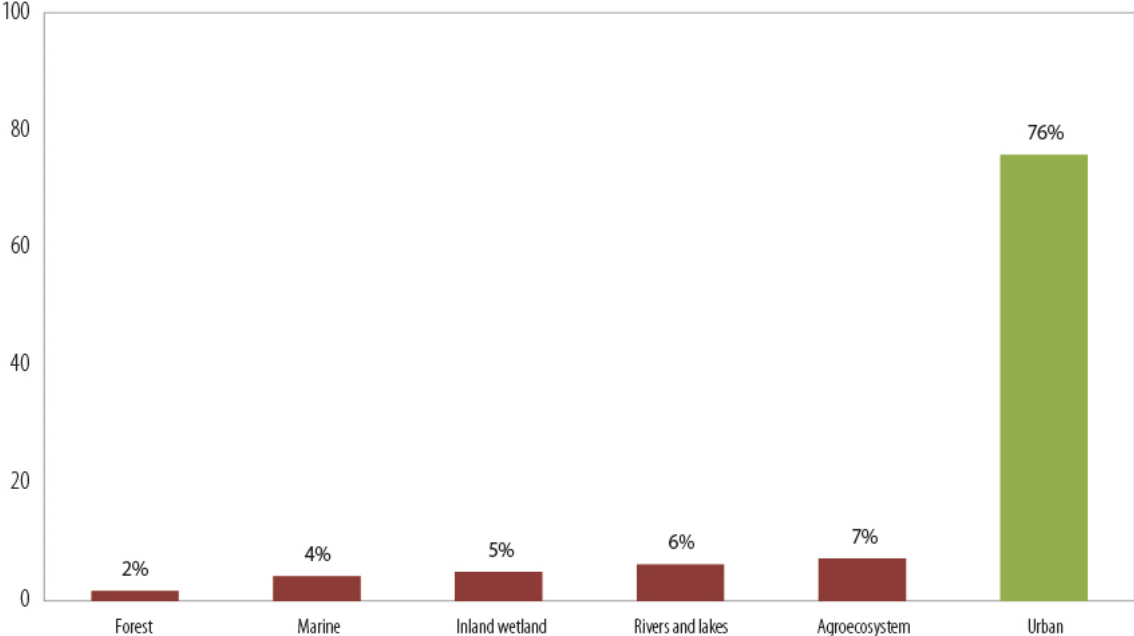
¹¹ <https://www.biodiversa.org/>

¹² <http://nwrn.eu/>

¹³ <https://publications.jrc.ec.europa.eu/repository/handle/JRC120383>

The vast majority of projects (76%) were categorised as urban. While this perhaps reflects the dominance of nature-based solutions in urban ecosystems, it likely also demonstrates that, despite the scale of the data collected, significant gaps remain across ecosystems. The remaining projects were relatively evenly spread across ecosystems, with forest ecosystem projects perhaps under-represented by project number (see Figure 2).

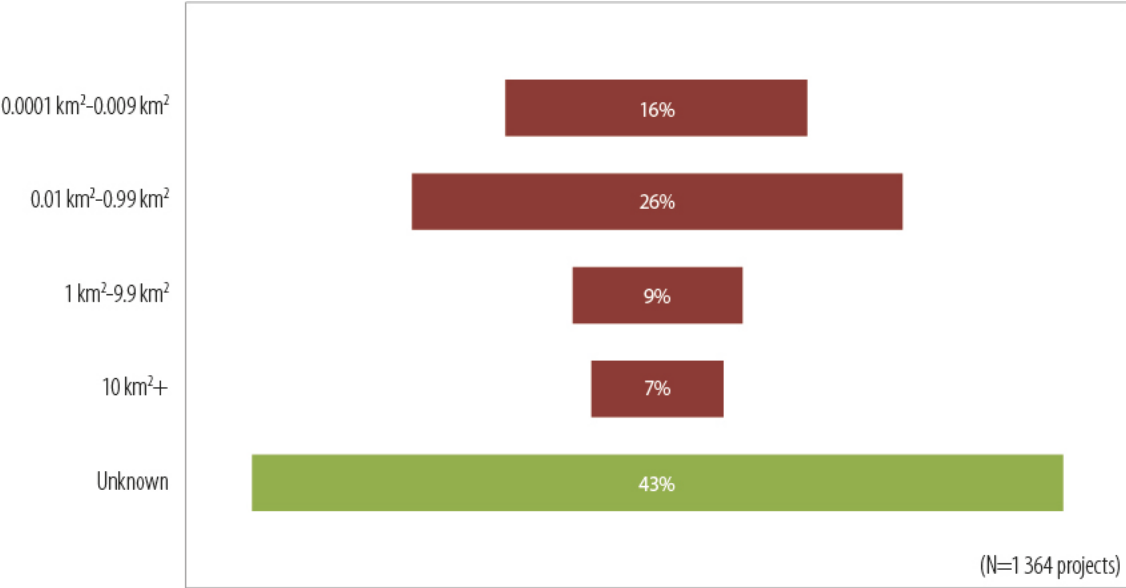
Figure 2 Nature-based solutions projects by ecosystem (N=1 364 projects), 2000-2022



In terms of location, the majority of nature-based actions (16%) were carried out in the United Kingdom, closely followed by Germany (13%) and France (10%). This highlights that examples of nature-based solutions in other countries may not have been added to databases that are populated in English. The percentage of nature-based solutions found in Germany and France is unsurprising given their geographical size. Following this logic, we could expect to see more nature-based solutions deployed in Sweden (3%) and Finland (1%), which are also relatively large.

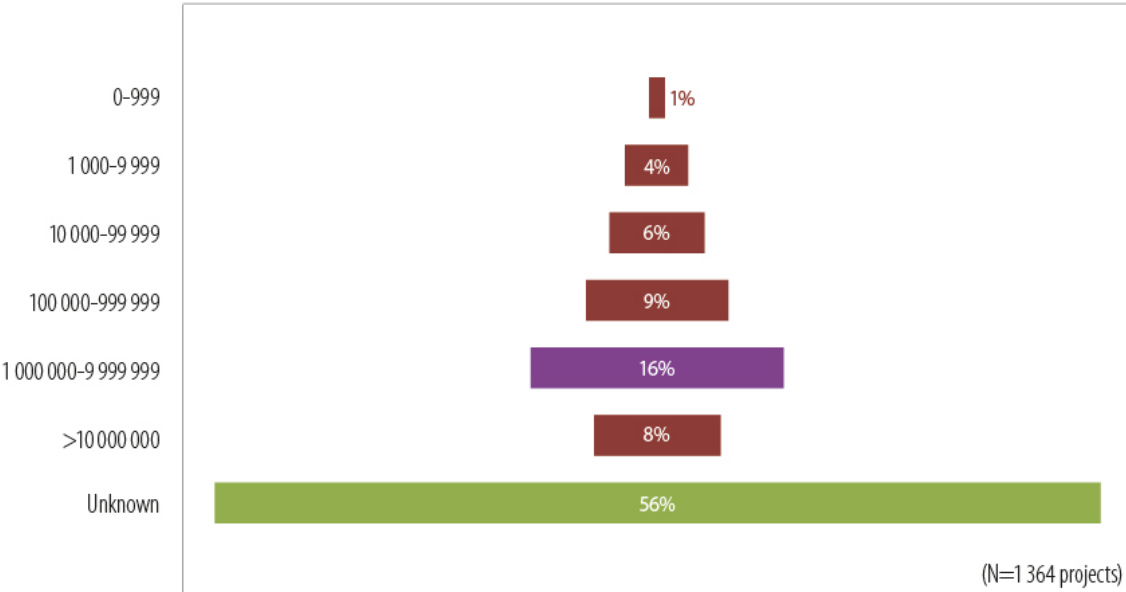
In relation to scale, a large minority of nature-based solutions identified (42%) did not contain any data on the scale of their implementation. For those that did, most tended to be smaller projects (below 1 km²), largely driven by the number of projects located in urban environments (with limited space available and higher land values).

Figure 3 Nature-based solutions projects by size (km²), 2000-2022



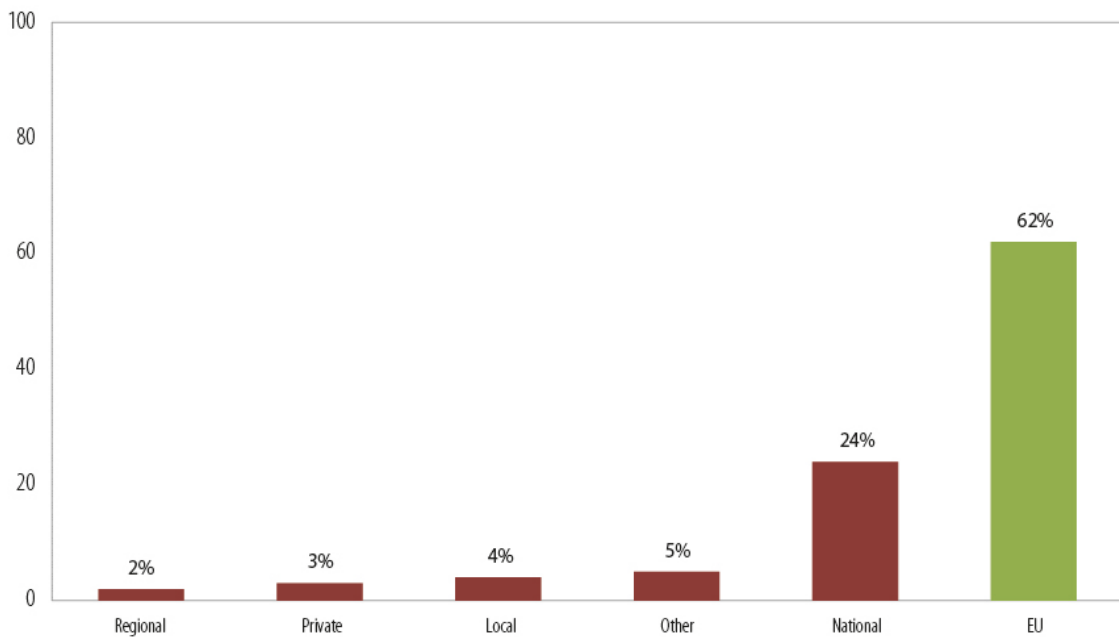
In relation to the size of the financial investment, significant data gaps were identified across all ecosystems — 56% of the projects did not provide any financial data. The majority of known investments tended to be between €1 million and €10 million.

Figure 4 Nature-based solutions projects by investment size (€), 2000-2022



When looking more closely at the financing data, the primary providers of finance (covering over 50% of the total project costs) are largely EU-funded programmes (through financing mechanisms such as LIFE) and national governments. Figure 5 below provides an overview of the main investors, excluding “unknown” investors (which constituted 84% of all data entries). “Other” investors included environmental organisations and NGOs. As shown in the figure below, EU funds are the most common main investor in nature-based solutions. However, the data available do not enable a breakdown of the specific funding mechanisms used.

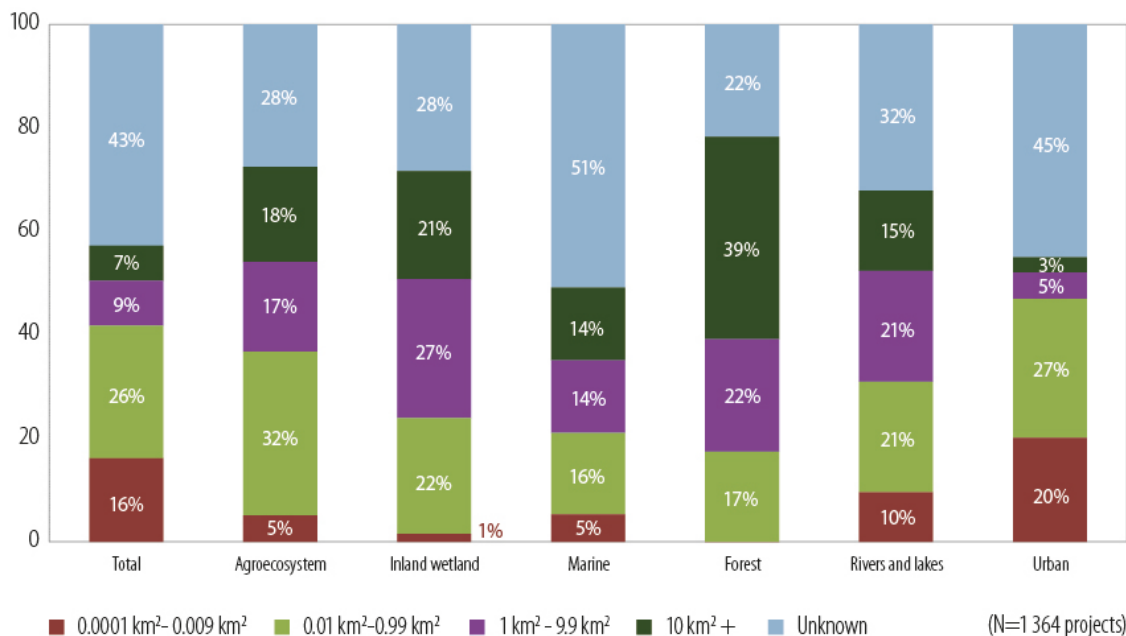
Figure 5 Main investors in nature-based solutions (covering over 50% of total project costs), 2000-2022



Note: Only 16% of the 764 projects disclosed information on their predominant investor (defined as providing over 50% of total project costs).

Figure 6 below shows the physical scale of nature-based projects per ecosystem. Urban projects are the smallest category in terms of size, with 20% of them measuring less than 100 m² and almost 50% of them less than 1 km².

Figure 6 Scale of nature-based solutions projects (km²) per ecosystem, 2000-2022



The largest projects are found in the forestry ecosystem, while almost half of marine projects do not provide information on project scale. The types of nature-based projects identified varied considerably, depending largely on the ecosystem they were implemented in. The following section presents an ecosystem-by-ecosystem overview of the predominant types of nature-based solutions implemented, along with information on their financing per ecosystem.

5 Ecosystem analysis

This section drills deeper into the data and analysis of nature-based solutions in the European Union by exploring projects in each of the six ecosystems. Each subsection looks at:

- What the project-level data tell us about the scale and characteristics of nature-based projects in that ecosystem, and our thoughts about how accurately the data likely depict the reality of nature-based solutions in that ecosystem.
- The expected “total” potential scale of nature-based solutions in that ecosystem, by considering ecosystem conditions and the scale and cost of the nature-based investment needed to bring the ecosystem into “good” condition (as per the categorisation of the Habitats Directive).
- The “market” for the provision of nature-based solutions in that ecosystem, and key barriers to scaling up.

As noted above, the terms “ecosystem” and “landscape” are used interchangeably throughout this report. The following analysis is split into ecosystem/landscape categories, as this provides a logical split in terms of the types of projects. To elaborate, for the purpose of this report, nature-based solutions are defined as on-the-ground interventions that are specifically implemented to generate a series of environmental co-benefits. Logically, such interventions will aim to provide benefits in a specific context (i.e. ecosystem/landscape), based on the pressures/drivers experienced within that context.

5.1 Agro-ecosystems

Agro-ecosystems consist of two agriculturally dominated ecosystem types: cropland¹⁴ (covering an estimated 36% of the European Union’s total land area) and grassland¹⁵ (covering 12%). They include land that is used for both permanent and temporary cultivation, in addition to areas composed of semi-natural features such as hedgerows, tree lines and field margins.¹⁶

5.1.1 Nature-based solutions in agriculture

For our database of nature-based projects, we identified 98 projects within agro-ecosystems (see Figure 7). Most of these relate to soil management practices such as increasing the nutrient holding capacity of soil matter or preventing soil erosion, with the ultimate objective of enhancing agricultural productivity while contributing to positive biodiversity outcomes. Other common nature-based projects include crop management practices, largely involving crop rotation to control pests and to improve soil structure, with the aim of improving food security. Landscape restoration actions were also common, including a range of nature-based solutions designed to alter water flows in agricultural areas close to wetlands and the conversion of land to enhance agricultural productivity (such as conversion to permanent grasslands).

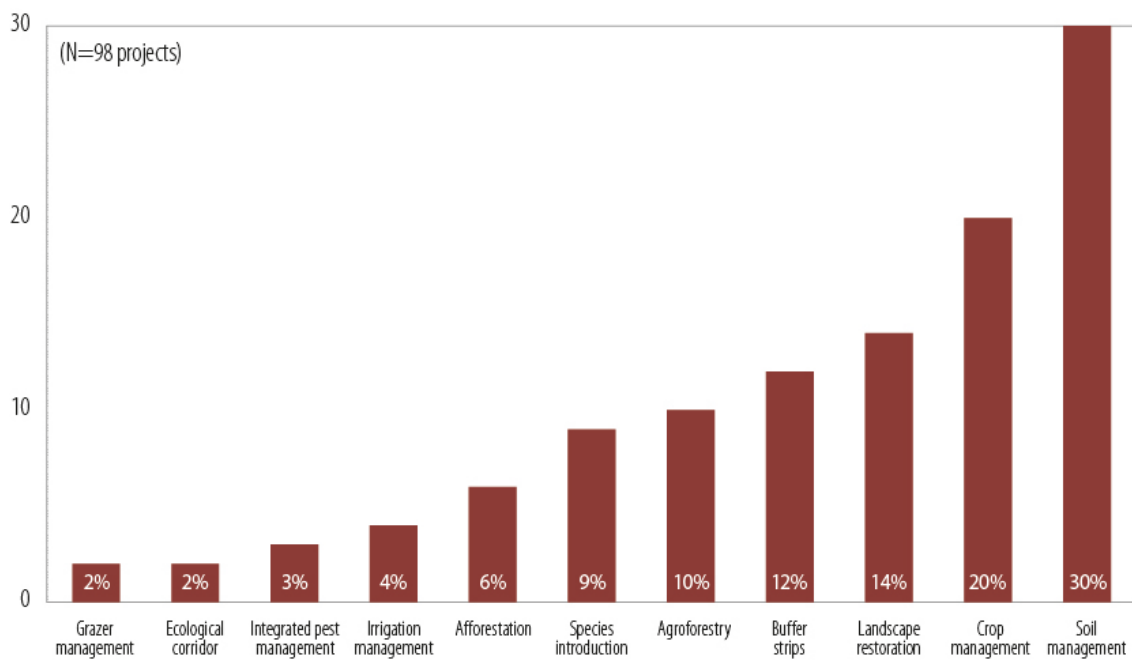
The median scale of the projects found within agro-ecosystems was 0.94 km², with the largest project reaching 10 000 km². The total scale of the projects that have been implemented within agro-ecosystems since 2000 was calculated as approximately 13 500 km², with an investment value of €68 million.

¹⁴ Croplands are broadly categorised as ecosystems covering communities of plants that have been modified by people to produce food, feed, fibre, energy and a range of other products for human consumption.

¹⁵ Grasslands are areas covered by grass-dominated vegetation, including pastures, meadows and natural grasslands.

¹⁶ Ibid.

Figure 7 Nature-based solutions implemented in agro-ecosystems, 2000-2022



5.1.2 Reflections on the data — agriculture

While the types of interventions in agro-ecosystems in the data collected are likely to be representative of the types of actions undertaken in practice, the scale of intervention is highly likely to be unrepresentative of the total level of nature-based solutions implemented across the European Union, for several reasons. The most prominent reason is that common agricultural policy (CAP) funding specifically for nature-based actions across the European Union covers an estimated minimum investment of between €10.4 billion and €15 billion annually (see Table 1 below) from “greening” and agri-environment-climate measures (AECMs),^{17,18} which dwarfs the scale of investment reported here. Data reporting on CAP expenditures for nature-based solutions is inadequate, with little reported on the type of action implemented in different locations, and no record of any monitoring or impacts.¹⁹ However, the sheer scale of investment strongly suggests that huge financial investment could boost support for nature-based solutions in agro-ecosystems, even if analysis suggests that the environmental performance of these investments could be improved.²⁰

The lack of projects found outside of Italy, France, Spain, Germany and the Netherlands during this data collection process supports the logic that actual investment in agricultural nature-based solutions is higher than recorded. Other EU countries such as Poland have large agricultural areas in poor ecological health and might therefore be expected to have larger amounts invested in nature-based solutions.

¹⁷ Under the common agricultural policy, two predominant strands of funding are available for farmers to encourage environmental benefits: CAP Pillar I covers greening measures, which seek to implement “Ecological Focus Areas”, and the maintenance of permanent grassland; and CAP Pillar II funding is devoted to agri-environment-climate-measures (AECMs) and organic farming (the only two measures under Pillar II relevant to nature-based solutions where data on funding exist).

¹⁸ ECA (2017). Greening: a more complex income support scheme, not yet environmentally effective. European Court of Auditors. Available at: <https://www.eca.europa.eu/en/Pages/Docitem.aspx?did=44179>; Pe’er, G. et al. (2017). Is the CAP fit for purpose? An evidence-based fitness check assessment. Leipzig, German Centre for Integrative Biodiversity Research (iDiv), Halle-Jena-Leipzig.

¹⁹ Pe’er, G. et al. (2020). Action needed for the EU Common Agricultural Policy to address sustainability challenges. *People Nat*, Volume 2(2), pp. 305–316. Available at: <https://doi.org/10.1002/pan3.10080>

²⁰ Previous evaluations have found that measures under the common agricultural policy do not effectively nor efficiently support positive environmental impact. See: European Commission, Directorate-General for Agriculture and Rural Development (2020). Evaluation of the impact of the CAP on habitats, landscapes, biodiversity. Publications Office of the European Union, Luxembourg. <https://data.europa.eu/doi/10.2762/818843>

Some financing data are available for 84% of the projects, but typically only the primary funder (usually the European Union) is mentioned, with no record of co-financing from other stakeholders. The funding data also rarely distinguish between capital expenditures and operating expenditures. For the majority of projects identified, there is no information on financing instruments, and those that did report this information were mostly financed by grant funding and donations (with the majority of projects including funding from the European Commission's LIFE programme).

Of the 24 projects that specified investor types, only two were found to be led by private investors. This reflects the likely reality that most funding for nature-based solutions in agro-ecosystems is sourced from public funds (primarily the common agricultural policy, as discussed further below).

5.1.3 Potential scale of nature-based solutions in agriculture

To estimate the total potential scale of nature-based solutions in agro-ecosystems, the authors analysed the extent and condition of this ecosystem across the European Union, drawing on Habitats Directive reporting, combined with average restoration costs per hectare. This is an imperfect but useful way of estimating the likely maximum scale of nature-based solutions in this ecosystem.

5.1.3.1 Demand

It is important to begin by outlining the scale at which comprehensive data are available within agro-ecosystems, making a clear differentiation between the utilised agricultural area (UAA) and the Habitats Directive's agriculture reporting scale.

The utilised agricultural area, which is the total area occupied by arable land currently in production, in addition to permanent crops, grasslands and vegetable gardens, covers approximately 1.8 million km² in the European Union and the United Kingdom. However, there is often insufficient monitoring and reporting information available for this area, meaning that it is not possible to estimate the potential demand for nature-based solutions. To do so would require an analysis of Habitats Directive reporting.

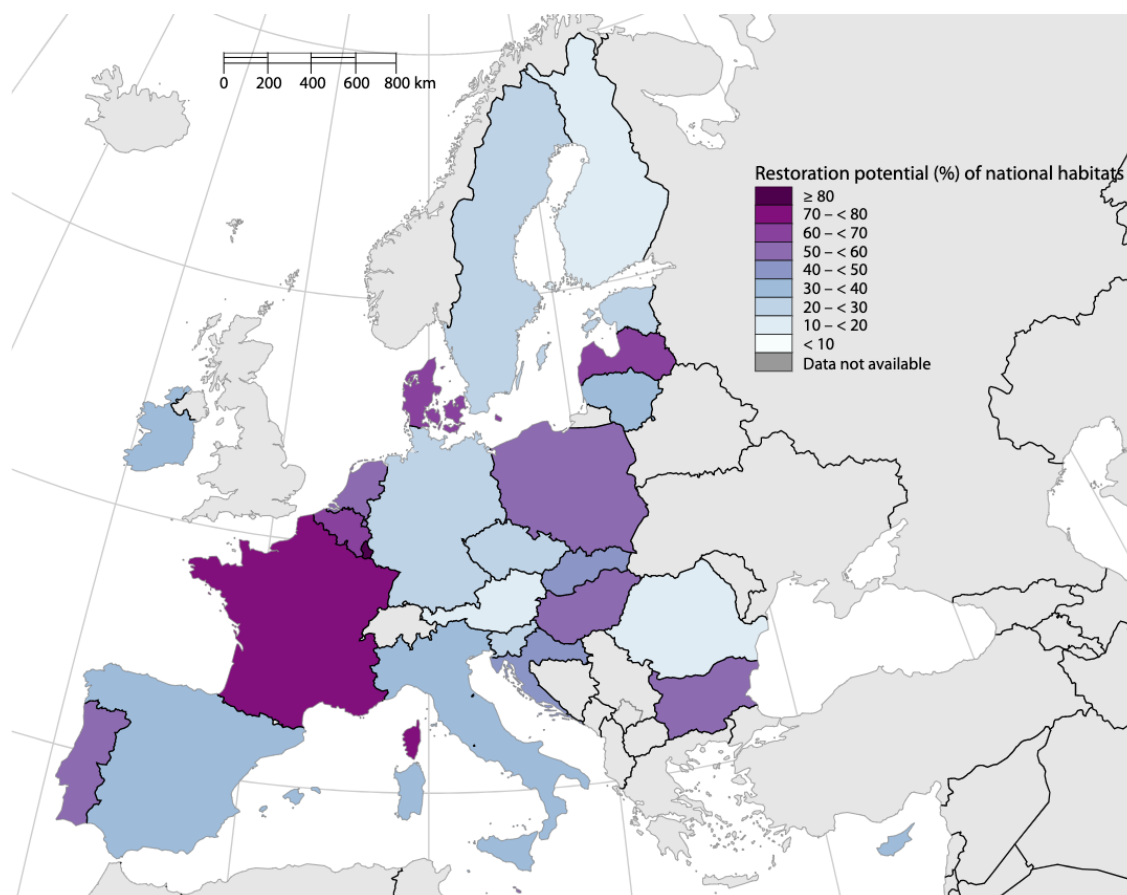
Habitats Directive reporting covers approximately 10% of the total utilised agricultural area. Using this data, we can estimate the scale of degraded area²¹ at 61 000 km². This can be interpreted as a proxy for the demand for nature-based solutions in agricultural landscapes in the European Union (i.e. the amount of land requiring actions to improve the condition of the ecosystem, including interventions such as nature-based solutions. Figure 8 presents this estimated demand across Member States). Assuming that similar levels of degraded area encompass the broader utilised agricultural area,²² the total utilised agricultural area that is degraded is approximately 615 000 km².

The data collected in the database are not restricted to Habitats Directive classification; they broadly categorise examples of nature-based solutions in the wider agriculture setting (i.e. the utilised agricultural area). Therefore, the 13 500 km² of nature-based solutions calculated in section 1.4.1 is significantly smaller than the demand, estimated at 615 000 km². This suggests that there is significant scope for scaling up nature-based solutions in agro-ecosystems.

²¹ This includes habitats reported as "not good" and assumes half of those reported as "unknown" will likely also require some level of restoration.

²² Acknowledging this is likely to be a conservative estimate as agricultural areas under Habitats Directive reporting are likely to be more diverse, have greater ecological importance and be in a better condition than areas outside this reporting.

Figure 8 Distribution of agro-ecosystems in need of restoration action. Map shows the relative restoration potential (%) of the total national agro-ecosystem habitats as reported by Member States under the Habitats Directive.



5.1.3.2 Investment

Comparing demand for agricultural nature-based solutions against *actual* investment is challenging. There is a lack of information on specific funding for nature-based solutions under the common agricultural policy (CAP).²³ Therefore, the biodiversity tracking expenditures reported under the multiannual financial framework (MFF) can be used as a proxy for investment in nature-based solutions under the policy.²⁴ As shown in Table 1 below, the data indicate that approximately €66.3 billion of CAP expenditure has been directed towards nature-relevant measures since 2014 (an average of €9.06 billion annually).

Table 1 — CAP biodiversity expenditure reported under the multiannual financial framework, 2014–2020

Fund	Contribution to biodiversity financing (€ million)						
	2014	2015	2016	2017	2018	2019	2020
EAGF	3 316	3 273	6 030	5 795	5 856	5 868	5 903
EAFRD	1 592	5 489	5 640	4 336	4 339	4 433	4 438

*Note that values for 2019-2020 were reported as estimates.

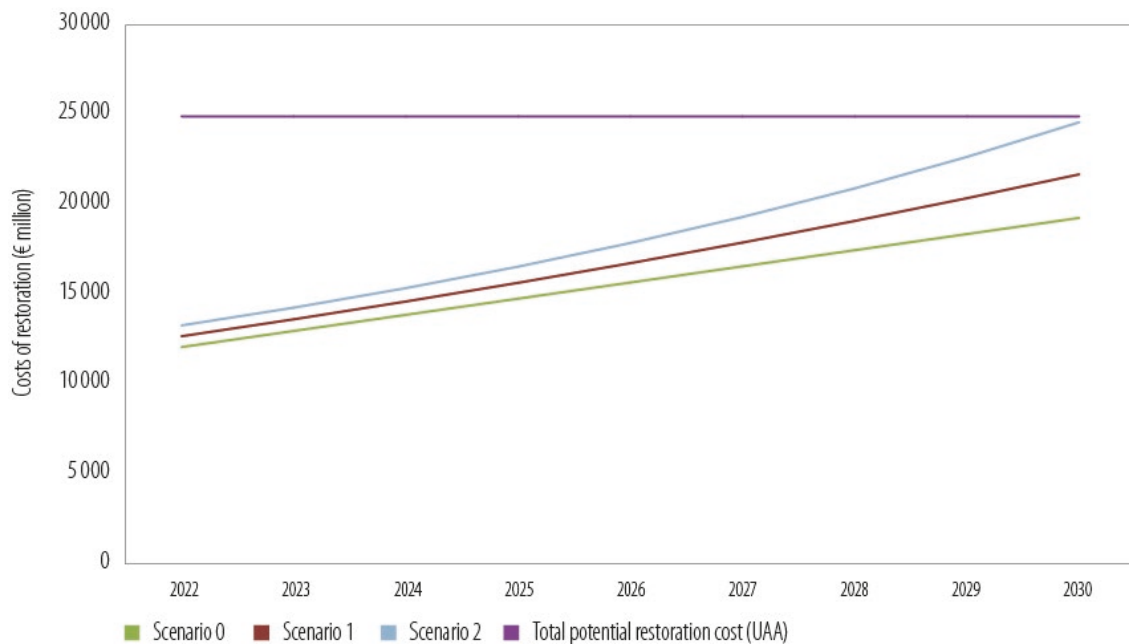
²³ Davis, M. et al. (2017). Nature-based solutions in European and national policy frameworks. Deliverable 1.5, NATURVATION. Horizon 2020 Grant Agreement No 730243, European Commission.

²⁴ The European Commission has developed a methodology to track how much expenditure is directed towards measures that could potentially have a positive impact on biodiversity within its multiannual financial framework (MFF). As nature-based solutions can benefit biodiversity, it is assumed here that biodiversity finance expenditure from CAP-related funds under the MFF (EAGF and EAFRD) provide a reasonable estimate of nature-based solutions expenditure under the common agricultural policy.

Based on these data points, we can compare the estimated “total demand” for agri-ecosystem nature-based solutions with the current rate of investment in such solutions through the common agricultural policy to better understand the scale of investment in this context. We can project this data forward to 2030 and see whether the current scale of investment in agri-ecosystem nature-based solutions is sufficient to significantly address the needs for such solutions in the agri-ecosystem over this period. This was done by:

- Assessing the total projected change in expenditure levels under the common agricultural policy for nature-based solutions measures. This was done by calculating the average, annual fluctuations in spending from the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD), as indicated in Table 1 (€9.06 billion annual average change), and projecting this annual change to 2030. This represents **scenario 0** in Figure 9 below.
- Assuming moderate (5% — **scenario 1**) and ambitious (10% — **scenario 2**) annual growth of this expenditure up to 2030.
- Applying the previous €40 833 per km²²⁵ cost estimate for agro-ecosystem restoration interventions (recognising this is an imperfect proxy for nature-based actions) to the estimated degraded area, to calculate a total of €25 billion in expenditure required per year until 2030 to restore agro-ecosystems (indicated by “**total potential restoration cost (UAA)**” in Figure 9 below).

Figure 9 Potential demand for investment in nature-based solutions in agro-ecosystems, per year, to 2030



The figure above reveals an interesting story: it appears that the ambitious growth scenario of a 10% increase in expenditure on nature-based solutions under the common agricultural policy could get close to the total potential restoration costs required in agro-ecosystems. Under current expenditure trends (scenario 0), it would take until 2037 to restore agro-ecosystems.

However, it is worth recognising that financial possibilities may not necessarily translate into significant restoration action and nature-based projects, nor effective and efficient outputs. While the most recent evaluation of the common agricultural policy notes that there are some effective measures and

²⁵ Tucker, G. et al. (2012). Estimation of the financing needs to implement Target 2 of the EU Biodiversity Strategy. Technical Annexes. Report to the European Commission. Institute for European Environmental Policy.

instruments that may significantly contribute to conservation, it also finds that the combined effect of the policy has not been sufficient to counteract the pressures on biodiversity from agriculture, based on the evidence gathered²⁶. When assessing how CAP instruments and measures have contributed to the goals of the Birds and Habitats Directives, the study reports that even with significant intervention under the policy, biodiversity and habitat conservation continues to decline²⁷. This brings into question the effectiveness of the investments being made rather than their scale.

This report's findings indicate that the sheer size of CAP expenditure, when applied on the basis of the conservation status of habitats under Annex I of the Habitats Directive, could make a significant contribution to achieving restoration targets if spent efficiently on high-quality nature-based solutions. However, as assessments of the policy have shown, past implementation has not resulted in a significant contribution to biodiversity or agro-ecosystem habitat restoration. This suggests, on the one hand, that a simple reform of the measures for implementing the policy could be enough to significantly increase investment in nature-based solutions and narrow the existing investment gap. On the other hand, the failure of investment to translate into effective action also means that the actual investment gap for nature-based solutions that exists, and thus the extent of its true needs and market scale, remains largely unknown.

5.1.4 Market analysis — agriculture

Agricultural market participants in nature-based solutions include farmers on whose land the interventions take place, as well as external funders, the large majority of which have been public entities to date. In the European Union, investment primarily comes from the common agricultural policy and other EU funding sources. There are few third-party private investors in agricultural projects, and most examples in our database were philanthropic or NGO investors that were not expecting a financial return from their investment.

Like all investments in nature-based solutions, agricultural projects typically produce a mix of public and private benefits. Figure 10 illustrates the actual estimated costs and benefits of an investment in nature-based solutions in an agricultural landscape, drawing on the Wendling Beck case study in the United Kingdom. Costs include the additional capital and operating costs of the investment, as well as the lost revenue from agricultural output and associated agricultural subsidies (as the project reduces the scale of agricultural production).

As can be seen in the chart, the benefits of the project include biodiversity gains, a reduction in pollutant loads to waterways, carbon sequestration, and flood mitigation. In this example, due to the United Kingdom's regulated markets for biodiversity credits (biodiversity net gain²⁸) and pollution load abatement to waterways (nutrient neutrality²⁹), revenue streams associated with these benefits exist. However, where these markets have not been created by governments, these benefits are "public goods" that receive no revenue. If these revenue streams are removed from the project, it becomes uneconomic, as the remaining revenue streams are insufficient to justify investment.

This is the general market challenge facing the private financing of nature-based projects where public benefits are not monetised and private benefits are insufficient to justify investment.

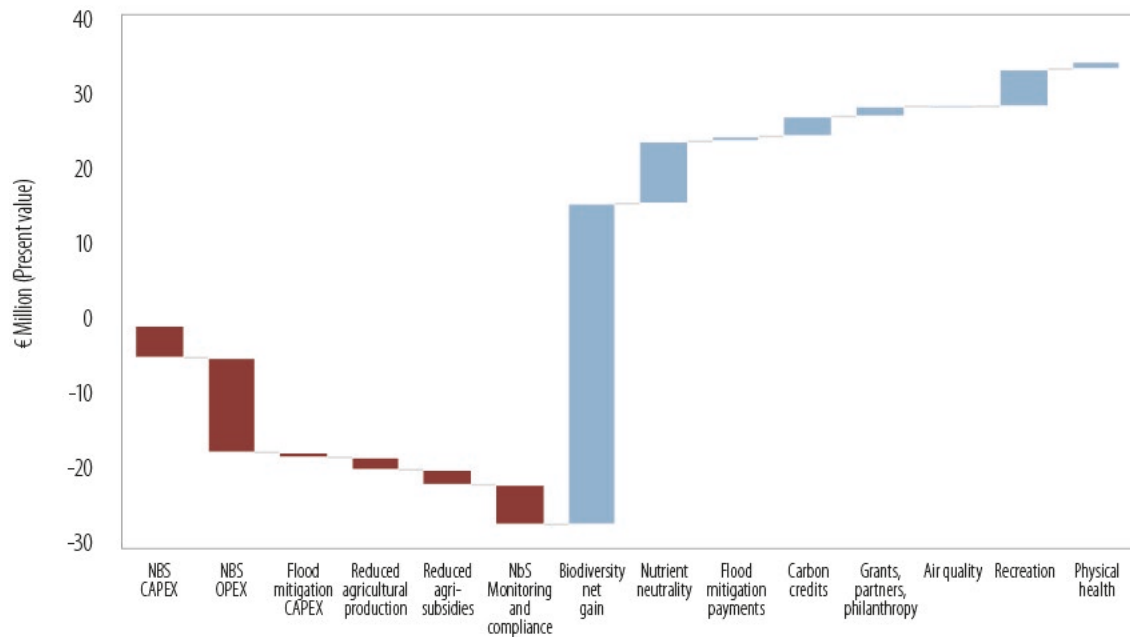
²⁶ European Commission, Directorate-General for Agriculture and Rural Development (2020). Evaluation of the impact of the CAP on habitats, landscapes, biodiversity. Publications Office of the European Union, Luxembourg.
https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/key_policies/documents/ext-eval-biodiversity-final-report_2020_en.pdf

²⁷ Ibid.

²⁸ Planning Advisory Service (2022). Biodiversity Net Gain for local authorities. Available at:
<https://www.local.gov.uk/pas/topics/environment/biodiversity-net-gain>

²⁹ North Norfolk District Council (2022). Nutrient Neutrality. Available at: <https://www.north-norfolk.gov.uk/tasks/development-management/nutrient-neutrality/#:~:text=What%20is%20Nutrient%20Neutrality%3F,River%20Wensum%20and%20The%20Broad>

Figure 10 Present value financial costs and revenue streams of landscape-scale investments in nature-based solutions in an agri-ecosystem (Wendling Beck)³⁰



Within the European Union, the most striking difference between the market for nature-based solutions in agriculture compared to all others is that it is the only one that has a large and dedicated public funding stream through the common agricultural policy. No other ecosystem has such a centralised and coordinated funding mechanism of such significant scale. Furthermore, the volume of funding available under the policy appears to be sufficient to cover the large-scale addition of nature-based solutions, if effectively and efficiently applied. Despite major criticisms regarding the effectiveness and efficiency of the current allocation of CAP funds for biodiversity outcomes³¹ (a criticism that also applies to the carbon abatement performance of the policy),³² the sheer scale of this policy component could provide a sufficient volume of investment to successfully address the need for nature-based solutions in this market, if it were efficiently and effectively used.

The other market feature of the common agricultural policy that influences investment in nature-based solutions on agricultural land is the general flat-rate payment structure of CAP Pillar I, which provides subsidies to farmers based on the area of land under cultivation. This provides a direct financial incentive to expand the area of land under production, including into more marginal farming land that could otherwise provide an important ecosystem function (such as peatland or previously forested highland areas). The flat-rate subsidy makes these marginal agricultural areas more profitable than they would otherwise be by providing an additional revenue stream. Conversely, it provides a disincentive to implement nature-based solutions projects that would return these areas to their previous function. Any decision to make such investments must find a revenue stream to counteract the loss of the CAP subsidy.

³⁰ Source: analysis undertaken by the authors based on data provided by the Wendling Beck project. Please note that this chart uses real data supplied by the Wendling Beck project team. Subsequent charts in this report are illustrative only and do not use real data.

³¹ See https://www.idiv.de/fileadmin/content/iDiv_Files/Documents/peer_et_al_2017_cap_fitness_check_final_20-11.pdf and https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/key_policies/documents/ext-eval-biodiversity-final-report_2020_en.pdf

³² European Court of Auditors (2021) Special report 16: Common Agricultural Policy and climate: Half of EU climate spending but farm emissions are not decreasing. Available at: <https://www.eca.europa.eu/en/Pages/Docitem.aspx?did=58913>

5.1.5 Conclusions – agriculture

The lack of information available relating to investment in nature-based solutions under the common agricultural policy, such as the lack of data on implementation and monitoring, means that it is challenging to provide an accurate overview of the projects that have been implemented within agro-ecosystems and the opportunities that exist. Nonetheless, given the scale of degradation and therefore the need for nature-based solutions in agro-ecosystems, and the fact that a specific financial instrument designed to achieve environmental goals exists, there is significant potential for nature-based solutions in these landscapes.

However, as assessments of the common agricultural policy have shown, past implementation has not made a significant contribution to biodiversity or habitat restoration in agro-ecosystems. This suggests, on the one hand, that a simple reform of the measures for implementing the policy could be enough to significantly increase investment in nature-based solutions and narrow the existing investment gap.

On the other hand, the failure of investment to translate into effective action also means that the actual investment gap for nature-based solutions that exists, and thus the extent of its true needs and market scale, remains largely unknown.

From a market perspective, the key challenge for nature-based solutions in agricultural ecosystems is the mix of public and private benefits that these investments produce, and monetising them where specific markets for these benefits do not currently exist.

Beyond the common agricultural policy, the European Commission has proposed a number of legislative and policy initiatives that may increase the use of nature-based solutions in agriculture if enacted by Member States:

- Legally binding restoration targets, including for agricultural ecosystems³³
- Implementation of the Pollinators Initiative, currently under revision³⁴
- A proposal in the Biodiversity Strategy for 2030 to reduce the use of chemical pesticides by 50% and reduce the use of more hazardous pesticides by 50%
- A proposal in the Biodiversity Strategy for 2030 to use CAP implementation to restore high-diversity landscape features in 10% of the European Union's agricultural area
- A proposal in the Biodiversity Strategy for 2030 to have at least 25% of agricultural land under organic farming management, using CAP Strategic Plans
- A proposal in the Biodiversity Strategy for 2030 to reduce the loss of nutrients from fertilisers by 50%, resulting in a reduction in fertiliser use of at least 20%
- Potential inclusion of agricultural activities within the EU taxonomy, although a decision on this has not yet been made.³⁵

Combined, these appear to be significant drivers for nature-based solutions in agricultural ecosystems, although apart from the legally binding restoration targets (which will address only 8.5% of agricultural land), it is not clear what instruments will be used to deliver these outcomes.

5.2 Forests

Forests are the largest terrestrial ecosystem type in the European Union and in 2018 covered 1 770 997 km² or 39% of the European Union's land area.³⁶ As with agro-ecosystems, the most comprehensive data available for forests that can help paint a picture of the condition of the ecosystem

³³ https://ec.europa.eu/environment/strategy/biodiversity-strategy-2030/eu-nature-restoration-targets_en

³⁴ https://ec.europa.eu/environment/nature/conservation/species/pollinators/policy_en.htm

³⁵ Political discussions on the inclusion of agricultural activities (and their respective screening criteria) within the taxonomy are ongoing, with discussions expected to continue throughout 2023.

³⁶ European Environment Agency (2020). Mapping Europe's ecosystems. Available at: <https://www.eea.europa.eu/themes/biodiversity/mapping-europes-ecosystems/mapping-europes-ecosystems>

stem from Habitats Directive reporting, although this only covers a fraction of the total forested area.³⁷ Therefore, estimations provided here only apply to areas under Habitats Directive reporting.

5.2.1 Nature-based solutions in forestry

Common nature-based solutions in forests include reforestation of areas that have been previously deforested, afforestation of previously unforested areas, as well as restoration activities that increase biodiversity outcomes in already forested areas through sustainable forest management practices. These include species introduction and control measures such as tackling invasive alien species, grazing management and water management actions.

In total, only 23 nature-based solutions projects in forests were identified through the data collection process, most of which focused on restoring ecosystems (71%). Actions included species introduction or control measures (36%), such as grazing management, tackling invasive species and planting vegetation, afforestation/reforestation (22%), including the construction of ecological corridors, and water management (21%), such as reconnecting forest and wetland water regimes and irrigation to control burning seasons. 13% of the interventions concerned the conservation and/or sustainable management of ecosystems and the creation of new, engineered ecosystems to reduce the impacts of climate change.

Despite the small sample of nature-based projects in forests, the results of the most frequently implemented nature-based solutions are in line with expectations. Practices such as planting trees and reintroducing plant and animal species are relatively low-cost and easily available. Species introduction/control measures are often implemented in relation to recent trends in pests (such as beetle bark infestations), whereas water management techniques (often in combination with various other categories of nature-based solutions) can be implemented to limit the impact of forest fires.

The total scale of nature-based solutions projects in forestry ecosystems in our database is approximately 1 600 km² with a median of 9.37 km². These projects accounted for a total investment of approximately €35.7 million between 2000 and 2021.

5.2.2 Reflections on the data — forests

Forest ecosystems can overlap with others such as agro-ecosystems or rivers and lakes (for example, agroforestry projects and nature-based solutions on alluvial plains), meaning that the projects we have identified likely underestimate the actual use of nature-based solutions in this ecosystem.

There are many information gaps in the data. For example, 22% of projects did not provide any information on the physical scale of implementation and only half of the projects contained publicly available information on the investments and their total cost. The very limited information on financing instruments that was available was predominantly related to EU grant funding from the LIFE programme. The relative lack of nature-based solutions projects in forests across Europe could be due to the significant proportion of forests under private ownership, as these are not subject to reporting obligations.

The data presented above are likely to significantly underestimate the scale of nature-based solutions used in forests throughout Europe. For example, some of the most commonly implemented actions are afforestation and reforestation/revegetation. If one looks at that measure alone, 34% of the forested area of the European Union and the United Kingdom is due to afforestation and regeneration by planting and/or seeding. Therefore, even when removing instances of afforestation/reforestation that do not integrate the principles of nature-based solutions (such as the plantation of monocultures), we would expect to see far more projects than our database captures. Recent trends show that approximately 20 000 km² have been afforested/reforested since 2000 alone (an annual rate of 969 km²).³⁸

³⁷ Calculated at 357 952 km².

³⁸ Forest Europe estimates an afforestation rate of approximately 6 430 km² annually within the MAES classification of forests in the European Union. When applied only to forests under the Habitats Directive classification, this amounts to approximately 5 969 km² annually. Forest Europe (2020). State of Europe's Forests 2020. Available at: https://foresteurope.org/wp-content/uploads/2016/08/SoEF_2020.pdf

Afforestation/reforestation clearly does not encompass all the actions related to nature-based solutions that have been carried out in forest ecosystems throughout Europe. Climate change-related impacts on forests are becoming more pronounced throughout Europe (forest fires, droughts and soil erosion); therefore, measures to conserve and expand our forests continue to be implemented on a large scale. This includes nature-based solutions. Instances of practices such as the conservation of deadwood, ecological process areas and soil protection actions were not found in any databases. We can therefore confidently conclude that our estimates of the use of nature-based solutions in forests are likely to be significantly lower than in reality.

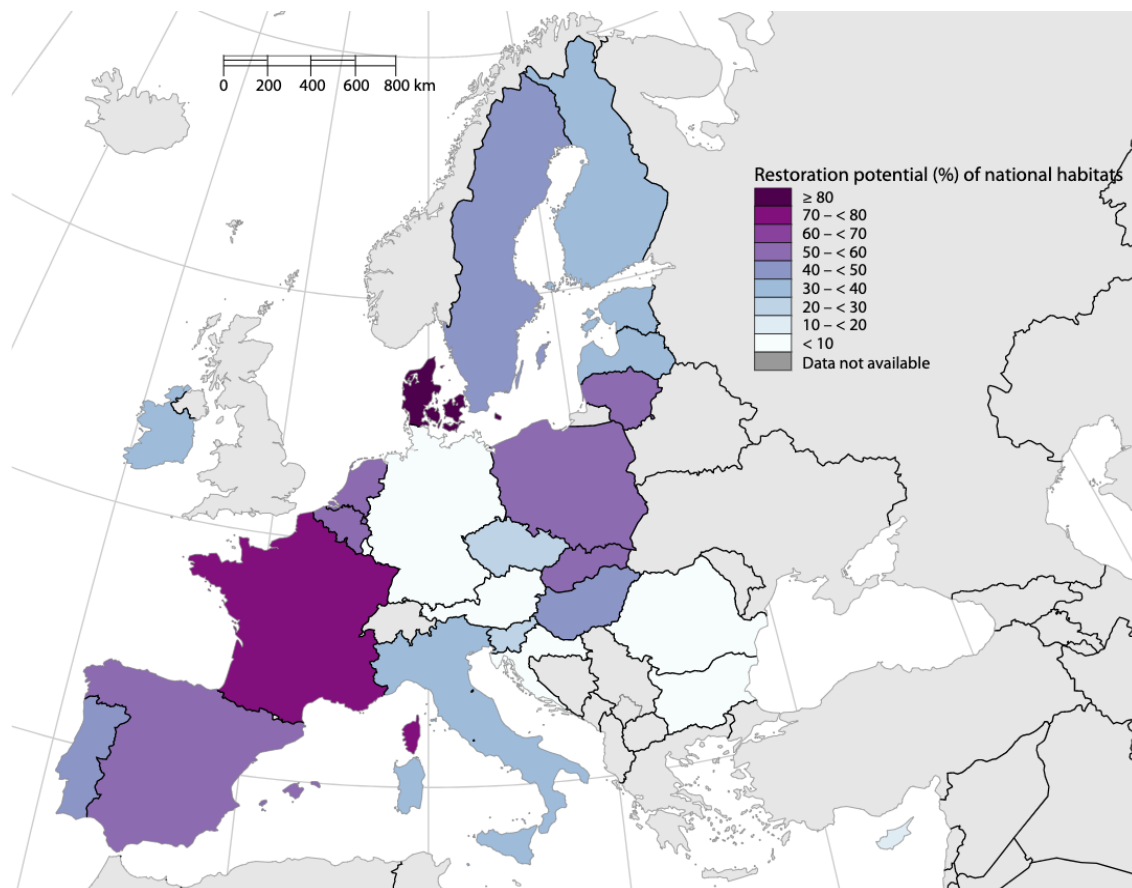
5.2.3 Potential scale of nature-based solutions in forests

5.2.3.1 Demand

The vast majority (84%) of EU forest habitats are currently reported as having “poor” or “bad” conservation status, while only 16% have a “good” conservation status. There are, however, notable differences between the types of forests. For example, Mediterranean forest habitats generally have the highest proportion of forests with good status, while Boreal forests are in the most unfavourable condition (100% with unfavourable status).

Using the reported surface area of forest ecosystems in “poor/bad” condition,³⁹ an estimate can be made using condition as a proxy for demand for nature-based solutions in forest ecosystems. This generates an estimate of 137 000 km² of forests in need of nature-based solutions in the European Union. The map below shows the distribution of this “demand” across the European Union.

Figure 11 Distribution of forest ecosystems in need of restoration action. Map shows the relative restoration potential (%) of the total national forest ecosystem habitats as reported by Member States.



³⁹ As per Habitats Directive reporting, which indicates that of the 357 952 km² of forest habitats, 79 210 km² are in “not good” condition. In addition, this report assumes that 50% of those classified as “unknown” are also in “not good” condition.

5.2.3.2 Investment

Calculating the exact current spending on nature-based solutions in forests is not possible, given the high level of private ownership of forests across the European Union and the resulting lack of reporting procedures. In order to reach an estimate, a series of assumptions must be made. First, we assume that the average costs of *restoring* forest ecosystems are the same as the costs required for *nature-based interventions*. This is calculated at €430 000 per km².⁴⁰ Secondly, we assume that the likely scale of nature-based solutions implemented in forest ecosystems is approximately 969 km² a year (calculated from the annual change in forest coverage⁴¹). This is a significantly larger area than estimated in our database, but as it is based on afforestation alone, it is considered to be a more accurate depiction of the actual implementation of nature-based solutions in forests. Multiplying these figures together gives a current estimate for the expenditure on nature-based solutions in forests of €417 million per year.

Using this estimate as a starting point, future projections can then be made out to 2030. This was done by:

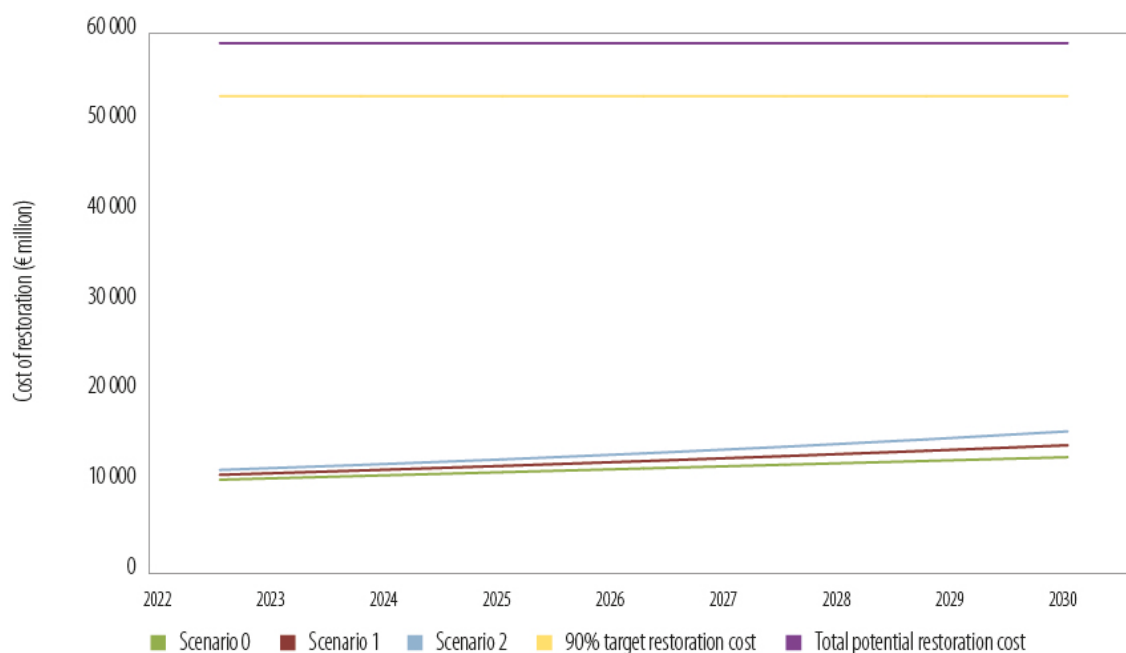
- Using the €417 million average annual expenditure on nature-based solutions in forests, assuming a constant cumulative increase until 2030 (**scenario 0**);
- Assuming moderate (5% — **scenario 1**) and ambitious (10% — **scenario 2**) annual growth rates of this expenditure up to 2030;
- Applying the previous cost estimate of €430 000 per km²⁴² for forest restoration interventions (while recognising this is an imperfect proxy for nature-based solutions actions) to the estimated degraded area (i.e. the “demand” for nature-based solutions in forests, estimated above at 137 000 km²), to calculate a total of €59 billion of expenditure required to restore forest ecosystems (indicated by “**total potential restoration cost**” in Figure 12 below).

⁴⁰ Trinomics et al. (unpublished). Support to the Impact Assessment of the EU Biodiversity Strategy to 2030.

⁴¹ Data taken from Forest Europe (2020). State of Europe’s Forests 2020. Available at: https://foresteurope.org/wp-content/uploads/2016/08/SoEF_2020.pdf

⁴² Tucker, G. et al. (2012). Estimation of the financing needs to implement Target 2 of the EU Biodiversity Strategy. Technical Annexes. Report to the European Commission. Institute for European Environmental Policy.

Figure 12 Potential demand for investment in nature-based solutions in forest ecosystems, comparing scenarios and the total scale of investment for nature restoration of Annex I habitats under the Habitats Directive



As demonstrated in the figure above, it is clear that the demand for forest restoration (total potential restoration costs) greatly exceeds the best estimates of current expenditure on nature-based solutions in forests (scenario 1). If we fast forward to 2030, even under ambitious scenarios (scenario 2), the investment gap for achieving the restoration goals of the forthcoming Nature Restoration Law⁴³ is significant — approximately €43 billion.

5.2.4 Market analysis — forests

The market for nature-based solutions in forests consists of forest owners and managers. In the European Union, these are a mix of private (60%) and public (40%) sector entities.⁴⁴ Privately owned forests are subject to less stringent reporting requirements, which means that there is less data available for such forests. This is reflected in the database, which shows that most of the financing for forestry-related nature-based projects comes from public sources (some estimates suggest around 5% of financing from private sources).⁴⁵ Mainstream institutional investors (for example, development finance institutions, impact investors, private equity funds and private corporations) currently do not have a significant presence in the market for forest-related nature-based solutions.⁴⁶ Some private corporations have established investment initiatives in the forestry sector as a defensive investment in their supply chains⁴⁷ or to meet the requirements of their social licence to operate.

The costs of investing in nature-based solutions in forests include capital and operating costs, and can also result in a reduction in timber production compared to purely commercial forestry operations. Like

⁴³ For an overview of the ecosystem-specific targets see: https://environment.ec.europa.eu/topics/nature-and-biodiversity/nature-restoration-law_en

⁴⁴ <https://efi.int/forestquestions/q2>

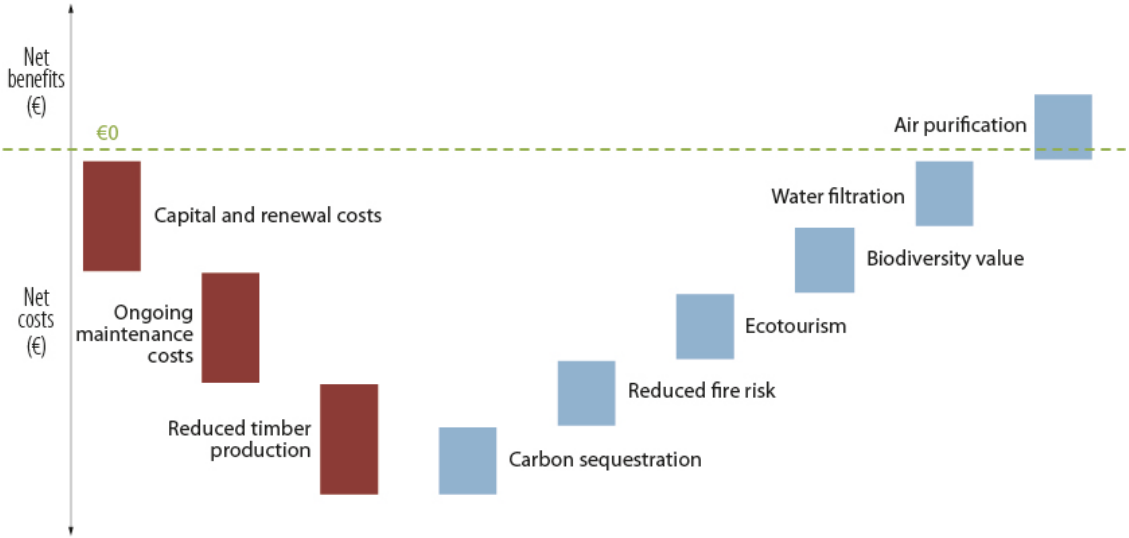
⁴⁵ World Economic Forum (2021). Investing in Forests: The Business Case. https://www3.weforum.org/docs/WEF_Investing_in_Forests_2021.pdf

⁴⁶ Bankers Without Boundaries and Terraformation (2022). Financing Forests. How to unlock capital for large-scale restoration.

⁴⁷ For example, Nestlé committed to distributing 2.8 million shade trees in Côte d'Ivoire and Ghana to provide important ecosystem benefits to its cocoa plantations: <https://www.weforum.org/agenda/2021/06/3-reasons-companies-are-investing-in-forest-conservation-and-restoration-and-how-they-do-it/>

other sectors, nature-based forestry projects produce a mix of public and private goods (see Figure 13 for an illustration of costs and benefits. Please note that, unlike Figure 10, this chart does not use real data and is illustrative only to demonstrate the types and potential scales of benefits and costs). Public goods produced by sustainable forest management⁴⁸ include biodiversity outcomes, as well as ecosystem services like water filtration services, flood and erosion mitigation, air quality improvement and carbon sequestration, which is increasingly becoming a private good through carbon credit markets. In addition, the main private good that forests produce is timber (revenue for which can be reduced through sustainable forest management, compared to traditional forest management practices). However, nature-based projects such as rewilding can also produce ecotourism revenues.

Figure 13 Illustration of the costs and benefits of an investment in nature-based solutions in forests⁴⁹



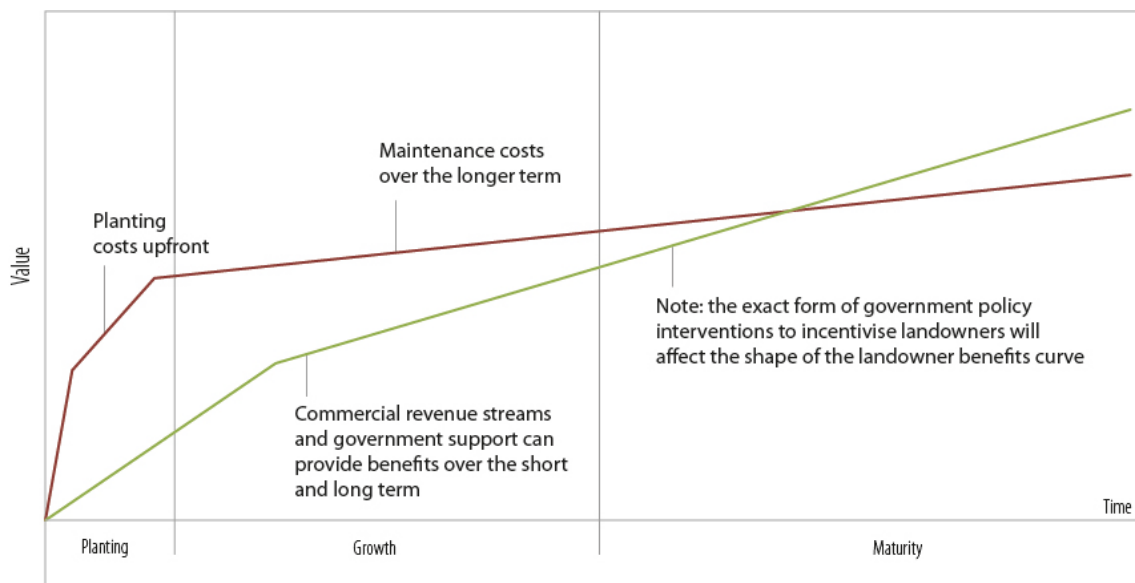
The private revenue streams of nature-based solutions in forest-based projects (timber, carbon and ecotourism) do not appear to exceed the private costs of implementing such projects over timeframes that are attractive to most private investors. The long timeframe for revenue generation from forestation projects (Figure 14) results in a risk profile that exceeds the appetite of many institutional investors and arguably reduces interest in forestation projects from investors seeking higher and more short-term returns. However, some pension funds with long-dated liabilities reportedly do invest in forestry projects.⁵⁰

⁴⁸ <https://www.pefc.org/what-we-do/our-approach/what-is-sustainable-forest-management>

⁴⁹ Source: report authors. Data are illustrative only and do not represent literal costs from an actual project. Dark blue boxes represent potentially monetisable revenue streams and light blue boxes represent non-monetisable benefit streams.

⁵⁰ Ibid, p. 14.

Figure 14 Illustration of the costs and revenues of an afforestation project over a 50-year period⁵¹



Despite the significant challenges identified in the section above, interest in nature-based solutions for forestry continues to rise because of the growing interest in climate mitigation investments. As carbon sequestration is a significant financial driver for forestry projects, it is likely that a higher carbon price will prompt further interest over time.

5.2.5 Conclusions – forests

The significant proportion of privately owned forests in the European Union and the consequent lack of reporting requirements makes it challenging to assess the current scale at which nature-based solutions are implemented in the sector. Using the scale of degraded forest habitats as a proxy for the demand for nature-based solutions, it is clear that there is significant potential for growth in the market for nature-based solutions in forest landscapes throughout the European Union.

However, as in other ecosystems, attracting investment to finance the public good outcomes of nature-based solutions in forests remains a challenge. Without regulatory intervention to require greater implementation of pro-biodiversity, sustainable forest management practices, or the creation of a market (for biodiversity credits, for example, just like carbon credits), we cannot assume that private entities will decide to finance the public good outcomes of nature-based forestry projects. Their financial investment decisions will continue to reflect their assessment of private returns on investment or be driven by their social licence to operate. If these private benefits do not provide attractive rates of return, a significant increase in investment in nature-based solutions for forestry is unlikely in the near term. Thus, investment in afforestation driven by carbon sequestration appears to provide the best opportunity.

5.3 Urban ecosystems

Urban ecosystems are almost entirely artificial environments, strongly influenced by human activities. Soil sealing is common in such areas to support dwellings and other structures, yet a variety of other ecosystems can also occur within urban environments. The urban environment covers an estimated area of approximately 222 000 km² in the European Union and the United Kingdom, and continues to grow at a rate of approximately 3% per decade.⁵² Given the growth of this “ecosystem” or landscape, and the multitude of societal challenges such environments face, it is unsurprising that there is a wealth of

⁵¹ Bankers Without Boundaries and Terraformation (2022). Financing Forests. How to unlock capital for large-scale restoration. P. 18.

⁵² Maes, J. et al. (2020). Mapping and Assessment of Ecosystems and their Services: An EU ecosystem assessment.

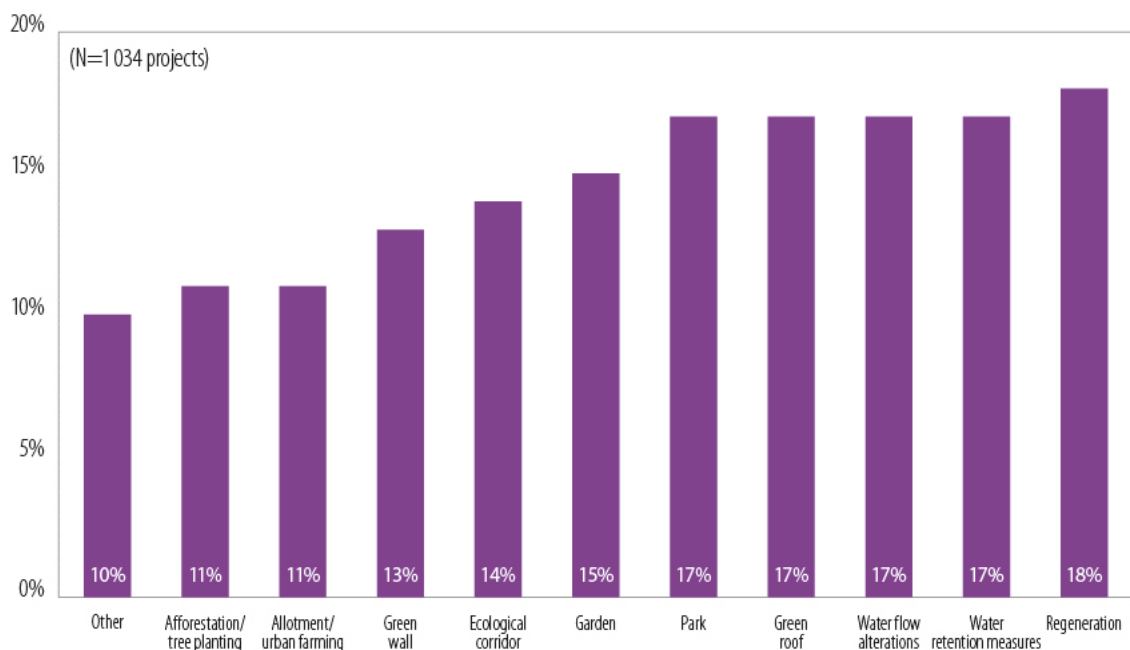
knowledge related to implementing nature-based solutions. Due to the prevalence of impervious surfaces and greatly reduced biodiversity, urban nature-based solutions seek to address societal challenges such as poor air quality, localised flooding exacerbated by impervious surfaces, urban heat islands (heat stress), pollution to waterways from stormwater and wastewater, and biodiversity loss.

5.3.1 Potential demand for investment in nature-based solutions in urban ecosystems

Nature-based solutions projects in the urban environment constitute the majority of projects in the report's database. A total of 1 034 urban project examples were found and these can be broadly categorised as: urban regeneration; the creation of urban parks; and the creation of gardens. Regeneration interventions commonly involve landscape restoration activities such as reclaiming brownfield sites, improving water quality through the removal of pollution with wetlands, and improving the quality of green spaces and the accessibility of previously derelict areas.

Water flow alterations were made in urban areas where waterways (streams and rivers) posed flood risks. Actions within this category related to re-meandering waterways, removing barriers, and strategically placing or removing vegetation. Water retention measures often involve the implementation of bioswales, catchment ponds/reservoirs and the creation of urban wetlands.

Figure 15 Nature-based solutions implemented in urban ecosystems, 2000-2022



The majority of projects (55%) did not report on the scale of implementation, and those that did indicated that urban nature-based projects were smaller in scale — 38% were less than 1 km², with the total scale of urban nature-based projects covering approximately 3 200 km². Only 35% of projects reported financing data. The majority of these indicated investments between €1 million and €10 million (34%) and a significant number reported investments of more than €10 million (20%). Investments in this bracket largely consisted of the development of new green areas (parks and gardens) and the retrofitting of urban districts with green measures such as green walls and roofs. Overall, the total investment is calculated at €5.7 billion since 2000.

5.3.2 Reflections on the data — urban areas

Nature-based solutions have tended to have an urban focus, so it is unsurprising that the majority of projects identified are in urban areas. However, there are several reasons to believe that these 1 034 projects underestimate the scale at which nature-based solutions have been used in Europe's urban areas. First, private investments in nature-based solutions such as commercial green roofs and walls are unlikely to be reported in the database due to the lack of a reporting process. Some European cities now

require new buildings and redevelopments to add green roofs, but these data do not appear at project level in our database. In addition, investments by water authorities and flood managers to comply with obligations under the Water Framework Directive (WFD) and Floods Directive may also not feature in the database, again due to a lack of a centralised reporting.

The majority of urban nature-based projects were located in the United Kingdom (18%), followed by Germany (15%) and France (10%). Surprisingly, no examples were found in Luxembourg, Malta or Cyprus, with only a limited number (less than ten) in Austria, Estonia, Latvia and Lithuania. For Luxembourg and Malta, this is particularly interesting as they are the two Member States with the highest proportion of functional urban areas in the European Union.⁵³

⁵³ Defined as the core city (with at least 50 000 inhabitants) and the commuting zone and based on commuters (employed persons living in one city who work in another city). Functional urban areas are an “operational urban spatial extent” that allows the city and its surroundings to be mapped and evaluated. From Maes, J. et al. (2020). Mapping and Assessment of Ecosystems and their Services: An EU ecosystem assessment.

Potential scale of nature-based solutions in urban areas

5.3.2.1 Demand

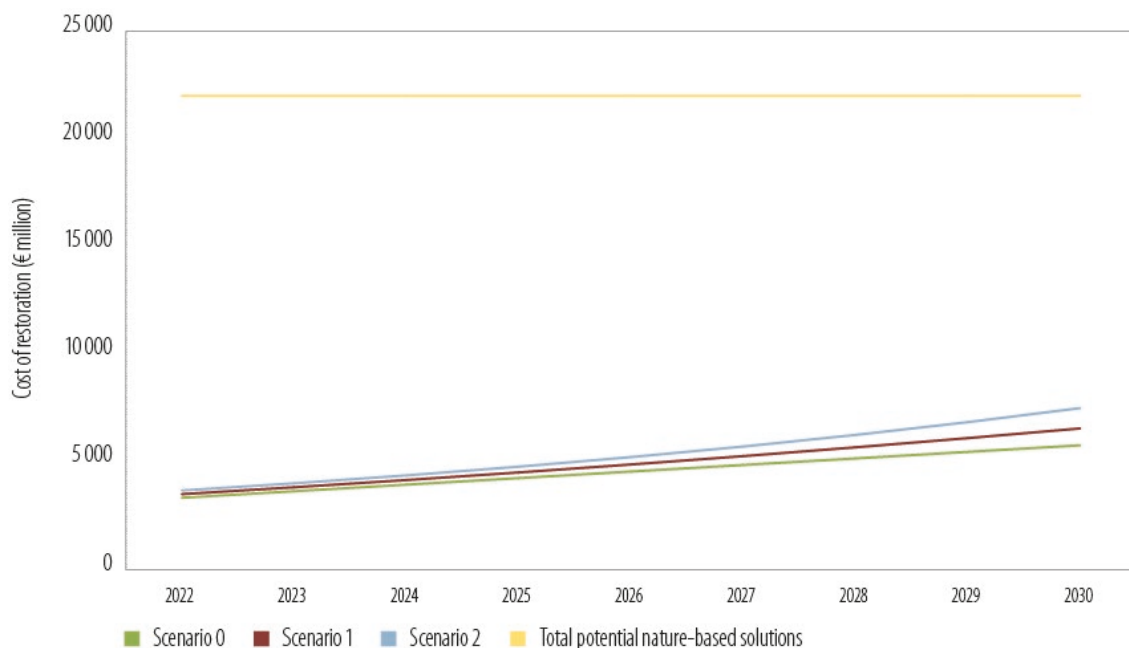
Estimating the potential demand for urban nature-based solutions is challenging, as using degraded habitat status as a proxy for demand is not possible: the urban environment is considered human-made and is therefore almost entirely degraded. As such, we developed a scenario based on data compiled in our database. We started with the conservative assumption that the current scale of nature-based solutions recorded in the database broadly reflects the current level of investment, and that the total urban area continues to grow at 3% per decade.⁵⁴ The demand for urban nature-based solutions can be expected to rise exponentially, as greening cities is the best measure to address the accelerating urban heat island effect.

5.3.2.2 Investment

Projecting this scale of investment forward, we estimate a “business as usual” investment expenditure starting at €3.04 billion in 2021, with annual growth of €304 million (scenario 0 in Figure 16 below).

To estimate the potential scale of investment, we drew on previous analysis by Trinomics⁵⁵ on the additional investment in nature-based solutions that is likely in the average urban environment. This includes park restoration, constructed wetlands and green roofs, producing an average additional investment of around €136 000 per km². Such an estimate is naturally associated with a high level of uncertainty, for instance for enabling infrastructure. Applied to the total EU urban area, this produces a total implementation cost of €22.4 billion by 2030 (total potential nature-based solutions in Figure 16). This can be considered a conservative estimate of the potential scale of investment. Scenarios 1 and 2 below add 5% and 10% annual growth, respectively. As can be seen in this chart, it is highly likely that huge additional potential exists for nature-based solutions in the urban environment, given the current estimated rate of investment and the likely scale of potential investment.

Figure 16 Potential demand for investment in nature-based solutions in urban ecosystems, comparing scenarios against the total scale of investment



⁵⁴ Maes, J. et al. (2020). Mapping and Assessment of Ecosystems and their Services: An EU ecosystem assessment.

⁵⁵ See European Commission, Directorate-General for Environment, Nesbit, M., Whiteoak, K., Underwood, E., et al. (2022). *Biodiversity financing and tracking: final report*. Publications Office of the European Union. <https://data.europa.eu/doi/10.2779/950856>

5.3.3 Market analysis – urban

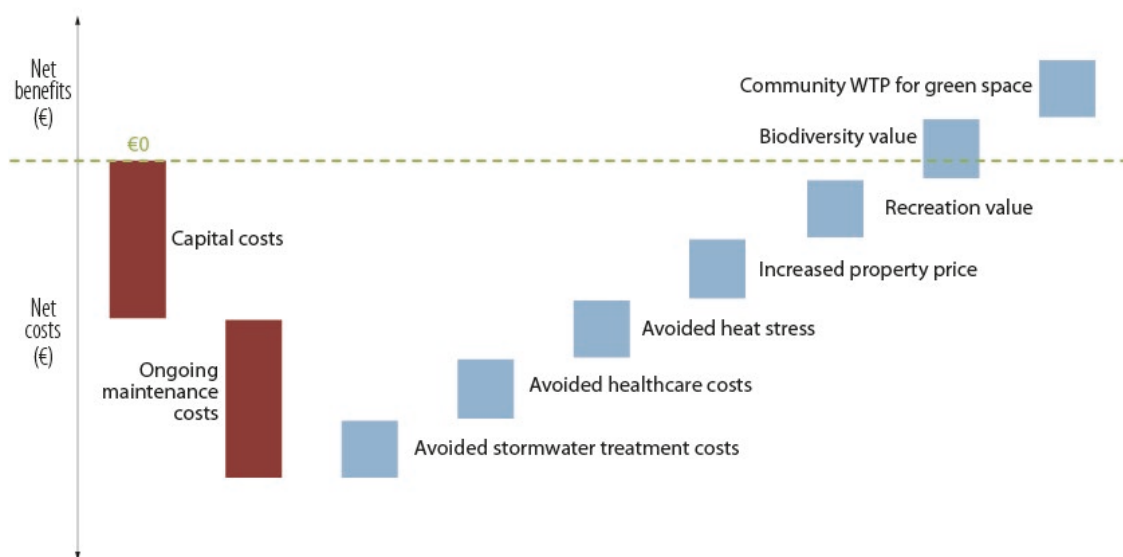
Most entities or individuals that implement nature-based solution investments in the urban environment do so because of a legislative responsibility or personal preference:

- Public agencies with legislative responsibility for the natural environment (e.g. water agencies/businesses, environmental agencies and those involved in infrastructure development)⁵⁶
- Private entities (urban developers and private businesses), in response to regulatory requirements (planning controls) or, less frequently, private financial incentives or social licence to operate (SLO)⁵⁷ initiatives
- Private landholders, also in response to regulatory requirements or because of personal preferences.

Through the data collected, it is clear that the vast majority of investment in urban nature-based solutions has been undertaken by public agencies. As revealed in interviews conducted as part of this project, this is unlikely to change in the coming years. Private investors have made relatively modest contributions, often driven by regulatory requirements (planning controls), or reflecting corporate social responsibility goals, or for the aesthetic benefits of urban greening (by way of green roofs and green walls in urban high-rise developments).

An explanation for the lack of private investment in urban nature-based solutions is illustrated in the figure below. This demonstrates the costs and benefits of an illustrative pocket park that is renovated for climate resilience with natural stormwater filtration, rainwater tanks for irrigation, and active and passive recreation opportunities. As shown, the total benefits of the investment (blue bars) outweigh its costs (red bars), yet the private monetisable benefits (in dark blue) do not.

Figure 17 Illustration of costs and benefits of an urban nature-based solutions project⁵⁸



⁵⁶ Interviews undertaken for this project have revealed the perception that public authorities have a large role to play in bringing nature-based solutions into the mainstream, but that grey solutions are seen as the default in public decision-making. This may require systemic change to integrate nature-based solutions into decision-making.

⁵⁷ A social licence to operate (SLO) refers to the level of acceptance or approval by local communities and stakeholders of organisations and their operations. A project has such a licence when the local community and other stakeholders provide their ongoing approval/acceptance or if there is broad social acceptance.

⁵⁸ Material produced by Trinomics as part of the GrowGreen H2020 project. Data are illustrative only and do not represent literal costs from an actual project. Dark blue boxes represent potentially monetisable revenue streams, and light blue boxes represent non-monetisable benefit streams.

From the perspective of a private investor, only a subset of benefits can be considered private monetisable benefits. The dark blue bars relate to the avoided cost of stormwater treatment (for the local water authority or local government), the avoided cost of irrigation for local community gardeners, and the carbon sequestration benefits of the project (notwithstanding measurement challenges). Other benefits of the project are public benefits that would accrue to various parties: noise reduction and improved air quality for those in the local area, the avoided healthcare costs for regional or national governments (in addition to the personal benefits for those exercising in the area), and biodiversity improvement for the broader society.⁵⁹

Private investors can only be expected to invest in nature-based solutions if they receive an attractive return on their investment over a reasonable period. Where this financial return cannot be provided, private investment cannot be expected to significantly increase under the same market conditions. While each specific investment in nature-based solutions will have its own combination of costs and benefits, it is the view of the authors that most urban projects produce a combination of public and private benefits, and that in most cases the combined private benefits do not outweigh the total costs. Where this is the case, no amount of information on the benefits of nature-based solutions will overcome this problem. The public good aspects of nature-based solutions and split incentives combine to inhibit increases in private investment.

5.3.4 Conclusions — urban

Overall, our analysis of the urban ecosystem shows that the potential market size for nature-based solutions is already very large, and at the current rate of recorded investment this potential is unlikely to be met anytime soon. The large surface area for potential projects and the continued expansion of grey surfaces shows that the market for urban nature-based solutions has the potential to thrive, not only for immediate investment in urban greening structures, but also in research and innovation that can assist in the implementation of innovative projects.

The key challenge in urban areas, as for most ecosystems, is that of the many benefits produced by nature-based solutions, only a relatively small proportion are monetisable. The remainder are public benefits that do not easily produce revenue streams. In such circumstances, providing incentives to invest requires government regulation, co-financing by public and private sources, and/or specific market creation for the benefits sought.

People desire to live in healthy, aesthetically appealing, natural environments — investments in nature-based solutions are often highly aesthetic and greatly valued by local residents. There is ample evidence of projects such as waterway restoration⁶⁰ and street trees⁶¹ producing significant increases in the prices of nearby residential properties, reflecting the community's willingness to pay for such investments. The high population density of the urban environment means that any changes that positively influence individuals create value.

This supports the case for investment in nature-based solutions from a “whole of society” perspective, but does not overcome the challenge of public goods and split incentives, which is that only partial returns for the investor are likely.

As things stand, it is clear that there are persistent market conditions that make it unlikely that private investment in markets for urban nature-based solutions will increase significantly. It will take public policy intervention to incentivise private action, through the co-funding of nature-based solutions and/or through regulatory or other policy instruments.

⁵⁹ Some of the public benefits that accrue to the local community may be reflected in increased property prices for those living near the investment, although there may be no direct means of benefiting from such an increase.

⁶⁰ See <https://www.sciencedirect.com/science/article/abs/pii/S0921800922001306?via%3Dihub> or <https://www.researchgate.net/publication/298788370> The value of restoring urban drains to living streams

⁶¹ <https://www.sciencedirect.com/science/article/abs/pii/S0169204609001674>

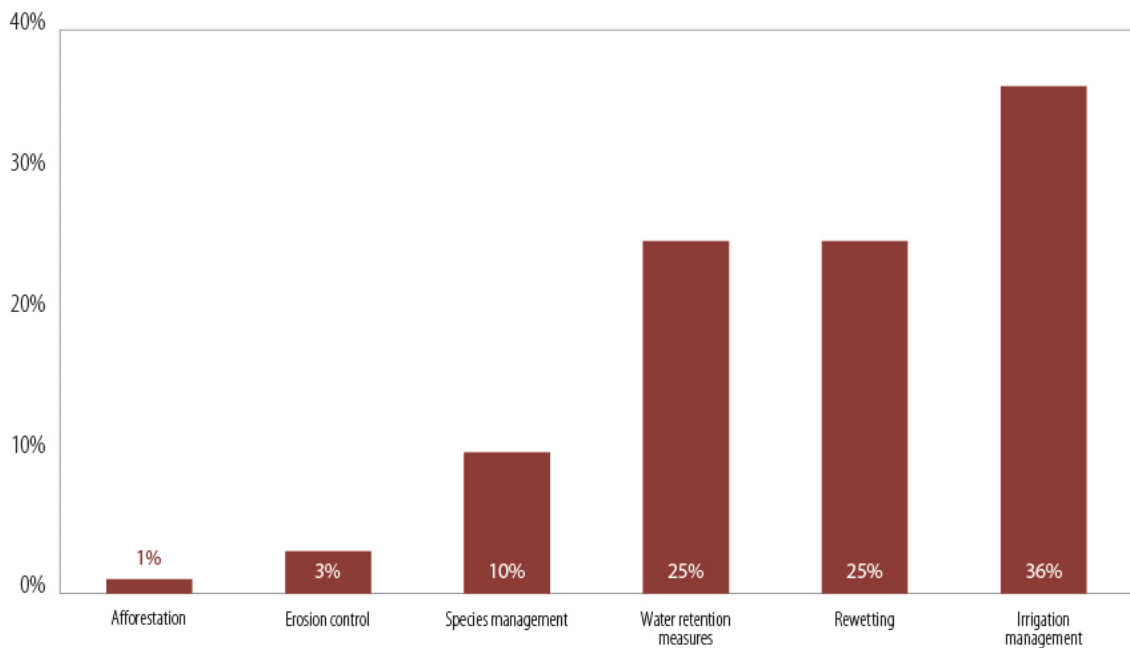
5.4 Inland wetlands

Inland wetlands⁶² are estimated to cover between 133 640 km² and 142 511 km² in the European Union and the United Kingdom.⁶³ Inland wetlands not only have unique ecological characteristics, but are also unique in how they are managed, used and contribute to the cumulative impact of extractive industries, particularly forestry and agriculture. For example, drained peatland habitats only cover around 2.5% of the European Union’s agricultural area but are responsible for around a quarter of total greenhouse gas emissions from the agricultural sector.⁶⁴ Furthermore, at the EU level it is estimated that approximately 28% (73 000 km²) of the organic soils in peatlands have been drained for forestry purposes, and 20% (52 000 km²) for agriculture.⁶⁵

5.4.1 Nature-based solutions in inland wetlands

Our data collection process identified 67 inland wetland nature-based projects, the majority of which (80%) were interventions for ecosystem restoration. Common actions to achieve this included rewetting (restoring wetland environments from areas previously drained for agricultural production); irrigation management (deepening water courses, re-channelling or diverting water flow, and removing dried peat layers); and water retention measures (blocking drainage ditches and damming water flows). Figure 18 below depicts the types of actions undertaken in inland wetland ecosystems. The nature of the projects demonstrates the connection between inland wetlands and the agricultural sector and also the broader freshwater ecosystem for which the EU Water Framework Directive (WFD) is a key driver for investment.

Figure 18 Nature-based solutions implemented in inland wetland ecosystems, 2000-2022



⁶² Inland wetlands consist of plant and animal communities that thrive in water-logged areas dominated by marshland and peatlands. These ecosystems are categorised separately from the likes of coastal lagoons, salt marshes and intertidal flats, which are included in the “marine” section of this analysis.

⁶³ Maes, J. et al. (2020). Mapping and Assessment of Ecosystems and their Services: An EU ecosystem assessment.

⁶⁴ Tanneberger, F. et al., (2020). The Power of Nature-Based Solutions: How Peatlands Can Help Us to Achieve Key EU Sustainability Objectives. *Advanced Sustainable Systems*, Volume 5(1). <https://doi.org/10.1002/adsu.202000146>

⁶⁵ European Commission, Directorate-General for Environment (2012). Review of existing information on the interrelations between soil and climate change: final report. Publications Office. <https://data.europa.eu/doi/10.2779/12723>

The median area of inland wetland projects is 2.59 km², with large-scale projects ranging up to 250 km². The area covered by some of the projects identified is likely to be overestimated, given the nature of the issue they seek to address. For example, many of the projects report the scale of the nature-based solution as the area they *impact*, rather than the physical area covered by the action itself. Given that the majority of these actions are designed to address water management-related issues, the scale reported can relate to the impacts of nature-based solutions on the watershed area. As such, the total area covered by inland wetland nature-based solutions (calculated at 1 017 km²) should be interpreted with caution.

The total investment in inland wetland nature-based solutions collected in our database is estimated at €2.03 billion between 2000 and 2022 (the period for which investment data were found for inland wetland nature-based solutions), with the majority of investments estimated to be between €1 million and €10 million (n=27; 50% of nature-based solutions with investment figures known). Where data on financing was obtained, 84% of projects involved EU grant/loan funding (predominantly through LIFE), while only a small number involved private investment.

Approximately 55% (n=39) of inland wetland projects in the database provided information on the types of investors involved. Details on projects that were instigated predominantly by private sector involvement were lacking, yet it is estimated in our database that approximately 18% of the interventions (from the 55% where information was provided) were driven by private investment (including water utilities⁶⁶).

Private investments in nature-based solutions were stimulated by the operating costs of wastewater treatment, or by the risk of financial loss posed by climate change (increased flood frequency and severity). Examples of the former include the restoration of ecosystems that provide water storage and/or water filtration services. By investing in natural water retention/filtration systems, private entities such as water companies can produce the primary resource of their business model (i.e. clean water) and potentially save on the costs associated with industrial filtration processes. Regarding the risk of financial loss posed by climate change, limited information was available but private investment seems to be driven by private landowners seeking to reduce the risk of flooding events. For example, by pooling financial resources, a community in Slovakia allowed previously disused land to be regularly flooded in order to alleviate downstream flooding events that damaged their property.

5.4.2 Reflections on the data — inland wetlands

Not much data exist to provide an accurate estimate of the actual scale of nature-based solutions in EU wetlands. In 2017, a study⁶⁷ estimated an annual implementation of 1 028 km² of restoration actions alone in wetlands (noting that this is only a subset of potential actions) throughout the European Union and the United Kingdom.⁶⁸ This annual estimate surpasses the total area of inland wetland nature-based solutions in our database over the last 20 years.

Given the current focus on the carbon sequestration potential of wetlands (in particular peatlands), it is perhaps surprising to see a relatively small proportion of projects that explicitly directly or indirectly seek to enhance or retain the carbon stocks present in these ecosystems. However, peatlands have historically often been degraded through conversion to arable farmland. Analyses have shown that EU funding programmes such as the common agricultural policy do not offer sufficient incentives for farmers to implement nature-based solutions in peatlands,⁶⁹ which could help explain the relative lack of projects in this landscape.

⁶⁶ These may in fact be public or private entities.

⁶⁷ The study (see reference below) used an online survey and conducted telephone interviews with the main EU and Member State entities involved in restoration activities, in addition to reviewing existing databases and literature to derive restoration scale estimates. The study acknowledges that this is only a rough estimate, particularly as the work focused on restoration projects over 1 000 hectares in scale, and given a general lack of data availability.

⁶⁸ Eftec et al. (2017). Technical support in relation to the promotion of ecosystem restoration in the context of the EU biodiversity strategy to 2020.

⁶⁹ BirdLife Europe and the European Environmental Bureau (2022). Peatlands and wetlands in the new CAP: too little action to protect and restore. Available at: <https://www.birdlife.org/wp-content/uploads/2022/04/Analysis-Peatlands-Wetlands-CAP-strategic-plans-April2022.pdf>

Only 55% of the projects provided information on the investors involved, whereas 24% provided information on the financing instrument. This, in addition to the overlap between wetlands and other ecosystems (such as forests and agriculture), means that the estimated investment of €2.03 billion in inland wetlands is likely to be an underestimate.

5.4.3 Potential scale of nature-based solutions in inland wetlands

A lack of information on both the condition of inland wetlands, the current scale of nature-based projects and current levels of investment means that it is very challenging to estimate the potential scale. As a crude estimate, it is possible to apply the aforementioned estimate of 1 028 km² per year of restoration (again, acknowledging that this is only a subset of potential nature-based actions), and projecting growth/reduction rates. To calculate this growth, it is assumed that all recent inland wetland habitat improvements are due to the implementation of nature-based solutions within the ecosystem, using MAES condition data.⁷⁰ Estimating an average annual growth rate of 5% for nature-based solutions, it is calculated that total inland wetland interventions could reach a cumulative scale of 12 930 km² by 2030.

5.4.4 Market analysis — inland wetlands

The main market participants in inland wetland nature-based solutions are landowners and land managers. In peatland habitats, these are mainly farmers, as these are the areas most frequently used for livestock grazing or peat extraction. Significant areas of peatlands are also owned by water companies and hunting estates. In our database, the majority of investments within wetlands were made by public entities (largely the European Union through common agricultural policy (CAP)/European Regional Development Fund (ERDF) and LIFE funding – *L'Instrument Financier pour l'Environnement*).

Inland wetlands produce a mix of public and private benefits, yet private interest in wetlands can stem from the resources derived from such ecosystems, such as freshwater, timber and grazing grounds for agricultural purposes. For private investors in nature-based solutions, the private benefits of the interventions are compared to the private benefits produced from the existing use of the land for productive purposes, which may be lost if the investment affects production.

The high level of agricultural land surrounding and within wetland areas means that the ecosystem services produced are largely dependent on agricultural practices and their intensity. For example, agricultural areas can positively impact wetlands by maintaining open landscapes to allow wildlife to feed and graze. Conversely, it can also be more profitable for farmers to set aside land or to grow crops rather than enter schemes that provide environmental benefits (such as agri-environment schemes under the common agricultural policy, which include elements related to nature-based solutions).⁷¹

Similarly to forest ecosystems, the carbon mitigation potential of wetlands is a major driver of the interest in nature-based solutions. Given the prominence of agricultural and forestry practices in wetlands, a reform in current funding mechanisms for these sectors (such as the common agricultural policy) would be a logical way to drive further investment. Under the policy, landowners/farmers are obliged to fulfil standards to receive direct payments, including standards relating to good agricultural and ecological conditions (GAECs). One such standard (GAEC 2) seeks to protect carbon rich soils, yet there is no obligation within this standard to halt or reverse degradation. This results in a lack of action to safeguard carbon rich soils (such as peatlands) by Member States and often in the continued draining of wetland habitats to further support resource extraction.⁷²

Payments for ecosystem services (PES) schemes provide a potential opportunity in wetland ecosystems. These schemes offer payments for the delivery of some of the public good benefits described above.⁷³ Of course, such schemes require public investment. However, as described above, the common

⁷⁰ Maes, J. et al. (2020). Mapping and Assessment of Ecosystems and their Services: An EU ecosystem assessment in the EU.

⁷¹ European Environment Agency (2020). Environmental signals 2000 — Environmental assessment report No 6. Chapter 14 Wetlands.

⁷² BirdLife Europe and the European Environmental Bureau (2022). Peatlands and wetlands in the new CAP: too little action to protect and restore.

⁷³ Canning, A.D. et al., (2021). Financial incentives for large-scale wetland restoration: Beyond markets to common asset trusts.

agricultural policy is a huge source of funds that could be more directly tailored to enhance nature-based solutions in wetland areas.

Legislative and policy initiatives mentioned under the “agriculture” analysis section are likely to be relevant to increasing the use of nature-based solutions in wetlands throughout the European Union in the future, particularly carbon markets.

5.4.5 Conclusions — inland wetlands

Given the potential of inland wetlands to serve as effective carbon sinks, it is somewhat surprising that only a relatively small sample of nature-based solutions in this landscape could be found. As with agro-ecosystems, the lack of granular reporting under the common agricultural policy could be a limiting factor here, although previously mentioned studies seem to point to a lack of nature-based actions through this funding mechanism. Indeed, the fact that such funding mechanisms are deemed the primary driver of investment in nature-based solutions in this ecosystem could in turn be the primary reason for the perceived lack of projects. A strong incentive provided by common agricultural policy payments is to convert ecosystems to farmland to enhance farmer payments, which are largely paid on a per-hectare basis. Inland wetlands, despite offering a wealth of biodiversity and an array of ecosystem services, do not tend to offer high agricultural yields unless they are drained for agricultural use. Draining these ecosystems to fully exploit their nutrient soils is therefore a prime target for land conversion by agricultural businesses. As such, alternative funding mechanisms or clearer, more stringent regulations and incentives to preserve/enhance these ecosystems under the common agricultural policy would be a logical way to increase the implementation of nature-based solutions in this domain.

5.5 Marine and coastal landscapes

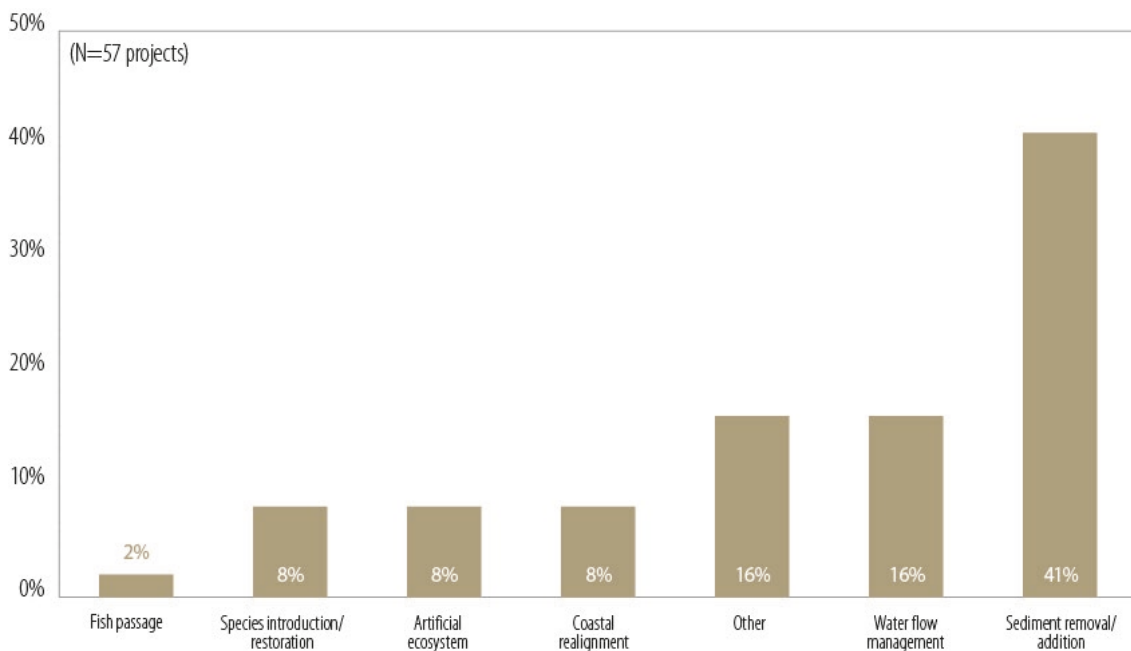
The total area of habitat types where marine nature-based solutions occur (Habitats Directive Annex I habitat types) is estimated at approximately 240 000 km²,⁷⁴ whereas the broader area beyond Habitats Directive reporting is approximately 5 786 516 km². Coastal environments are often highly developed and have been significantly modified in Europe. Both coastal and marine environments are vulnerable to climate change (for instance rising sea levels and temperatures). Nature-based projects in coastal areas often seek to improve climate resilience and reduce disaster risk. This is made more challenging by high land values and commercial development. In marine environments, active restoration projects such as seagrass and kelp restoration, and passive restoration by excluding commercial activities from marine protected areas, are prominent examples of nature-based solutions.

5.5.1 Potential demand for investment in nature-based solutions in marine and coastal landscapes

A total of 57 marine projects were collated in our database. They were mostly intended to improve climate resilience (35%) and biodiversity enhancement (31%). This is shown in Figure 19 below, with the majority of projects involving sediment removal/addition practices (such as beach nourishment). Such practices are designed to increase coastal resilience in response to flooding/sea level rise or to rehabilitate degraded ecosystems. It should be noted that such projects may create new above-water habitats. However, in general they may also cause negative effects on the seafloor where sediment is abstracted as well as in the coastal zone where it is applied, but the data available do not provide sufficient insight to make such an assessment. “Other” actions largely consist of fisheries management approaches to maintain/enhance fish stocks and related habitats.

⁷⁴ Maes, J. et al. (2020). Mapping and Assessment of Ecosystems and their Services: An EU ecosystem assessment.

Figure 19 Nature-based solutions implemented in marine and coastal ecosystems, 2000-2022



The median area covered by the projects is approximately 1 km². Limited information on the scale of marine nature-based solutions was recorded (only 49% of projects reported on scale), leading to a total estimate of only about 390 km² of nature-based solutions in marine and coastal ecosystems since 2000.

A significant volume of funding has been directed towards nature-based solutions in this ecosystem. The cumulative total (where 67% of projects provided finance information) is estimated at €800 million since 2006 (the earliest recorded example of marine nature-based solutions in our database, largely through EU grant funding/donations such as LIFE (58%)). None of the projects in our database involved significant private sector investment.

5.5.2 Reflections on the data — marine and coastal landscapes

Knowledge and research on marine restoration is still a maturing area of science.⁷⁵ The landscape suffers from significant information gaps, particularly regarding the current condition of the ecosystem and therefore the potential “demand” for nature-based solutions and their implementation. The Horizon 2020 MERCES project⁷⁶ performed an integrated mapping at European level in 2017, underlining the fragmented and mixed nature of the data available.

The limited number of examples of nature-based solutions found likely do not provide a complete census of the nature-based actions actually being carried out. However, given the number of projects found in other ecosystems, the number of actions in the marine environment appears to be relatively accurate. There is no large source of funding for the private sector for marine projects (unlike for agriculture), and there is no equivalent to the Water Framework Directive (WFD) that we can be confident is driving significant investment in marine nature-based solutions from public sources of funding.

At EU level, the Natura 2000 network currently covers approximately 9.7% (441 000 km²) of the combined marine area of the European Union and the United Kingdom. Natura 2000 areas are not strict nature reserves, nor do they explicitly require nature-based solutions to be implemented. However, upon designation, such sites are required to be aligned with EU environmental legislation that is likely to involve the implementation of nature-based solutions. Again, data on the scale (not just techniques) of nature-

⁷⁵ Wood, G. et al. (2019). Restoring subtidal marine macrophytes in the Anthropocene: trajectories and future-proofing.

⁷⁶ Marine Ecosystem Restoration in Changing European Seas (MERCES). See Bekkby, T. et al. (2017). Deliverable 1.1: State of the knowledge on European marine habitat mapping and degraded habitats; Gambi, C., Girardin, E. and Danovaro, R. (2020). Deliverable 10.7: Summary of the final meeting. <http://www.merces-project.eu/?q=content/list-deliverables>

based solutions within such sites are not readily available, and the management plans often lack suitable indicators and quantifiable targets/objectives, making it difficult to measure and monitor the implementation of Natura 2000 sites.⁷⁷ Other biodiversity actions in the marine environment, such as those accompanying large infrastructure works as compensation/mitigation, or smaller projects driven by corporate social responsibility(CSR) mandates or local initiatives, are not centrally reported.

Aside from the lack of reporting, it is likely that the small number of marine nature-based projects also relates to the technical costs of such projects linked to their challenging scale, location and the water depths involved. This often proves to be a barrier to scaling up their implementation. For example, technological improvements in marine restoration through seagrass or macroalgae plantations do not seem to have led to a large number of projects yet. Cost also plays a role in limiting certain well-known techniques such as restoring rocky habitats. The EU LIFE project BLUEREEF for the restoration of a boulder reef habitat, for example, cost approximately €1 million per hectare⁷⁸ of restored reef (over an area of around 6 hectares, and with impacts beyond this area). This underlines the importance of cost and practicality issues, efficient design, and strategies for cheaper and sustainable sourcing of suitable materials, as well as the need to understand ecological synergies and wider co-benefits. Innovation and design optimisation and the coordination of activities in the marine environment and material flows will be required to improve the take-up of nature-based solutions in marine environments.

5.5.3 Potential scale of nature-based solutions in marine and coastal landscapes

As suggested above, there are significant quantitative information gaps on the condition of the marine ecosystem (the condition of a significant proportion of these habitats is “unknown” according to Habitats Directive reporting). Combined with the uncertain future evolution of policies and multiple pressures (such as climate change) that influence the viability of nature-based solutions, this means that any quantitative estimates of the potential uptake or scaleup of nature-based solutions are subject to a high degree of uncertainty.

The ecosystem and governance characteristics of the marine environment are very different to terrestrial ecosystems but are also linked to them. Problems regarding the governance of the marine environment (international waters and areas that may border multiple regions or countries) and obtaining permits can often act as a barrier to the implementation of nature-based solutions. Highly productive coastal areas are generally under national jurisdiction and offer a clearer entry point. While the marine ecosystem offers opportunities in that it is not as fragmented as land-based ecosystems (though it does have distinct physical and chemical environments), it remains subject to a number of interacting pressures.

In general, oceans have high primary productivity and, where nutrients permit, have the potential to recover rapidly to higher trophic levels. Highly biologically productive parts of the marine environment around the world have demonstrated a capacity to rebound after pressures are removed/substrate is restored. However, deep sea environments with low light and growth are slower to recover naturally. This calls for an exploration of active approaches but also poses challenges in terms of scaling and cost. Importantly, “time scales to restoration vary widely between ecosystems from months/years (kelp, sponges, some seagrasses), to decades (some seagrasses and corals), to multi-decades or centuries (deep sea corals)” (MERCES). Studies underline the need to match techniques, species and local conditions, which in turn requires a detailed understanding of marine/seafloor environments.

The high interconnectivity of marine ecosystems mean that future sectoral policies will have a strong bearing on the potential scale and effectiveness of nature-based solutions. For example, the impact of fisheries and other human activities on carbon embedded in sediments and ecosystems — and consequently the potential benefits of altering fishing practices — is an area that is receiving increased attention. The cumulative impact from rapid scaling of offshore energy infrastructure without large-scale master planning in relation to habitat and migration is adding uncertainty to shaping integrated nature-positive strategies. The degree to which rising seas and changing weather patterns affecting coastlines

⁷⁷ European Environment Agency (2020). Management effectiveness in the EU's Natura 2000 network of protected areas. Available at: <https://www.eea.europa.eu/publications/management-effectiveness-in-the-eus/management-effectiveness-in-the-eu>

⁷⁸ Barratt et al., (2014). Marine Thematic Report. The future of Europe's seas – contribution of the LIFE programme to protecting and improving the marine environment. Astrale 'gamma-Contract'. 67pp.

will be met by passive policies or active defence and management will frame intentions to seek nature-based solutions in coastal zones and how “hard” or “soft” they will be. The impact of increased construction and material abstraction in conjunction with what is deemed to be unavoidable climate mitigation and adaptation infrastructure will test the willingness of decision-makers to consider and incorporate the funding of compensatory measures, which are sometimes a contentious issue. The increasing interest in the blue economy raises the urgency of establishing clear priorities for the protection and restoration of marine environments, particularly with respect to impact and efficient resource use.

Realistically, a balance will be struck between active and passive approaches, given the physical scale and often logistical inaccessibility of environments, as well as the range of physical, chemical and biological pressures and impacts, all of which affect costs. In terms of potential scale and capital intensity, the main nature-based solutions in marine and coastal ecosystems will relate to the critical carbon sequestration function of the ocean and to improving the sustainability of coastal resilience strategies, in addition to safeguarding critical habitats and migration as well as the viability of commercial species.

5.5.4 Market analysis — marine and coastal landscapes

The market for nature-based solutions in marine environments is different because the actions involved are almost exclusively carried out on public “land” or on “land” beyond national jurisdictions, which reduces the potential for private returns. Coastal zones, however, are generally under single national jurisdiction, which facilitates regulated action. The recent High Seas Treaty⁷⁹ seeks to lay the legal foundations for effective cooperation in areas beyond national jurisdiction, including the creation of marine protected areas (MPAs) covering 30% of the world’s oceans.

Investors in marine nature-based solutions in our database are largely public entities. However, a small number of projects were also supported by private investment (mostly by organisations/companies that would benefit from nature-based solutions such as sediment additions to form new land for port infrastructure purposes).

Public bodies are key potential drivers for the implementation of nature-based solutions in marine ecosystems. Public authorities may, with the help of blended private financing, seek nature-based solutions to encourage economic opportunities by enhancing the provision of marketable goods (such as fish, seaweed and oysters) or by reducing the risk of damage through enhanced coastal defences. A number of interviewees expressed an interest in nature-based solutions to reduce risks and this could grow as the effects of climate change become more apparent.

Private entities whose operations result in physical damage to habitats (such as fisheries, coastal defence and port developers and contractors, dredgers of construction materials, offshore energy producers and miners) may also offer potential benefits from nature-based solutions. They may voluntarily seek or be required by regulation to fund nature-positive actions and may be well placed to contribute practically to restorative nature-based actions given their access to the challenging marine environment.

Other entities driving the degradation of the marine environment through environmental “externalities” may have the potential to fund nature-based solutions. These include the agriculture and aquaculture sectors; shipping operators whose boats introduce invasive species; and those involved in coastal (including land-based) operations such as land reclamation for urban development, which cause changes in hydrological conditions leading to sedimentation and altered water flow or chemistry.

Given the recent interest in seagrass and kelp forest restoration, it is possible that carbon sequestration will also feature as a driver for future marine nature-based solutions.⁸⁰ For such initiatives to be scaled up significantly, the price of carbon emissions would need to rise to cover implementation costs, and/or there would need to be co-funding by public entities to fund the public good outcomes such as biodiversity protection. Significant data gaps remain in relation to the carbon sequestration performance of such actions, which must be overcome with monitoring and reporting. This would also require the

⁷⁹ United Nations (2023). UN delegates reach historic agreement on protecting marine biodiversity in international waters. <https://news.un.org/en/story/2023/03/1134157>

⁸⁰ Adam, D. (2022). Blue carbon offsets taking root. <https://chinadialogueocean.net/en/climate/blue-carbon-offsets-taking-root/>

production of carbon credits or offsets to be placed on such nature-based activities. In slow growth/deep sea environments, a carbon sequestration case would still be difficult to establish (e.g. carbon catalysed at the level of an ecosystem). In general, the strongest immediate case may be actions to prevent further carbon losses resulting from degradation and remobilisation of sequestered carbon. An “avoided carbon” case is inherently difficult because of multiple pressures and the challenges of establishing the baseline/counterfactual and due to climate and policy factors.

Figure 20 Illustration of the costs and benefits of a nature-based marine project⁸¹

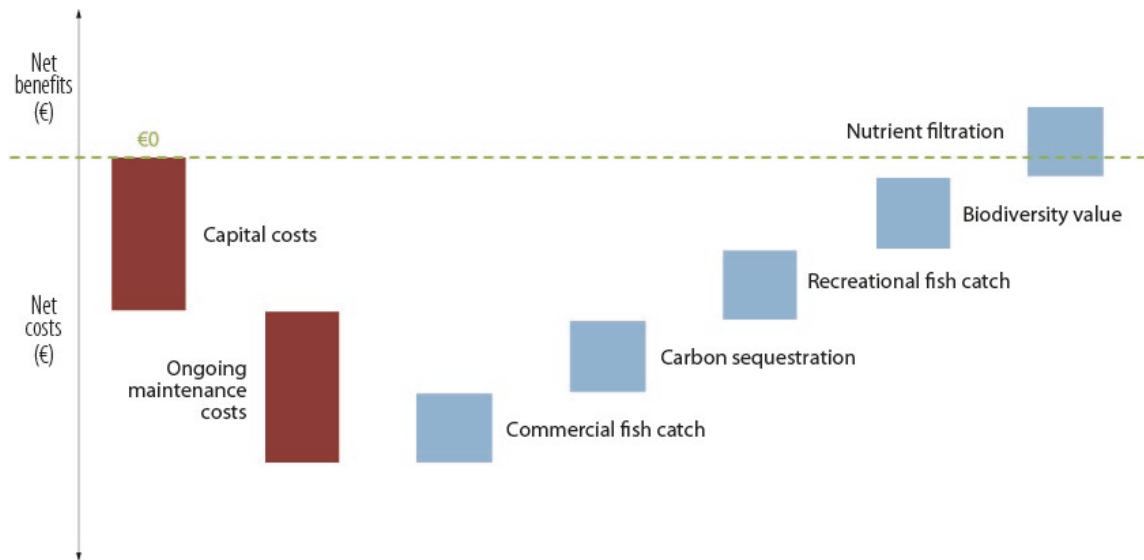


Figure 20 illustrates the potential costs and benefits of a nature-based marine project, such as a kelp restoration project, which may have clear capital and operating costs but produce benefits that are challenging for a private investor to monetise. Commercial fish catch and carbon sequestration are potential benefits that could be privatised, but improvements to fish catches would be shared between commercial fishing companies and the benefits from carbon sequestration in the marine environment are yet to be clearly established. The remaining benefits, while significant, accrue to the general public and are very difficult to monetise, with the exception of tourism revenues, which could mobilise private financing. While project types in the marine environment differ, this mix of public and private benefits is a frequent challenge.

Mandating or monetising (multiple) benefits in the marine environment, for instance by establishing financially autonomous marine protected areas or de facto bespoke concessions, or by contractualising specific revenues in specific areas, present many challenges. These challenges could be addressed by building on legal principles used for other types of concessions such as for those governing offshore energy generation. However, the effectiveness and enforceability of such arrangements in the marine environment are particularly challenging as they typically require a significant level of effort to involve local communities in ongoing monitoring as a condition for success. There are examples of local communities taking a leading role in the creation of permanent or seasonal no-take zones (fisheries).

Demand for construction materials extracted from the seafloor poses a serious challenge to sustainability and the expansion of the blue economy. Many coastlines and areas of the seafloor have already been affected by the removal of habitat-forming hard substrate for construction purposes. Denmark, a country with limited access to rock, is estimated to have lost approximately 8-9 million cubic metres of stones and boulders (largely submerged glacial moraine landscapes) from low-depth coastal areas for onshore construction purposes, equivalent to 55 square kilometres of reef.⁸² Sand and gravel continue to be

⁸¹ Material produced by Trinomics. Data are illustrative only and do not represent literal costs from an actual project. Dark blue boxes represent potentially monetisable revenue streams, and light blue boxes represent non-monetisable benefit streams.

⁸² Tækker, C. (2022). Stone reefs in concrete to increase marine biodiversity. <https://www.dtu.dk/english/news/all-news/stone-reefs-in-concrete-to-increase-marine-biodiversity?id=b6090b65-2562-49eb-a543-dc2ee04add3>

removed in large quantities from the sea. Plans for extensive offshore energy infrastructure (e.g. energy islands and foundations) and hard and tall coastal defence structures such as sea walls and dykes will add to existing pressures from construction and the need to maintain navigability. Importantly, large-scale restoration efforts and the incorporation of nature-positive strategies in infrastructure plans will also require the sourcing of similarly robust and biologically suitable materials.

Cross-border cooperation and reusing materials may offer opportunities for more sustainable solutions to finding the large-scale resources needed for habitat restoration and could add a blue carbon dimension. For example, transport infrastructure planned in rocky Norway and Sweden will generate vast quantities of blasted rock that will be expensive to dispose of in traditional ways that have also become unpopular, such as dumping in fjords. Research and pilot projects are exploring the optimisation of restoration techniques for cost and biodiversity impact, including designs and novel materials (for instance carbon negative concrete in combination with rock or printed structures) as well as active management (such as through “underwater gardening”⁸³).

Some energy developers and public authorities are already adopting nature-positive measures for infrastructure, but such measures could potentially be more systematically prescribed and more coherently planned at a larger scale. Certain EU contractors and developers that are also active globally are looking to nature restoration as a potential new market and source of competitive advantage. However, they are dependent on contracting authorities, including governments, to set more stringent biodiversity requirements. They also need better high-level biodiversity mapping and planning. They would likely be willing to pay for such measures because of their relatively marginal cost in relation to the infrastructure/economic activity with which they are associated and because they may provide practical solutions to dispose of materials in a socially acceptable way.

5.5.5 Conclusions — marine and coastal landscapes

There are many information gaps regarding nature-based solutions in the marine environment, which makes it challenging to produce robust quantitative assessments and conclusions. A very limited number of projects were identified, which could be due to the technological and governance constraints previously discussed, as well as the fact that many of the benefits from such projects are public goods.

As discussed above, effective measures in the marine ecosystem will require substantial additional mapping of environmental conditions, especially in the open/deep sea. It will also require effective policies to remove multiple pressures, many of which influence the viability of certain nature-based solutions. Halting further degradation and understanding future vulnerabilities will be essential, as will identifying areas of particular potential for nature-based solutions/restoration. Developing governance and monitoring structures and coordinating activities among different entities will create new opportunities, including the development of coherent nature-positive strategies for climate mitigation and adaptation.

EU efforts to create viable restoration strategies are being scaled up through, for example, the Horizon Europe mission on healthy oceans, seas, coastal and inland waters. This programme seeks to improve the basis for decision-making and governance, for example by identifying flagship projects to integrate and demonstrate a broad range of factors for successful implementation, many of which are discussed above.

5.6 Rivers and lakes

Freshwater ecosystems, such as rivers and lakes, can be defined as a network that connects land and sea, while transporting water, materials and biota across systems. Freshwater ecosystems also include the catchments of water bodies with riparian zones (wetlands adjacent to rivers and streams), floodplains and lakeshores. Nature-based projects in the freshwater environment often seek to reverse previous modifications of natural waterways through renaturalisation, or to reduce pressure on the freshwater

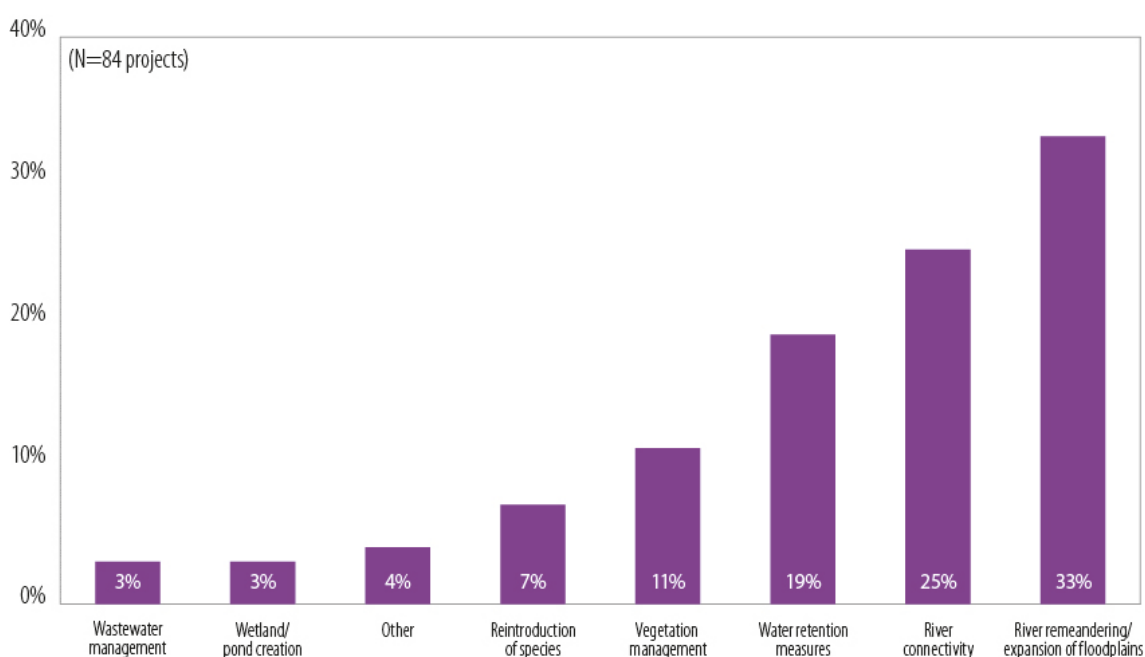
⁸³ European Commission. Marine forest coastal restoration: an underwater gardening socio-ecological plan. <https://cordis.europa.eu/project/id/101093910>

environment from surrounding areas (particularly urban and agricultural areas). Across the European Union and the United Kingdom, rivers and lakes cover an estimated 407 000 km².⁸⁴

5.6.1 Current status of nature-based solutions in rivers and lakes

A total of 84 nature-based projects implemented in river and lake ecosystems were identified for our database. These projects were broadly focused on interventions to restore rivers and lakes (69%). Nature-based solutions mainly involved restoration, including river remeandering, floodplain restoration, the reconnection of rivers and lakes (to improve flow regimes and the environmental status of water bodies) and the removal of dams and other longitudinal barriers. Figure 21 outlines the nature-based solutions implemented in rivers and lakes.

Figure 21 Nature-based solutions implemented in river and lake ecosystems, 2000-2022



The total area covered by river and lake projects in the database is approximately 13 000 km² (largely due to one project of 11 590 km²), with a median area of 1.86 km².⁸⁵ Out of the 84 river and lake projects in our database, 73% provided information on the costs and investments made for their implementation. The main investors for the vast majority were public bodies (national governments or the European Union). The total investment in these EU-sponsored nature-based projects amounts to approximately €8.2 billion between 2000 and 2022.

5.6.2 Reflections on the data — rivers and lakes

31% of the river and lake projects in the database did not provide any information on the area of implementation. The largest share of available data on scale places projects between 0.01 km² and 10 km² (43% of total projects).

The Water Framework Directive (WFD) is the predominant driver of nature-based actions at EU level, under which Member States are obliged to develop river basin management plans and implement a series of measures to achieve good water quality status. However, data on the scale/nature of measures are not currently available from all Member States. As a result, the data for this analysis are likely to

⁸⁴ Maes, J. et al. (2020). Mapping and Assessment of Ecosystems and their Services: An EU ecosystem assessment.

⁸⁵ There is one big outlier of 11 590 km² (Lower Danube green corridor: floodplain restoration for flood protection in Romania and Bulgaria) in our dataset that represents the majority of the total area for nature-based solutions. Excluding this outlier would give a total area of 1 605.62 km² in nature-based solutions for river and lake ecosystems.

underestimate the total scale of nature-based solutions in rivers and lakes currently found in the European Union.

5.6.3 Current scale of nature-based solutions in rivers and lakes

Limited data on the likely scale of implementation of nature-based solutions in rivers and lakes exist. As such, the only estimates currently available derive from a 2017 study,⁸⁶ which estimated 387.13 km² of *restoration* (acknowledging this is a subset of nature-based solutions) across the European Union and the United Kingdom annually (8 127 km² since 2000). This figure is lower than the total scale estimated in our database (which, as noted above, is likely to be an underestimate), so does not assist us in improving our estimates of total nature-based solutions in river and lake ecosystems.

5.6.4 Market analysis — rivers and lakes

The limited data available in our database show that the majority of nature-based solutions being implemented involve public funding, often from national water authorities such as river basin management authorities. The water supply sector in the European Union (like elsewhere) is a natural monopoly due to the huge cost of developing a water supply network. Therefore, this sector is largely guided in its actions by strong regulatory frameworks, which in turn drive investment decisions. These include environmental obligations that are often enshrined in law.⁸⁷

Beyond the public domain, the other market participants involved in nature-based solutions in rivers and lakes are predominantly private landowners, typically within the riparian zone of rivers. For example, river re-meandering actions sometimes lead to the flooding of land that was previously used for economic activities such as agriculture. Here, agreements between public authorities and private landowners are required to compensate for opportunity costs. Similarly, private landowners may need to be compensated for the impacts of upstream water retention measures, or for the implementation of such measures on their land, should they affect previous economic activities.

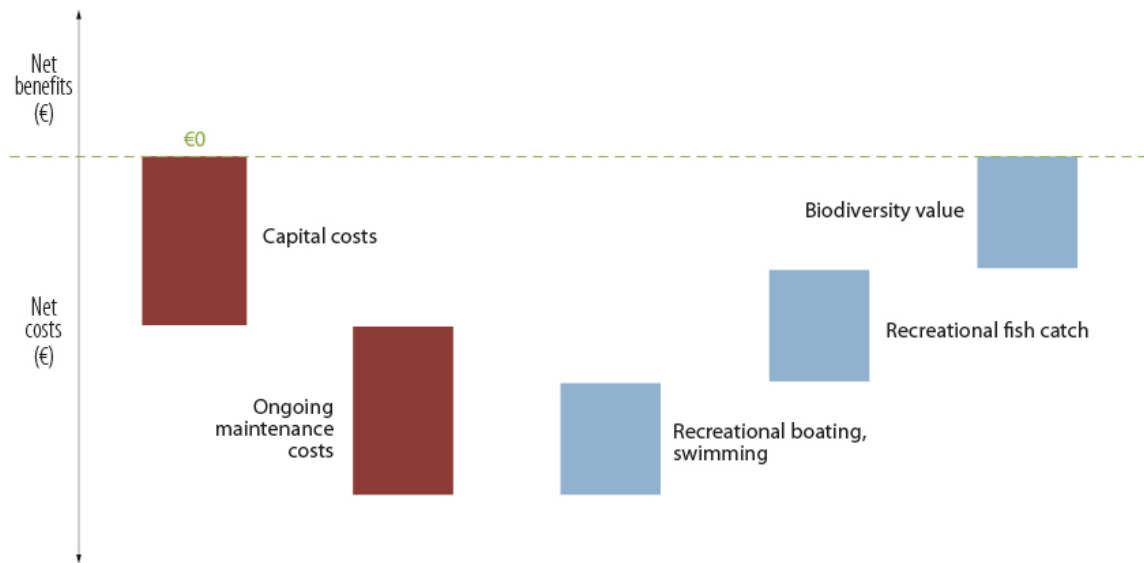
The public good nature of rivers and lakes largely explains the absence of private investment in this ecosystem. Operating almost entirely on public lands, it is difficult to imagine private investments in this ecosystem that deliver private returns. This challenge is illustrated in Figure 22, for a project aimed at waterway restoration (e.g. gully restoration, fencing livestock away from the waterway and riparian replanting). The capital and operating costs of actions on accompanying land are clear, while the benefits accrue entirely to the general public through, for example, recreational opportunities, carbon sequestration and increased biodiversity. While waterway restoration may bring private benefits (such as tourism benefits), it is difficult to imagine them accruing directly to a project proponent.

⁸⁶ Eftec et al. (2017). Technical support in relation to the promotion of ecosystem restoration in the context of the EU biodiversity strategy to 2020.

⁸⁷ For example, see:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69603/pb13829-statement-obligations.pdf; and <https://www.eureau.org/resources/publications/150-report-on-the-governance-of-water-services-in-europe/file>

Figure 22 Illustration of the costs and benefits of a nature-based project involving rivers/lakes⁸⁸



5.6.5 Conclusions — rivers and lakes

The missing data on nature-based actions undertaken in relation to the Water Framework Directive are a clear omission from the data assembled here, especially given that the directive is likely to be a key driver of action within this ecosystem.

It is likely that future nature-based investments in rivers and lakes will continue to be undertaken with public funds in response to the Water Framework Directive and other regulatory drivers. Adopting the polluter pays principle could create market incentives to address the key pressures on rivers and lakes. While this has proven effective in targeting point source polluters (like wastewater treatment plants), this is more challenging for “diffuse-source” polluters such as the agricultural sector. In such cases, regulatory requirements to reduce pollutants flowing from farms into adjacent waterways may be required. It may be beneficial to direct funds from the common agricultural policy towards actions that reduce these externalities, and to introduce regulation to prevent land-based activities from affecting river and lake ecosystems.

⁸⁸ Material produced by Trinomics. Data are illustrative only and do not represent literal costs from an actual project.

5.7 Overall ecosystem summary

Below is a brief summary of the opportunities for scaling up the use of nature-based solutions by ecosystem.

Figure 23 Summary of NBS upscaling potential by ecosystem

<p>High opportunity for NBS growth</p>	<p>Urban</p> <ul style="list-style-type: none"> • Many policy instruments are readily available for urban NBS (e.g. use of building codes to encourage/require green roofs) • High population density results in greater number of people deriving benefits from NBS, which in turn can enhance demand for urban NBS • Examples: urban heat and flood mitigation, aesthetic greening 	<p>Forestry</p> <ul style="list-style-type: none"> • Strong potential for revenue streams through carbon credits and ecotourism revenues • Poorly managed commercial forests have significant opportunity for NBS deployment, through potential for enhanced carbon sequestration and for NBS actions to achieve policy goals (such as the EU Nature Restoration Law targets) • Key challenge: risk profile of long-term maturity rates linked to the slow growth rates of plantings 	<p>Agriculture</p> <ul style="list-style-type: none"> • Significant potential for NBS funding through the Common Agricultural Policy (CAP) • Such funding could be directed toward current NBS instruments under the CAP which are under-utilised, or additional NBS through CAP reform • CAP reform could also reduce perverse incentives
<p>Medium opportunity for NBS growth</p>	<p>Rivers and lakes</p> <ul style="list-style-type: none"> • Lack of incentive for private investment due to public good-nature of benefits derived from these ecosystems (e.g. biodiversity improvements are difficult to finance privately) • However, the water sector could invest in NBS to meet regulatory requirements and recoup costs from customers 		<p>Wetlands</p> <ul style="list-style-type: none"> • Peatland and wetland areas have significant carbon storage potential • Such ecosystems often overlap with agricultural landscapes, and their absolute area is relatively small due to historic land take actions
<p>Low opportunity for NBS growth</p>	<p>Marine and coastal</p> <ul style="list-style-type: none"> • Low private ownership of sites hinders the opportunity and incentive for private investment • Significant knowledge gaps mean that identifying areas in poor condition (a proxy for NBS demand) is challenging • Key driver for future NBS is public investment in risk reduction measures • Restoring seagrass, kelp forest, coastal wetland areas for carbon and biodiversity is a potential area of growth 		

6 State of the market and market trends

The current European market for nature-based solutions (NBS) is considered to be at a nascent stage by both investors and project developers. According to the 2021 UNEP State of Finance for Nature report, the level of investment in nature has reached €113 billion worldwide, of which €27 billion in Europe. This is 24% of the global total^{89,90}. Under 1% of total water management financing and only 1% of biodiversity conservation financing is directed to nature-based projects globally.⁹¹

In order to identify issues that could disincentivise the commercial financing of nature conservation projects, a 30-question questionnaire was sent to 250 nature-based solutions professionals, and 110 responses were received. In addition, 58 organisations involved in nature-based solutions were interviewed, including investors and project managers operating in the European Union. This exercise provided a first-hand assessment of key stakeholders in the EU nature-based solutions market. Interviews consistently proved that interest in investable nature-based solution products appears to be growing steadily among investors (banks, insurance companies, asset managers and multilateral development banks⁹²). The strategic declarations of large banks and asset owners, as well as the creation of privately owned financing facilities, confirm the intention of the private sector to contribute an increasing amount of capital towards the nature-based solutions field, whether for decarbonisation or for the protection of nature.

This trend, however, is challenged by a mismatch between the sought-after late-stage nature-based projects and the current prevalence of early-stage projects. While investors seek ready-to-invest projects with proven financial sustainability, the majority of project managers are struggling to develop nature-related business models and generate cash flows, and are thus failing to meet the minimum requirements set by large, mid-sized and private investing institutions. In fact, most of the nature-based projects analysed did not incorporate bankability assessments in their project plans. This section highlights the extent to which different financial institutions engage in financing nature-based projects at the EU level. This report finds that public funding meets up to 91% of the current financing needs of projects at the EU level, covered by EU agencies, EU-based multilateral development banks, and national, regional and local governments. This is broadly in line with global figures where it is estimated that 86% of nature-based projects are publicly funded.^{93, 94}

According to the 2020 Financing Nature report, in order to conserve the natural environment, \$845 billion is required for investment on an annual basis⁹⁵. Through the deployment of the Natural Capital Financing Facility (NCF), the EIB has become a leader in market-based nature-based solutions in Europe. However, in order to meet the \$700 billion financing gap⁹⁶ for nature over the next decade, public investments will need to mobilise private sector finance. This section therefore explores the motivations and potential incentives for private institutions, non-governmental organisations (NGOs) and other funding providers to intervene at different financing stages for nature-based projects. The following overview summarises responses from interviews with various types of financial market operators and analyses their investment preferences and the implications that this has for the development of the EU market.

⁸⁹ United Nations Environment Programme (2021). State of Finance for Nature 2021. Nairobi.

⁹⁰ Deutz, A. et al. (2020). Financing Nature: Closing the global biodiversity financing gap.

⁹¹ WWAP (United Nations World Water Assessment Programme)/UN-Water (2018). The United Nations World Water Development Report 2018: Nature-Based Solutions for Water. Paris, UNESCO.

⁹² This trend was observed throughout the exchanges with institutional investors, large banks (investment banks and commercial banks) and insurance companies.

⁹³ CrossBoundary (2021). Unlocking private capital for nature-based solutions in emerging and frontier markets. Available at: https://www.crossboundary.com/wp-content/uploads/dlm_uploads/2021/08/Unlocking-private-capital-for-nature-based-solutions-in-emerging-and-frontier-markets-FINAL.pdf

⁹⁴ Following the terminology used in this report, the words “funding providers” encompass both public and private sources of funding.

⁹⁵ Deutz, A. et al. (2020). Financing Nature: Closing the global biodiversity financing gap.

⁹⁶ Deutz, A. et al. (2020). Financing Nature: Closing the global biodiversity financing gap.

6.1 Overview of current EU investors in nature-based solutions

Table 2 General overview of current EU investors in nature-based solutions

Financing investors	Selection criteria	Investment horizon	Investment tools	Maturity level in the field
INSTITUTIONAL INVESTORS				
1. Asset managers	Proven cash flows	Medium to long-term	Market rate or concessional loans	Early-stage
2. Banks	Proven cash flows	Short to medium-term	Market rate or concessional loans	Early-stage
3. Insurance companies	Risk reduction; cash flows	Long-term	Equity and loans	Mid-stage
4. Risk capital investments	Feasibility; potential growth	Medium-term	Equity (traditional or blended*)	Early-stage
DEVELOPMENT FINANCE INSTITUTIONS				
EU and non-EU-based development finance institutions	Non-EU operations	Medium to long-term	Grants, loans and guarantees	Prioritising jobs and growth over climate/nature conservation
EU MEMBER STATES AND LOCAL GOVERNMENTS				
1. Nation states	Innovation potential	Long-term	Grants, loans, guarantees and subsidies	Advanced
2. Regional authorities	Local benefits and innovation potential	Long-term		Advanced
3. Municipal authorities	Local benefits	Medium to long-term		Advanced
EU INSTITUTIONS AND AGENCIES				
European Commission (Horizon 2020, Horizon Europe, LIFE, Interreg)	Financial self-assessment, cofunding requirements, consistency and innovation	Long-term	Grants	Advanced
EIB and European Commission — Natural Capital Financing Facility	Financial viability, business model, abiding by general EIB funding rules	Medium to long-term	Loans, equity and guarantees (through the LIFE programme)	Advanced
European Bank for Reconstruction and	Non-EU operations	Medium to long-term	Grants, loans and guarantees	Intermediate
NON-GOVERNMENTAL ORGANISATIONS				
EU and non-EU-based NGOs	Proprietary	Variable	Providing guidance for development, bankability and future investments. Grants or concessional loans are deployed but in rare scenarios.	Intermediate

Source: *Bankers without Boundaries (BwB)*

6.1.1 Institutional investors

The following section examines the current views of institutional investors towards nature-based solutions at the EU level. To this end, interviews were conducted with:

- Eight asset managers managing portfolios (total assets under management) ranging between €100 million and €125 billion
- Four EU-based banks
- Two insurance companies managing over €120 billion and €600 billion, respectively, and one insurance representative in a Nordic EU Member State
- Six consulting institutions that work with all these financial entities
- Five multilateral organisations active in the field and three university researchers studying the topic
- Two NGOs that collaborate with institutional investors on nature-based projects.

The overall picture emerging from these exchanges shows that the private sector is willing to enter the EU market for nature-based solutions, but is restricted from doing so for multiple reasons, which are discussed below.

a. Asset management companies

Category description: Asset management companies invest a pool of capital in tangible and intangible assets on behalf of their clients. This could be through a variety of different means, such as mutual funds or exchange traded funds (ETFs), in order to provide investors with access to private equity, infrastructure, real estate and international bond markets.

Overall account: The asset management firms interviewed have started supporting nature-based projects through several funds by providing growth capital in the form of market-rate loans⁹⁷, despite the frequent lack of cash flows or financial information available for such projects. For at least three out of the eight asset managers, the only active European projects were based in the United Kingdom. The medium to long-term vision of the asset management sector is to significantly scale up the funds committed to nature-based solutions by identifying viable projects. However, the lack of ready-to-invest projects or projects with sufficient proof of financial viability is a major barrier to the development of investable projects, despite the supposed availability of capital. At present, this is in part illustrated by the fact that the current average investment size for nature-based projects is less than €2 million⁹⁸. For most asset managers, such a small deal size is an issue for the development of the field, since the financial benefits from such small deals tend to be marginal. This is due to the fixed cost of due diligence, which is the same irrespective of the deal value. The majority of the asset managers interviewed (six out of eight) stressed they would be willing to invest in projects for commercial reasons starting from at least €15 million to €20 million, including nature-based projects.

When trying to address the sector in innovative ways, some asset managers such as Actiam, a Dutch asset manager with a portfolio of €60 billion, have put in place a set of criteria to rate companies by their biodiversity potential and compliance capacity. The selection criteria allow the company to promote only companies that score highly in terms of biodiversity protection. Although not representing a direct investment in nature-based projects, it does deliver an indirect investment in nature and biodiversity protection through the most active companies in the field⁹⁹.

b. Banks

The banks operating in Europe that were interviewed, including investment banks and commercial/retail banks, describe their involvement in nature-based solutions as exploratory. The banking institutions consistently argued that a high risk of default prevents large-scale fund deployment at this stage and that the pricing mechanism of nature-based projects is too unclear to be used as collateral for loans. Two large EU-based banks have declared a limited allocation of development funds (below €50 million overall) for nature-based projects without seeking profits, mostly in the fields of reforestation and regenerative

⁹⁷ When referring to *market-rate loans*, investment companies indicate loans bearing an interest using the market rate. The term is used in contrast to *concessional loans*, which do present additional benefits or discounted rates to borrowers and which are generally deployed by development finance institutions and sovereign entities.

⁹⁸ Dushkova, D. and Haase, D. (2020). Connecting Nature Data and Knowledge Base. Connecting Nature.

⁹⁹ The Sustainable Finance Platform (2020). Biodiversity Opportunities and Risks for the Financial Sector. Available at: <https://www.dnb.nl/media/cv2p51gx/biodiversity-opportunities-risks-for-the-financial-sector.pdf>

agriculture. As there is no requirement for a return on the invested capital, this allocation could be considered a constrained use of the corporate social responsibility (CSR) budget rather than a real investment in nature-based projects. This points to the early stage of the private banking sector's engagement in financing nature-based solutions.

Case study — ASN Impact Biodiversity Fund

Interviews and desktop research were used to gather information on one of the few examples in continental Europe of an investment bank investing in biodiversity outcomes in order to generate profitable returns and impact. Even in light of the challenges in sourcing bankable projects in specific sectors, ASN Impact has three primary impact funds involved in generating climate and nature-positive outcomes in Europe. The first is a market finance impact fund and the second involves renewable sources of energy. Both sectors have recognisable revenue streams and attract significant levels of investment.

The third impact fund, the ASN Impact Biodiversity Fund, which is listed on Euronext,^{100, 101} invests in positive biodiversity outcomes. As is its mandate, the fund invests in four primary sectors: sustainable forestry, agroforestry (coffee), ecotourism and aquaculture (marine protected areas — MPAs).

c. Insurance companies

Overall account: Insurance companies intervene in the field of nature-based solutions in three ways: (1) by insuring the natural capital itself; (2) by investing their assets under management in the development of nature-based projects that help to reduce the physical risk to insured real estate or infrastructure; and (3) by investing in nature-based solutions at large for financial returns. For this category, two major EU-based insurance companies with €1 trillion in combined assets under management were interviewed, as well as a country insurance representative for over 20 local insurance companies in a Nordic EU Member State.

Insurance companies are uniquely positioned to develop nature-based solutions. This is because they are among the few companies whose operations benefit directly from solutions that can hedge physical risks and therefore reduce actual investment costs through lower payouts for claims over time. For example, the financing of a natural drought-prevention mechanism could lower the physical risk of drought in a certain area. An insurance company might finance a project aimed at hedging the risk of droughts and thereby offset the cost of payouts if such an event occurs. Yet, with a few notable exceptions who entered the field a few decades ago, many insurance companies have not scaled up their investments in nature-based solutions. Insurance contracts are usually taken out on a short-term (yearly) basis and this creates a principal-agent issue as premium prices are only reduced when observed losses are seen, rather than factoring in a reduction in future expected losses. In effect, the future reduction in losses only affects those who hold the policy at the time and given that there is no guarantee that an individual provider will remain until that time, the projected reduction in losses is not factored into the pricing or investment policy. Individual insurance companies are less likely to invest in nature-based projects that could also benefit their competitors and generate a “free rider” effect.¹⁰²

d. Risk (venture) capital investors

Category description: Venture capital investors are capital providers that are willing to take on a greater level of financial risk than most other investors with the aim of generating higher returns.

¹⁰⁰ Clarmondial (2022). ASN Biodiversity Fund invests in Food Securities Fund. Available at: https://www.clarmondial.com/asn_invests_fsf/

¹⁰¹ ASN Bank (2020). Net Positive Effect on Biodiversity in 2030. Available at: <https://www.asnbank.nl/over-asn-bank/duurzaamheid/biodiversiteit/biodiversity-in-2030.html>

¹⁰² The free rider effect appears as members of a community fail to contribute their fair share to the costs of a shared resource. In the insurance field and in the nature-based solutions scenario, it would occur if some insurance companies pay for the restoration or conservation of some territories, reducing the overall physical risk of an area, while others do not but still receive the same benefits.

Overall account: Due to their unique approach to capital management and profit maximisation, risk or venture capital investors are more deterred than others by the issue of natural capital pricing and the lack of scalability in potential nature-based projects. The business model of risk capital investors is strictly related to the higher end of the risk-taking spectrum with an expectation of compound returns on a small share of investments (i.e. accepting a high failure rate). While this goal is attainable when investing in highly innovative companies and technologies, this is much more complicated when it comes to natural capital, due to hurdles associated with pricing, regulation and scalability. For projects in the agro-forestry space, where additional revenue sources mostly come from selling timber and carbon credits, one of the experts interviewed from a natural capital venture capital firm claimed that the higher costs involved in EU nature-based projects required them to secure higher revenues from selling carbon credits (which at present remain significantly below the €20 per tonne threshold¹⁰³) than the average non-EU project.

6.1.2 Development finance institutions

According to the latest report by the European Development Finance Institutions¹⁰⁴ (EDFI), which groups 15 development finance institutions based or operating in the European Union, the investment size and scope of these institutions has been expanding steadily in recent years in an attempt to tackle global poverty and improve job opportunities through economic growth. At the end of 2015, the combined investment portfolio of European development finance institutions had reached roughly €36 billion,¹⁰⁵ after a decade of steady growth in which the value of portfolios had tripled. While these institutions play a large role in supporting economies, they are limited in the geographical scope of their activities, meaning that their activities mostly address developing regions. The geographical distribution of the EU-based institutions' portfolios as of 2016 was as follows: Sub-Saharan Africa (31%), Latin America and the Caribbean (20%) and South Asia (14%). The most covered sectors were financial services (30%), power generation/transmission/distribution (18%) and manufacturing (16%). Investing in nature or climate priorities is not mentioned in the report or in other sources as a main sector in which development finance institutions have historically invested. However, interviews with institutions operating mostly in Africa and South-East Asia revealed a willingness to develop their portfolio of nature-based investments in developing countries. One institution in particular shared a plan to allocate up to 15% of its funding to nature-based projects (both through grants and loans) over the next few years.

The most active European-based development finance institutions financing nature-based projects worldwide are the Dutch Fund for Climate and Development (FMO)¹⁰⁶, a €160 million fund operating in collaboration with the World Wildlife Fund (WWF), and the Norwegian Reducing Emissions from Deforestation and Forest Degradation Initiative (REDD+). Initially a UN initiative created in 2005, REDD+ has proved effective in transferring funds from developed to developing countries, mostly in the Caribbean, Central Africa and South-East Asia. Norway's REDD+ has deployed more than €2 billion in developing countries for reforestation and biodiversity protection.¹⁰⁷ The REDD+ fund offers a pay-for-result model, which allows the fund to unlock portions of the allocated capital as milestones are achieved.¹⁰⁸ The overall assessment of development finance institutions shows that, although they play a fundamental role in supporting the economy of developing countries, their mandates often do not lead them to invest in nature-based projects or in the European Union.

Within the European Union, an increasingly important role is being played by national promotional banks and institutions, which are a specific kind of development finance institution. Their role mostly involves the rollout of market-based EU funds. National promotional banks and institutions in Europe are a diverse

¹⁰³ 8 Billion Trees (2022). Carbon Credit Pricing Chart: Updated 2022. Available at: <https://8billiontrees.com/carbon-offsets-credits/new-buyers-market-guide/carbon-credit-pricing/>

¹⁰⁴ EDFI (2016). Investing to create jobs, boost growth and fight poverty, Flagship report 2016. Available at: <https://edfi-website-v1.s3.fr-par.scw.cloud/uploads/2017/10/EDFI-Flagship-Report-2016.pdf>

¹⁰⁵ Ibid.

¹⁰⁶ FMO (n.d.). Dutch Fund For Climate and Development. Available at: <https://www.fmo.nl/climate-fund>

¹⁰⁷ Angelsen, A. (2017). REDD+ as result-based aid: General lessons and bilateral agreements of Norway.

¹⁰⁸ IPCC (2019). Climate Change and Land. Available at: <https://forestsnews.cifor.org/61824/number-crunching-making-sense-of-redd-and-results-based-payments?fnl=en>

group: the majority are medium-sized banks with assets of between €1 billion and €10 billion, while some have assets of more than €100 billion and a significant number have less than €1 billion in total assets.¹⁰⁹ While data on the precise investments of national promotional banks and institutions in nature-based solutions are not widely available, these institutions have the potential to increase the flow of capital towards nature-based solutions given their privileged access to advantageous financing instruments, guarantees and local relationships.

6.1.3 EU institutions and agencies

As discussed previously, the market for nature-based solutions in Europe is dominated by public sources of funding in the form of grants. In particular, a significant funding source for nature-based projects is the EU Horizon 2020 research programme, its successor the Horizon Europe programme 2021-2027 and the LIFE programme. Among the 22 project managers interviewed, most relied solely on grant financing and expressed no intention to seek repayable financing to fund their projects. Only one project manager was willing to seek loans to scale their project. Research concluded that the single biggest investor in any type of nature-based project in Europe over the past decade was Horizon Europe/Horizon 2020, with €441 million invested.¹¹⁰ The next biggest was the Natural Capital Financing Facility (NCFF), which deployed just over €80 million for nature-based projects through its project financing facility,¹¹¹ and additional grant financing through its technical assistance facility.¹¹²

Unlike commercial private investors, for policy reasons the EIB's eligibility criteria prevent it from financing the acquisition of land. As land represents both a significant cost and a valuable asset at a project level, this can influence the ability of the Natural Capital Financing Facility to invest in nature-based solutions. Land eligibility, availability and cost therefore pose a challenge for the EIB in attracting private investors. Land eligibility, availability and cost therefore pose a challenge for the EIB in attracting private investors. In addition to this, the facility has no mandate for investing direct equity in projects. This is a characteristic that will be explored in more detail below, but in a market where the average investment size is below the Natural Capital Financing Facility's minimum benchmark of €5 million to €15 million, equity rather than debt is the most applicable form of investment in nature-based projects. From a financial standpoint, the instruments deployed by the facility focus on grants for technical assistance and market-priced loans but with a somewhat higher than normal risk appetite. Other than that, they do not differ significantly from the offering of other development banks worldwide. In addition to EU-funded programmes and the Natural Capital Financing Facility, the European Bank for Reconstruction and Development (EBRD) also funds some nature-based projects using grants to co-finance projects.

6.1.4 EU Member States and local governments

As the results from this report's EU-based dataset show, after EU bodies, the most significant financing source for nature-based projects are EU Member States, particularly through local and regional governments. The role of these entities in contributing to project development has been essential in providing the resources to enable projects to grow and develop. By providing resources mostly through grants and by leveraging their capacity to offer a centralised management approach, EU Member States are well positioned to finance and coordinate the scaling of nature-based projects at multiple levels.

6.1.4.1 National and regional level

The role of states to date has typically either been to finance projects at 100% of their face value, or to complement grants that those projects have received from other institutions, such as the European Commission. Within the European Union, interviews with project managers show that Germany and France are the most active financiers of nature-based projects in terms of the number of projects, deal size and technical advancement. The Netherlands leads in terms of diversity and innovativeness of

¹⁰⁹ Rubio, E. (2018). Making better use of public funding: the role of national promotional banks and institutions. Available at: https://www.astrid-online.it/static/upload/the_role_of_npbis_in_the_eu_budget.pdf

European Commission (2022). Nature-based solutions, EU-funded NBS research projects tackle the climate and biodiversity crisis. Available at: <https://op.europa.eu/en/publication-detail/-/publication/780fb633-49e4-11ed-92ed-01aa75ed71a1/language-en/format-PDF/source-276259760>

¹¹¹ EIB (n.d.). Project examples. Available at: <https://www.eib.org/en/products/mandates-partnerships/ncff/index.htm>

¹¹² EIB (2022). Technical assistance operations under the Natural Capital Financing Facility (NCFF). Available at: <https://www.eib.org/attachments/ncff-ta-operations-en.pdf>

projects, setting a standard for public and private entities to follow. The United Kingdom has the highest number of nature-based projects overall, as our database shows.

6.1.4.2 Municipal level

Nature-based projects tend to be highly tailored to their specific geographical contexts. Similar types of project may vary considerably in different locations due to unique local factors. Their level of complexity may therefore depend on their location and land ownership, local regulation and local ecosystems/habitats. As a result, projects tend not to be developed at a national level, but rather at a regional or municipal level. As mentioned above, urban projects represent the largest category of projects currently being financed in the European Union. Unsurprisingly, the largest share of financing for urban nature-based solutions comes from municipal sources through grants, which are funded by local taxes or government grants. Overall, municipal entities make up a substantial group of grant providers and provide meaningful coordination and cooperation support.

At the municipal level, the main managers and deployers of capital for nature-based projects are utilities, publicly managed entities offering energy generation and distribution or water management services. In Europe, there are several examples of utilities sponsoring and funding nature-based solutions. Thanks to their long-term investment horizon, land ownership and revenue models, utility companies are among the best positioned to invest in nature-based solutions.

Case study — Municipal tax for financing nature-based solutions in the Netherlands

A relevant case study for this project is a water tax introduced by a regional governing body in the Netherlands. The regional authority was looking to raise capital by levying three types of tax on entities that own land, buildings or nature reserves. The first is a water purification levy. This applies to commercial entities that release waste into the sewage system, where the amount of the levy depends on the degree of pollution. The second is a pollution levy for commercial properties that discharge waste into surface water, not sewage systems. Once more, the degree of pollution influences the amount of the levy. The third is a water system levy for landowners. This is based on an assessment of “built-up” land in comparison to “non-built-up land”.¹¹³ The water authority then reinvests the proceeds in the construction and repair of facilities such as embankments and ponds.

The intention of such tax initiatives is to adjust the incentive structure for the entities at risk of having to pay the levy to discourage polluting activities and improve local water systems. The degree to which this solution will be able to scale across the continent depends on political and regulatory factors.

6.1.5 Corporations

The interviews conducted for this report and market intelligence show that European-based corporations are playing an increasingly important role in financing nature-based solutions in the European Union and around the world. Large corporations, in particular, are allocating an increasing share of their budgets to preserving natural resources that are essential to strengthening the resilience of their supply chains. By reviewing several companies’ allocation of resources for nature-based projects, we concluded that, while institutional investors seek profitable or marketable projects, companies tend to align their funding of nature-based solutions directly with their needs, risks and business operations. Corporates are also hedging future European regulatory developments, especially the evolution of carbon credit prices, by investing in carbon sequestration. This type of approach results in two main observations: (1) Corporations are motivated by a sense of urgency since their economic livelihood could be linked to the supply of certain natural resources (such as water for a food and beverage company) or by the preservation of certain levels of CO₂ in the atmosphere through carbon extraction and removal (such as in the case of an energy company); (2) Corporations are much more structured (i.e. bankable) entities, which makes them more eligible to receive funding than many nature-based projects in Europe at present. They already have a financial track record, and they can also raise debt using the cash flows produced by their operations.

¹¹³ Government of the Netherlands (n.d.). Regional Water Authority tax. Available at: <https://business.gov.nl/regulation/water-authority-tax/>

For corporations, cost reduction and supply chain resilience are as essential as steady cashflows, and other revenue streams grant them the opportunity to cover the costs of deploying nature-based solutions without the need to make them financially sustainable on their own. The EIB and the European Commission might therefore consider seeking collaboration with corporate entities to advance the development of nature-based solutions in the field. One mechanism could be to reduce the cost of capital for long-term sustainability processes by providing innovative financing structures that may include longer maturities and grace periods.

6.1.6 Non-governmental organisations (NGOs)

NGOs are uniquely positioned to understand the nature-related value of projects and are therefore among the best placed to support the development of the nature-based solutions sector. Although some players are very active at the EU level, such as WWF and Rewilding Europe, many prefer to support projects in developing countries. According to exchanges with two international NGOs, South-East Asia, Central Africa and South America are the areas that require the most support due to the higher potential for natural resource management and development, lower costs and skilled local populations.

According to our exchanges, NGOs almost exclusively offer an advocacy, coordination and skill support role. The description of WWF's main tasks on its Impact Ventures website highlights the main operations of these NGOs:

- To support conservation businesses in environmental impact measurement and the implementation of biodiversity management best practices;
- To provide targeted capacity building and technical assistance to conservation businesses; and
- To generate attractive investment opportunities in high-impact conservation businesses for investors interested in biodiversity-linked outcomes.¹¹⁴

Expanding on the role of NGOs in financing nature-based solutions worldwide, the 2021 Finance Earth report on financing for nature-based solutions with a dataset of 80 projects states that “NGOs sponsored (only) 10% of (NBS) transactions. The small representation of NGOs is likely due to reliance on finite donor capital and risk of delivery. Cross-sector partnerships such as between corporates and NGOs are a key enabler to delivering investment into NBS: 20% of transactions were sponsored by a consortium of public, private and/or philanthropic sponsors.”¹¹⁵

6.1.7 Overall remarks

The interviews highlighted that private sector investors are led to think about nature, if at all, either from a communication/reputation perspective or from a financial risk and return standpoint. However, with the potential exception of insurance companies, risk mitigation is generally not a driver of investment for them. As mentioned in the first section of this report, nature-based projects yield a wide array of benefits, ranging from avoided costs and reduced risks to improved environmental quality, better health benefits and even biodiversity protection and enhancement. The reluctance or incapacity of private entities to invest repayable capital into nature-based solutions will need to be overcome if the sector is to scale up. According to the United Nations,¹¹⁶ the world will need to triple its investments in nature-based solutions by 2030, and quadruple them by 2050, with additional financing needed for “blue” nature-based solutions. This is a future annual investment rate of \$536 billion. In order to effectively overcome the funding gap, institutional investors need to be engaged to a greater degree.¹¹⁷ Controlling \$87 trillion in

¹¹⁴ WWF (2022). WWF Impact Ventures: For a future in which humans and nature prosper together. Available at: <https://wwf-impact.ventures/our-work>

¹¹⁵ Finance Earth (2021). A Market Review of Nature-Based Solutions: An Emerging Institutional Asset Class.

¹¹⁶ United Nations Environment Programme (2021). State of Finance for Nature 2021. Nairobi.

¹¹⁷ Finance Earth (2021). A Market Review of Nature-Based Solutions: An Emerging Institutional Asset Class.

assets under management¹¹⁸ and overseeing €4 trillion in lending and investments,¹¹⁹ global capital markets have a critical role to play. In 2021, private sector finance for nature-based solutions amounted to only \$18 billion per year globally.¹²⁰ In Europe, only 5% of total funding for terrestrial ecosystem restoration is sourced from the private sector.¹²¹

Currently, very little commercial finance is being leveraged in nature-based projects and this is a situation that will need to be addressed at a European and global level if the present funding gap to conserve natural ecosystems is to be overcome. Institutions such as the European Commission and the EIB have an important role to play in either acting as coordinators, or leveraging public funds in order to catalyse additional commercial finance.

6.2 Analysis of investment trends in nature-based solutions

In an effort to provide an accurate overview of where the market for nature could be headed to in the short to medium term, a survey containing 30 questions was compiled and distributed to a wide range of organisations involved in nature-based solutions. The results from the 110 responses received were compiled into five main categories: (1) composition of the respondents and size of their assets under management, (2) sectoral trends, (3) investment stage trends, (4) geographical trends and (5) improvement opportunities. The outcome of questions on two additional topics covered in the survey (financial barriers and financial instruments) have been included in sections 6 and 7 of this report.

This survey presents the compiled opinions of several experts in nature-based solutions at the EU level, with the specific objective of providing a thorough insider view.

6.2.1 Composition of respondents

Of the 110 survey respondents, 52 replied to the categorisation question, with the largest defined respondent group being NGOs (21%), followed by development banks (12%) and asset managers (12%). Foundations and charities represent a combined 14%, while investment banks, insurance companies, private equity firms and philanthropists make up 10%. A substantial group (33% of respondents) categorised as “other” are a mix of non-financing and financing entities whose contribution has been essential in providing insights on macro trends concerning nature-based solution projects. This category included environmental consultancies, government agencies, UN officers, foundations, university professors and project managers.

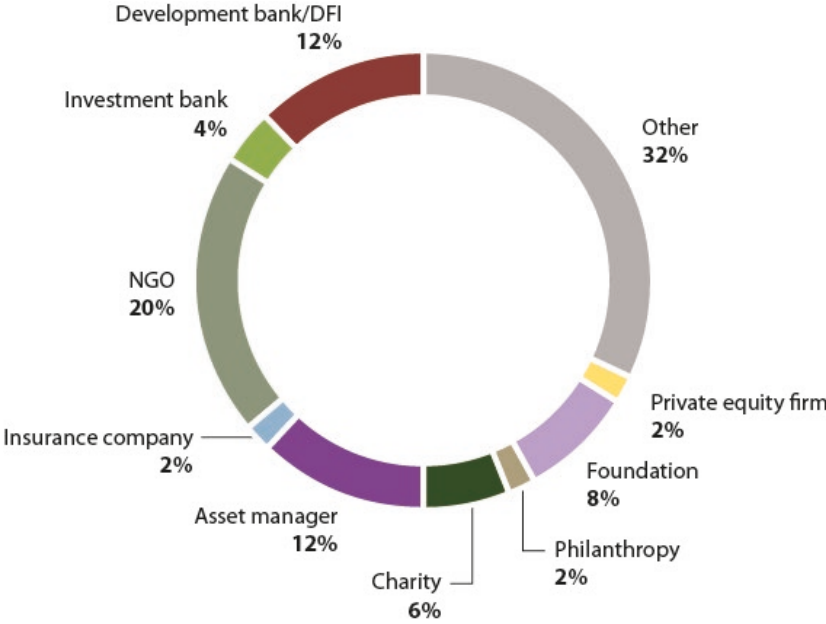
¹¹⁸ IRENA (2020). Mobilising institutional capital for renewable energy. International Renewable Energy Agency.

¹¹⁹ DNB (2020). Indebted to nature: Exploring biodiversity risks for the Dutch financial sector. Available at: <https://www.dnb.nl/media/4c3fqawd/indebted-to-nature.pdf>

¹²⁰ United Nations Environment Programme (2021). State of Finance for Nature 2021. Nairobi.

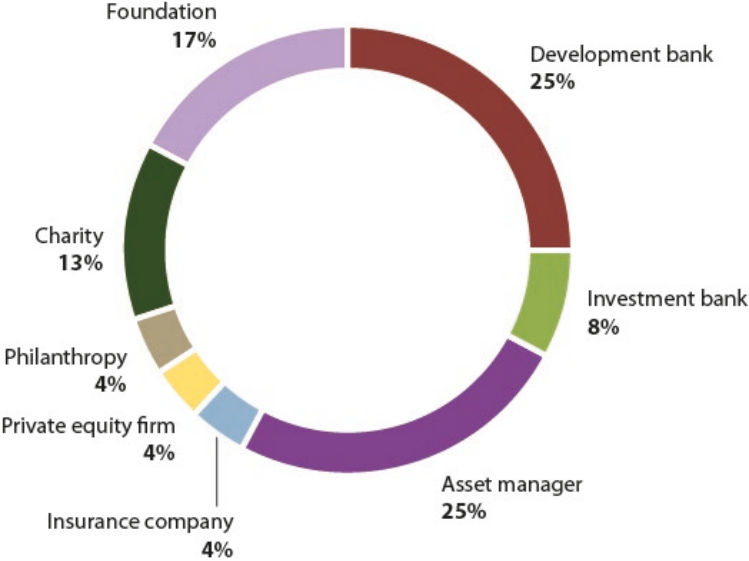
¹²¹ UNEP-WCMC, FFI and ELP (2020). Funding Ecosystem Restoration in Europe: A Summary of Funding Trends and Recommendations to Inform Practitioners, Policymakers and Funders. Available at <https://www.endangeredlandscapes.org/wp-content/uploads/2020/09/FFI-ELP-Restoration-Funding-Brochure-A4.pdf>

Figure 24 Composition of the survey respondent pool



Of the investors who responded to the survey, half were development banks and asset managers, each representing 25% of the total investor respondents. Foundations represented a further 17% of investor respondents, followed by charities (13%).

Figure 25 Investor respondents by type (28 total investors)

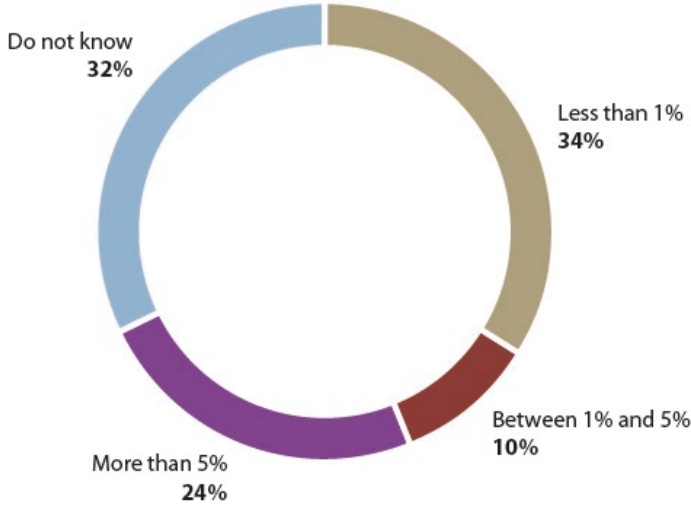


Examining the percentage of investments in nature-based solutions in the respondents’ overall portfolio, based on the Commission’s definition,¹²² only 24% of respondents claim to have invested more than 5% of their portfolio in nature-based solutions. 10% have invested between 1% and 5% of their total capital and 34% have invested less than 1%. The remaining respondents (32%) are not aware of the exact figure. The average size of investments in nature-based solutions at the EU level is between €1 million and

¹²² “Solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions.”

€5 million; 47% of respondents had allocated less than €1 million per project, 30% between €1 million and €10 million, and 17% more than €10 million.

Figure 26 Investment in nature-based solutions as a share of total investment portfolio

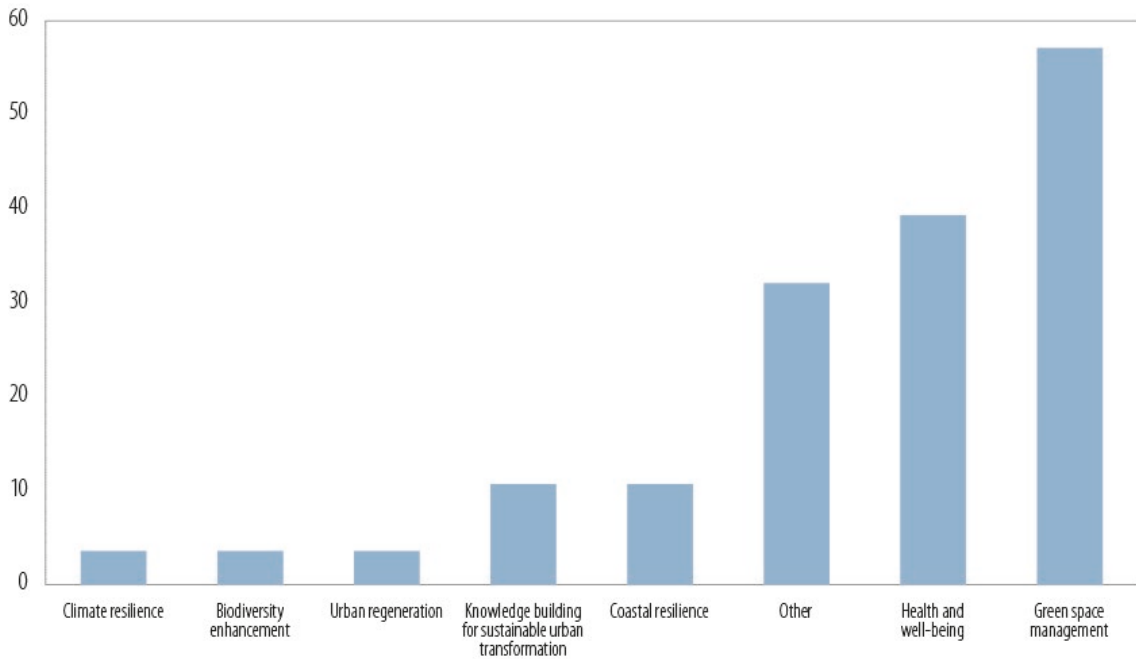


When asked whether they intend to invest in nature-based solutions in the future, respondents are optimistic. Most respondents (43%) expect to invest more than 5% of their overall portfolio in nature-based solutions, 33% plan to invest between 1% and 5%, and only 23% said they would invest less than 1%. Although it might be argued that such figures appear overly optimistic compared to the current state of the market, the sentiment of market players should not be underestimated, as the figures indicate the willingness of investors, whether large or small, to embrace the sector and work to improve the financial sustainability and bankability of the field.

6.2.2 Sectoral trends

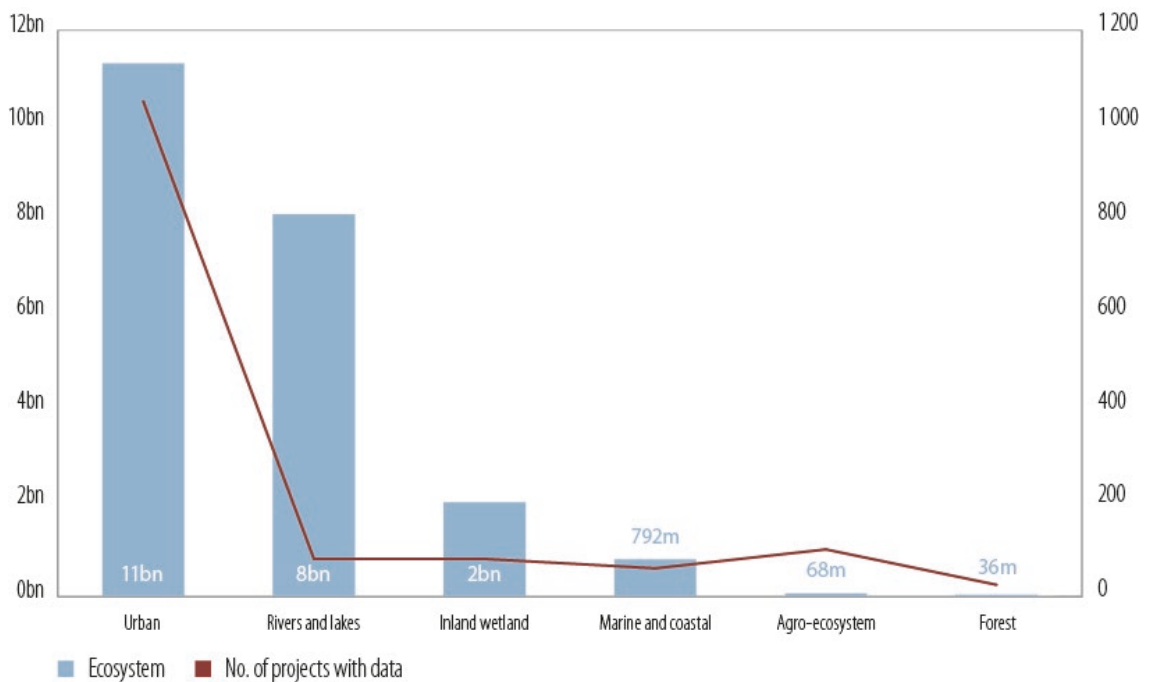
Analysed at length throughout the first section of this report, sectoral trends clearly show that climate resilience is the most common area of investment, followed by biodiversity enhancement and urban regeneration. The graph below shows the sectors currently receiving the most investment from respondents.

Figure 27 Sectors most invested in by respondents (%)



Respondents to the survey were also asked to assess which sectors of the market they believe to be the most promising over the next few years. They were given the option to select two choices at once. Climate resilience projects were chosen as the most likely to receive funding in the future (50%), as were biodiversity enhancements (39.3%).

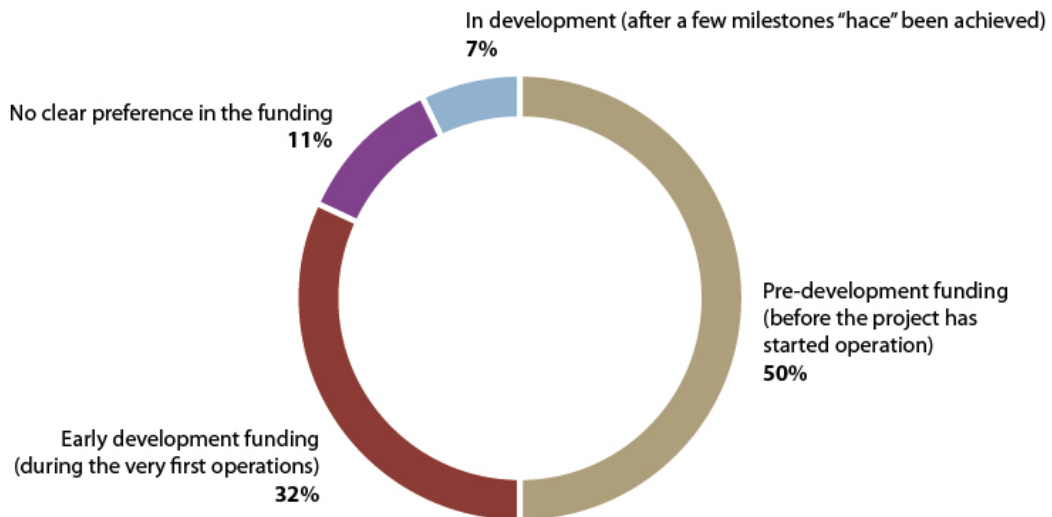
Figure 28 Sectoral distribution of EU projects in € (from section 2 sample analysis of this report)



6.2.3 Investment stage reflections

When asked about the project stage at which they invest, more than 50% of respondents said that they had already invested or were willing to invest in pre-development or early-stage investments. Only 25% of respondents would invest between the in-development and late-development stages, while the remaining 25% had no preference in funding stage. It should also be noted that investments in early-stage ventures (seed and pre-seed) are mostly hindered by the overall conditions of the market, which are not yet in a position to produce more developed projects. Financial investors claim that, when possible, they would prefer to invest in more late-stage solutions. However, this will only be possible when the various financial barriers can be overcome, which will be discussed in the financing instruments section.

Figure 29 Most effective investment stage for nature-based solutions

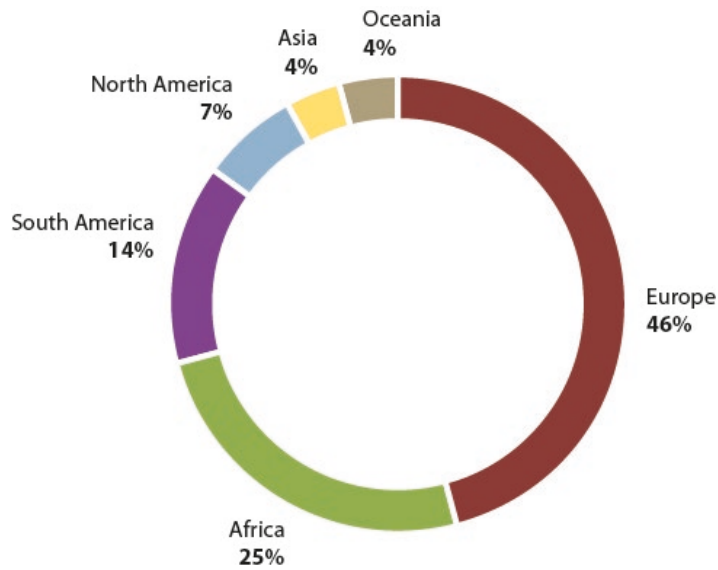


According to respondents, which include both investment experts and project leaders, pre-development funding is the most effective stage of investment (50% of responses) in order to best develop nature-based projects. The second most selected option is then early operations funding (32%). Only 18% of respondents considered in-development funding the most effective.

While in absolute terms early-stage funding can be considered the most effective since it provides the capital to initiate a project, it may also have been interpreted that the most effective stage corresponds to the most desirable investment stage for investors. Therefore, such a finding demonstrates a consensus that the sooner a project receives funding money, the easier its development is expected to be. As the current investment stage distribution shows, private investors remain the most likely to finance projects in development and in later development, once a track record has been established. Public institutions are currently the most likely to invest in earlier project stages.

6.2.4 Geographical analysis

Figure 30 Geographical distribution of respondent investments

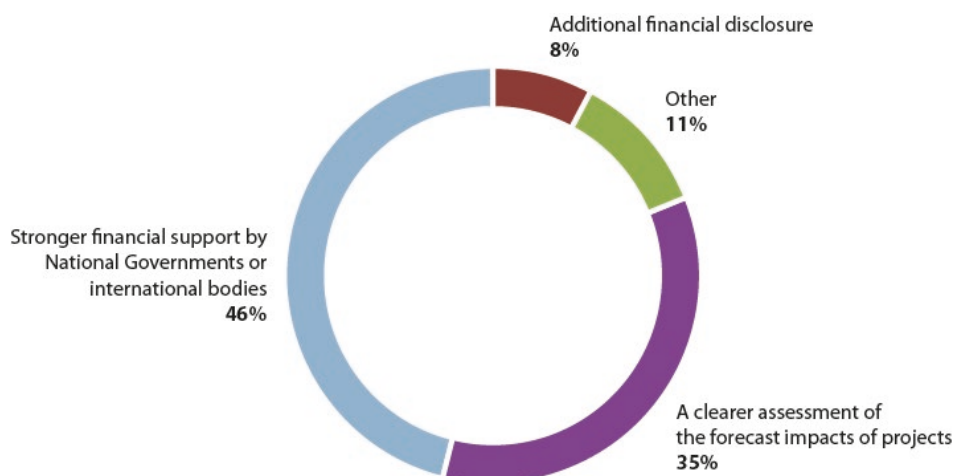


The survey was specifically directed towards entities that appeared to be operating in Europe. Despite this screening, only 46% of financed projects provided by respondents were actually located in Europe, with the remaining 54% split, in descending order, between Africa, South America, North America and the rest of the world. When asked about the most promising geographical locations where nature-based projects are most likely to develop, the percentage of those who selected Europe dropped compared to the previous question (39%). Respondents chose South America (22%), Asia (17%) and Africa (17%) as the most promising areas in the world. Although not considered the most promising geographical location for investment in nature-based solutions by a large share of EU respondents interviewed, Europe was still selected by the relative majority of respondents.

6.2.5 Investment opportunities

In conclusion, the survey asked respondents to reflect upon what kind of improvements would need to happen in order for nature-based solution projects to progress. A large majority of the answers point to the need for stronger support from national governments and international bodies (46%). This was followed by a clearer assessment of the projects' forecasted impacts (35%).

Figure 31 Opportunities for future investment in nature-based solutions



7 Barriers to the development of the market for nature-based solutions

This section examines the barriers and opportunities related to market and financing entities and their current investment in nature-based solutions. It begins with an exploration of the barriers and challenges to the market uptake of nature-based solutions, focusing on their public good nature, and the issues this can pose for private investors. The following section will break down and compare barriers relating to capital deployment, administrative difficulties and other external hindrances from the perspective of investors and project managers.

7.1 Market barriers

7.1.1 Externalities and other challenges

It is worth considering why we need nature-based solutions in the first place and what creates this need. Economic activity often gives rise to undesired effects on the environment which impose indirect costs on society. These “externalities” are not usually captured by markets.¹²³ Moreover, the environment is often considered a public good accessible to everyone. As a result, environmental externalities are broadly shared by society while the returns from economic activities causing negative environmental impacts accrue only to the entities responsible. Despite these general considerations, recent studies have shown that more than half of global GDP is highly or moderately dependent on nature and its services, with a total value of \$44 trillion.¹²⁴ This supports the case for increasing commitments and investment in nature and nature-based solutions projects.

Externalities and public goods are examples of “market failures” that are particularly relevant to nature-based solutions, as they seek to correct the environmental impacts of previous or alternative human actions. A market failure is where a market fails to function efficiently, causing economic impacts. Dasgupta et al. summarise this situation well, noting that “...nature’s worth to society...is not reflected in market prices because much of it is open to all at no monetary charge. These pricing distortions have led us to invest relatively more in other assets, such as produced capital, and underinvest in our natural assets.”¹²⁵

A range of other challenges have been identified in markets for nature-based solutions, which we can describe in market failure terms:

- Projects face significant challenges in **identifying and assembling relevant information** on the performance of nature-based solutions that can be used to inform investment decisions. In market failure terms, this is “information failure”. Environmental externalities often result from challenges in identifying and measuring the polluting impacts of economic activities. Implementing nature-based projects may also inherently involve higher risk. Rectifying information failure requires a concerted effort to measure and quantify in monetised form the benefits and costs of nature-based projects, which can itself be costly because of the monitoring and evaluation activities involved.¹²⁶

¹²³ Keohane, N. and Olmstead, S. (2016). Markets and the Environment. Available at: <https://link.springer.com/book/10.5822/978-1-61091-608-0>.

¹²⁴ World Economic Forum (2020). The New Nature Economy Report. Available at: https://www3.weforum.org/docs/WEF_New_Nature_Economy_Report_2020.pdf

¹²⁵ Dasgupta et al. (2021). The Economics of Biodiversity: The Dasgupta Review.

¹²⁶ As examples: <https://opendocs.ids.ac.uk/opendocs/handle/20.500.12413/16737>; <https://portals.iucn.org/library/sites/library/files/documents/2016-036.pdf>; <https://royalsocietypublishing.org/doi/10.1098/rstb.2019.0120>; and <https://www.sciencedirect.com/science/article/pii/S0959652619340247>

Related to this information failure is a **gap in knowledge and skills** among practitioners and policymakers for whom the concept of nature-based solutions may be relatively new and may conflict with previous approaches (for example, “grey” solutions to manage flood challenges). This can influence public procurement decisions on grey vs. nature-based options. Knowledge and skills gaps reflect the nascent nature of markets for nature-based solutions — it is difficult to build skills and knowledge where few projects exist. However, investment in education and training in relevant key skills (such as environmental engineering) would assist the process.¹²⁷

Another information failure is related to **public perception**, whereby the general public may be unaware of nature-based solutions and their merits and may even be openly hostile to them. This hostility may be reduced or reversed upon evidence of the outcomes of successful projects and is correlated with public trust in the implementation agency.¹²⁸

- A much-noted challenge of project development is that of **coordinating multiple agencies and stakeholders** to create a project that may have overall net benefits for society but may not have a single agency with clear incentives to implement it alone. This is particularly a challenge for landscape-scale projects involving multiple land uses or urban projects with multiple public entities charged with different legislative responsibilities.¹²⁹ This broadly reflects a problem of “split incentives” and is another persistent challenge that increases the transaction costs of nature-based solutions. It can be resolved by identifying key areas where coordination challenges exist and developing processes to facilitate and encourage coordination.¹³⁰
- Highlighted more by financiers seeking to fund investable projects than analysts of nature-based solutions themselves, the **high transaction costs** of such projects combined with their **small scale** presents another challenge for market growth. Not typically considered a market failure (but argued by some to be at the root of all market failures¹³¹), transaction costs are the research and administration costs of developing and financing a project. Where they are high and the size of nature-based projects is relatively small (as is often noted by financiers), this may significantly inhibit project implementation. Aggregating a large number of projects into a portfolio to reach sufficient scale and reduce the transaction cost per project may assist.¹³²
- Financiers seeking to invest in nature-based solutions also highlighted the **long timeframes sometimes required for financial returns** (for example, from carbon revenues). These are seen to inhibit private financing, which may find short-term investments in other projects more attractive.
- Long timeframes, combined with the inherent and uncertain risks of operating in the natural world (as opposed to using “grey” solutions), leads to a **higher risk** profile that may not appeal

¹²⁷ University of Surrey et al., (2019) OPERANDUM- OPEn-air laboRAtoRies for Nature baseD solUTions to Manage hydro-meteo risks, Deliverable 1.1, Mapping, characterization and critical evaluation of existing NBS. Available at: https://www.researchgate.net/publication/345620260_OPEn-air_laboRAtoRies_for_Nature_baseD_solUTions_to_Manage_hydro-meteo_risks_Mapping_characterization_and_critical_evaluation_of_existing_NBS

¹²⁸ Anderson, C. et al. (2021). Public Acceptance of Nature-Based Solutions for Natural Hazard Risk Reduction: Survey Findings from Three Study Sites in Europe. *Frontiers in Environmental Science*, Volume 9. <https://www.frontiersin.org/articles/10.3389/fenvs.2021.678938/full>

¹²⁹ For example, an urban stormwater reuse project could involve separate agencies charged with public health, flood mitigation and water supply, all with specific mandates narrowly focused on their core function.

¹³⁰ As an example: https://www.water.vic.gov.au/_data/assets/pdf_file/0022/81544/DELWP-IWM-Framework-FINAL-FOR-WEB.pdf

¹³¹ Todorova, T. (2014). The Transaction-cost Roots of Market Failure. https://mpr.aub.uni-muenchen.de/66757/1/MPRA_paper_66757.pdf

¹³² Examples: <https://www.iucn.nl/en/publication/marktstudie-financiering-van-natuurlijke-kustbeschermingsprojecten/>; <https://unalab.eu/system/files/2020-02/d61-value-chain-analysis-report2020-02-17.pdf>; https://naturvation.eu/sites/default/files/news/files/naturvation_characterizing_nature-based_solutions_from_a_business_model_and_financing_perspective.pdf; and <https://opendocs.ids.ac.uk/opendocs/handle/20.500.12413/16737>

to many investors. In such cases, it is argued that public co-funding may be an effective way of offsetting this challenge.¹³³

Many of these challenges can be addressed to minimise their impact over time. Information failures can be addressed with research and development, such as through the Horizon Europe programme, targeting key information gaps. Skills shortages can be addressed through education and training. Coordination challenges can be addressed with tools and government direction where they are identified. Transaction costs can be reduced with initiatives to bring relevant information together, connecting buyers and sellers.¹³⁴

7.1.2 The challenge of public goods

However, unlike the above challenges, the public good aspects of nature-based solutions cannot be overcome with research, training and information. Most projects produce a mix of public and private benefits, and private benefits frequently do not exceed the total costs of the project. This is a persistent issue that is relevant to nature-based solutions in all ecosystems.

Private goods accrue directly to private entities, such as timber from trees, for which prices are set by markets (supply and demand). They are excludable (for example the forestry owner can prevent others from harvesting their trees) and rivalrous (in that one person's consumption of timber reduces the amount available to others).

In contrast, public goods cannot be acquired by private entities — they are non-excludable (for example, the increase in species and habitat protection from biodiverse forestry accrues to all of society) and non-rivalrous (in that one person's "consumption" of biodiversity protection does not reduce the remaining biodiversity for others). For this reason, private entities have little incentive to invest in public goods as they cannot profit from the benefits produced.

The relevance of this distinction in nature-based projects is that private interests will only invest in public goods to the extent that they can benefit directly. Nature-based projects often seek to address environmental externalities caused by other markets (for example, water pollution from agriculture) and therefore usually produce a mix of public and private benefits.

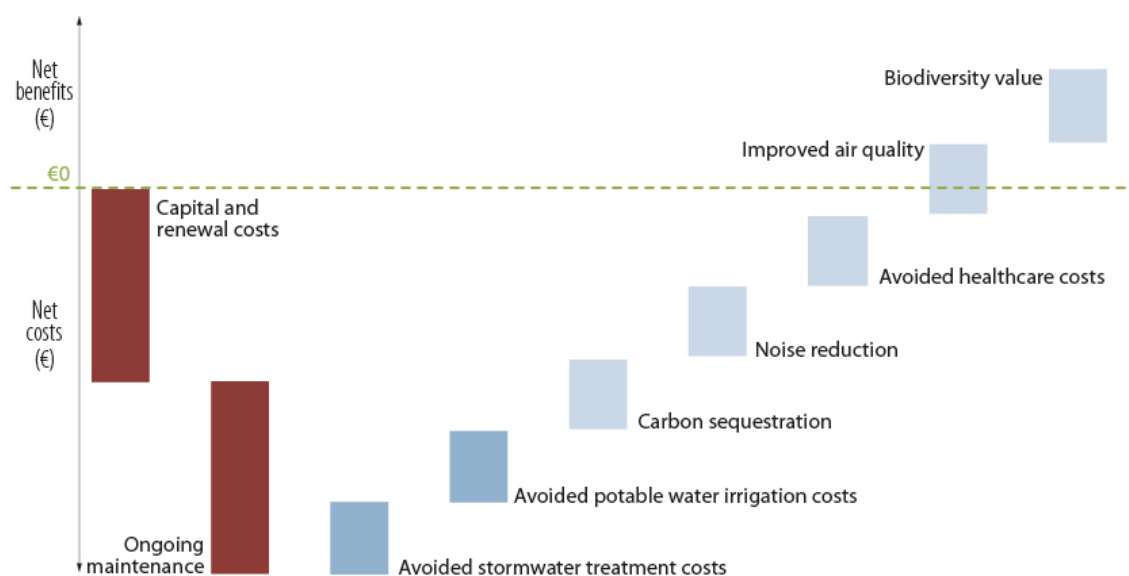
This is a critical consideration because the clear implication is that without structural change to these markets, private interests will only invest in nature-based projects to a level commensurate with their private benefit. Unless private benefits from nature-based solutions exceed the total cost of the project, no amount of correcting for information failures, high transaction costs or coordination failures will inspire greater investment from private sources alone.

While this is a dilemma that nature-based projects face across ecosystems, Figure 32 illustrates this problem for an urban project, reproducing the chart from the previous section (the scale of costs and benefits in this example are illustrative only). This represents a classic "multiple benefits" project in which one single benefit or beneficiary may not reap all the benefits, although combined the total benefits (in blue bars) exceed the total costs of the project (in red bars). Thus, from a "whole of society" perspective, this project should go ahead.

¹³³ Examples: <https://www.sciencedirect.com/science/article/pii/S0301479721004333>; <https://opendocs.ids.ac.uk/opendocs/handle/20.500.12413/16737>; <https://www.eib.org/attachments/pj/ncff-invest-nature-report-en.pdf>; and <https://op.europa.eu/en/publication-detail/-/publication/8bb07125-4518-11eb-b59f-01aa75ed71a1>

¹³⁴ Our case study on forestry intermediary Xilva is one such example.

Figure 32 Illustration of costs and benefits of an urban nature-based solution¹³⁵



However, from the perspective of a private investor, only a subset of the benefits can be considered private and monetisable. These are represented in dark blue and relate to the avoided cost of stormwater treatment (for the local water authority or local government), the avoided cost of irrigation for local community gardeners, and the carbon sequestration benefits of the project (notwithstanding measurement challenges). Other benefits of the project are public benefits (in light blue bars) that would accrue to various parties: noise reduction and improved air quality for those in the local area, the avoided healthcare costs for regional or national governments (in addition to the personal benefits for those exercising in the area), and biodiversity improvement for the broader society.¹³⁶

A number of other market failures highlighted in the literature are present here (information failures, coordination challenges and split incentives). However, even if they could be easily overcome, the public goods market failure would mean that no amount of freely available private investment would seek to invest in the project beyond the scale of recoupable private returns.

This example can be generalised to cover other urban nature-based solutions, and indeed nature-based solutions in all other ecosystems. It demonstrates one of the greatest challenges for the development of any successful nature-based solutions market: how to incentivise private action if a significant share of benefits is not reaped by private entities.

7.2 Financial barriers

7.2.1 Valuing nature

Several of the interviews consisted of conversations on the incentives within private markets for the conservation of nature. More than half of the world's GDP is either moderately or highly dependent on nature and its services.¹³⁷ The challenge identified by investors, however, was that while nature has immense value, it does not have a price.¹³⁸ Within the definition of nature-based solutions, there are ecosystems such as wetlands and peatlands. For many of these ecosystems that hold value through their natural capital, valuation mechanisms allowing investors to capture and integrate this value into their investment models are still very limited. It will take time for such models to reach a mainstream level that

¹³⁵ Material produced by Trinomics as part of the GrowGreen H2020 project.

¹³⁶ Some of the public benefits that accrue to the local community may be reflected in increased property prices for those living near the investment, although there may be no direct means of benefiting from such an increase.

¹³⁷ World Economic Forum (2020). Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy

¹³⁸ Avery, H. (2019). Part 1: Conservation finance: Can banks embrace natural capital? BIOFIN-UNDP.

would enable large entities to effectively reap the socioecological benefits of such nature-based interventions^{139,140}.

When discussing nature-based solutions with interviewees from financial institutions, the conversation often shifted to forestry and regenerative agriculture. The main reason for this is that very few types of nature-based solutions have clear revenue sources.¹⁴¹ Forestry, through the sale of timber and carbon credits, and regenerative agriculture, through the sale of produce, have recognised sources of revenue. This means that they can be evaluated for levels of bankability. Historically, therefore, few investors have been able to engage with nature-based solutions in sectors such as peatland and wetland restoration, due to the lack of recognised revenue sources. According to a 2020 study by Seddon et al.,¹⁴² a fundamental issue of nature-based projects is that many of the benefits cannot be capitalised by any one party. Externalities are created that affect multiple groups, resulting in issues of ownership and leading to the free rider problem mentioned in interviews with insurance companies. Investing in nature-positive outcomes¹⁴³ (where nature — species and ecosystems — is being restored and is regenerating rather than declining) that accrue to the public, while desirable for many, will be undesirable for entities within these competitive markets.

7.2.2 Input costs

In comparison with other regions around the world, the cost of input factors for nature-based solutions projects in Europe are relatively high due to the higher price of factors such as labour and land. Additionally, not only is the cost of land prohibitive, but also the opportunity cost of land hinders potential investments. A higher level of impact could be generated for the same level of investment in other regions outside Europe. In sectors where reliable revenue streams are difficult to source, the risk is increased for potential investors who may not be able to cover costs or secure a basic level of return. Many investors who are willing and able to invest in nature-based projects globally are choosing to deploy investments in areas outside of Europe, where input costs are lower and the potential for impact is greater, although some investors (in particular, corporates) may perceive the relative stability of Europe from a political and regulatory perspective to be attractive for certain projects.

7.2.3 Grant addiction

The market for nature-based solutions in Europe is dominated by public sector funding in the form of grants. This is partly due to the existing market sentiment that the primary focus of nature-based solutions is to restore the ecological functionality of natural habitats and improve ecological values such as biodiversity outcomes. This focus, although positive, may lead to a lower, or even missing, appetite for interest-bearing forms of financing. According to the experts interviewed, the oversaturation of grant funding causes particular issues for the European market. If a project owner is looking for additional financing, the surplus of grant funding means very few entities look to engage the private sector for repayable capital. Along with other barriers, this has long-term implications. It limits the project pipeline for commercial investors, crowds out a range of different types of repayable investors from the market, and leads to inefficient project pipeline building.

Grant funding is vitally important for nature-based solutions. However, in order for grants to be used with maximum efficacy, we recommend defining more stringent criteria in grant funding disbursement and

¹³⁹ Costanza et al., (1997). The value of the world's ecosystem services and natural capital.

¹⁴⁰ Christiansen, L. and Martinez, G. (2018). Adaptation metrics: perspectives on measuring, aggregating and comparing adaptation results.

¹⁴¹ Schrodgers (2021). Investing in Natural Capital: Benefits and Barriers. Available at: <https://prod.schrodgers.com/de/sysglobalassets/digital/insights/2021/11-november/natural-capital-investing/2021-nov-investing-in-natural-capital-dl.pdf>

¹⁴² Seddon, N. et al. (2020). Understanding the value and limits of nature-based solutions to climate change and other global challenges.

¹⁴³ Lammerant, J. (2022). Nature positive in a business context: Current working definition. EU Business and Biodiversity Platform. Available at: https://ec.europa.eu/environment/biodiversity/business/assets/pdf/2022/EU_B@B_platform_Thematic_Report_Nature_Positive_final_link.pdf

ensuring close coordination between repayable financing and grants. This will be explored in the financial recommendations section of this report.

7.2.4 Time horizon

When it comes to creating nature-positive outcomes through investments from different entities, another barrier is the time horizon over which these outcomes are achieved. The conservation, management and regeneration of nature can often take over a decade. In many cases, this timeline does not align with an investor's time horizon, as investors prefer immediate sources of revenue and a shorter exit horizon (for example, while many banks and investors might seek to retrieve all the invested capital and returns within five to ten years, in the case of forestry investments it might take 20 to 30 years for a project to be developed and produce returns).

7.2.5 Standardisation and track record

This barrier relates to several factors regarding the complexity of defining nature contributions and measuring outcomes. Unlike the market for CO₂ emission abatement, the market for nature-based solutions spans a variety of different ecosystems and habitats, ranging from wetland and peatland restoration to green infrastructure. The goal to reduce carbon intensity in the atmosphere can be encapsulated by a single metric — CO₂ PPM (parts per million), and carbon credits can be attributed per metric tonne of CO₂ abated. In contrast to nature and its outcomes, there are many different potential metrics and outcomes that can be evaluated. It is therefore difficult to evaluate outcomes without adequate standards across the market for nature-based solutions,¹⁴⁴ and acts as a barrier to investment as investors cannot easily select key performance indicators (KPIs), or identify the sector in which they can most effectively measure impact. To bridge this gap, the European Committee for Standardisation CEN/TC 465 on sustainable and smart cities and communities is in the early stages of preparing standards for nature-based solutions. This work covers three areas of standards: (1) terminology, (2) technical references and standards (minimum requirements), and (3) standards on processes. For example, the committee is working on a protocol for assessing the effectiveness of various nature-based solutions and decision support (including cost-benefit comparability considerations). It is also defining a monitoring and evaluation strategy/plan for nature-based solutions. Once such plans have been created, they will require time to be fully deployed and integrated into current systems and adopted by investors and organisations.¹⁴⁵

Case study — Overcoming data and standardisation barriers

One initiative brought up in several interviews is the Partnership for Biodiversity Accounting Financials. It was created by financing entities to increase transparency in the financing industry, specifically to standardise financing entities' disclosures on their impact and dependency on biodiversity.¹⁴⁶ By better understanding the dependency on nature, biodiversity and its services, financing entities are better able to inform their investment decisions in order to reduce risk and increase their short and long-term financial sustainability.

The Partnership for Biodiversity Accounting Financials works closely with the Partnership for Carbon Accounting Financials, the Taskforce on Nature-related Financial Disclosures and the Finance for Biodiversity Pledge in order to maximise collaboration and synergies.¹⁴⁷

¹⁴⁴ World Bank (2021). Enabling private investment in climate adaptation and resilience. Available at: <https://openknowledge.worldbank.org/server/api/core/bitstreams/127de8c7-d367-59ac-9e54-27ee52c744aa/content>

¹⁴⁵ A summary of the activities of the CEN/TC can be found here: <https://standards.iteh.ai/catalog/tc/cen/c576c5c3-7f5a-4841-821a-58e7d9070d06/cen-tc-465>

¹⁴⁶ Verney (2020). Dutch financials join in biodiversity impact measurement push.

¹⁴⁷ PBAF Global (2022). Who we are. Available at: <https://pbafglobal.com/about-pbaf>

7.2.6 Place-based complexity, ticket size and due diligence

A key barrier to investing in nature-based solutions in Europe is the place-based complexity of projects. For example, a wetland restoration project in one part of Europe may be completely different to another one with similar aims elsewhere due to the local complexities of each project, such as differences in land ownership and regulation. Therefore, from a project perspective, climate risk is localised.^{148, 149} As a result, investment in nature-based solutions is difficult to scale through direct replication. A review by Savage (2015)¹⁵⁰ illustrates this point. When analysing the additional intangible benefits of increasing co-benefits such as climate resilience, biodiversity and similar non-financial benefits through nature-based solutions, the benefits outweigh the costs by a factor of two to one, and in some cases up to £50 for every £1 invested. In the context of capacity constraints, complexity can prove to be a significant burden. Since projects are often uniquely adapted to their local environment, they struggle to scale in terms of size. In a publication by Dushkova and Haase (2020), it was estimated that the average project size of urban nature-based solutions was less than €2 million.¹⁵¹ This small scale of investment, combined with the cost of the due diligence required by investors for all investments, can become a barrier to private sector engagement.¹⁵²

7.2.7 Regulation

Interviewees identified a specific regulatory challenge linked to the EU taxonomy. The EU taxonomy is a classification system that aims to scale up sustainable investments by establishing a list of environmentally sustainable economic activities. This will help companies to make more sustainable investment decisions.¹⁵³ The interviewees noted, however, that some categories of nature-based solutions, including regenerative agriculture, wetland restoration and peatland restoration, are not included in the taxonomy.

Additionally, a useful concept for biodiversity measurement, protection and restoration called “biodiversity net gain”,¹⁵⁴ piloted in the United Kingdom, has yet to be included in the EU taxonomy. While investors acknowledge that the taxonomy is a living document, which is constantly evolving to include relevant inputs and contributions, and that it provides clear guidance on sustainable investments, they claim that the lack of a direct mention or categorisation of nature-based solutions could affect the development of the nature-based solutions sector. The authors of this report acknowledge the fact that the taxonomy mentions both climate adaptation and mitigation, for which different types of nature-based solutions can be mobilised. Nonetheless, an additional effort to mention nature-based solutions and include each of the subcategories that pertain to them in the sustainable investable categories could help to foster investment in the sector at large.

A second major regulatory barrier arose in conversations with the insurance and re-insurance industries. It has been observed that these industries are among the most willing and able to invest in nature, not only through the issuance of natural risk and disaster-related cover, but also because nature-based solutions can reduce the risk profile of their portfolios and therefore their costs in the long term. The insurers interviewed recognised that it is cheaper to prevent damage than pay for its restoration.¹⁵⁵ However, even though they recognise the value of investing in nature to reduce costs, the lack of

¹⁴⁸ Tall, A. et al. (2021). Enabling Private Investment in Climate Adaptation and Resilience.

¹⁴⁹ Toxopeus, H. and Polzin, F. (2021). Reviewing financing barriers and strategies for urban nature-based solutions.

¹⁵⁰ Savage, M. (2015). Evidence paper on VFM of investments in climate resilient development. Available at: https://assets.publishing.service.gov.uk/media/57a0897b40f0b652dd00023c/EoD_HDYr3_43_August2015_Adaptation_VFM.pdf

¹⁵¹ Dushkova, D. and Haase, D. (2020). Connecting Nature Data and Knowledge Base. Connecting Nature.

¹⁵² IUCN (2022). Financing nature-based solutions for coastal protection. A practical review of blended finance approaches with carbon credits from blue carbon sources. Available at: https://www.iucn.nl/app/uploads/2022/02/-market-study_RVOTIO_IUCNNL_WolfsCompany_final_280122-compressed.pdf

¹⁵³ European Commission (2022). EU taxonomy for sustainable activities. Available at: https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/eu-taxonomy-sustainable-activities_en

¹⁵⁴ Planning Advisory Service (PAS). Biodiversity Net Gain for local authorities. Available at: <https://www.local.gov.uk/pas/topics/environment/biodiversity-net-gain-local-authorities>

¹⁵⁵ United Nations Environment Programme (2022). State of Finance for Nature in the G20.

regulatory clarity is a major barrier to scaling up investments. As an insurance or re-insurance company, regulation mandates that a certain level of liquidity must be proven for certain probabilities of payout in order to protect the consumers in need of the insurance should an event occur, such as a natural disaster. At present, best practice dictates that insurance companies should align with these regulations at both national and EU level. The regulations ensure that customers are protected in the event of a payout. However, they limit the amount that these companies can invest in nature-based projects. Solutions discussed in these conversations often revolved around liquidity facilities that are able to prove liquidity in the event of a payout.

Within the European Commission-sponsored Horizon Europe programme, a project known as NATURANCE (Nature for Insurance) was recently created to examine the technical, financial and operational feasibility and performance of solutions that are built upon and combine disaster risk financing and investments with nature-based solutions. Its deployment will likely spur additional regulatory support at the European and national level as well.¹⁵⁶

Certain types of nature-based solutions are often perceived to be under-represented in regulation and sustainable taxonomies. This is because, historically, ecosystem services have not been recognised as an economic activity. An effort to reduce nature to conventional economic categories has hindered regulatory advancement in the field. The consequence of this under-representation is that entities aligning with EU regulation may lack incentives to invest in nature-positive outcomes. Another thread that emerged from interviews was that taxonomies do not reward innovation by sector leaders. It was suggested that these innovations need to be nurtured and incentivised in order to better scale up the conservation and regeneration of nature.

7.2.8 Lack of investor appetite for existing nature-based projects

Sentiment from project managers confirmed the research from Moersberger et al. (2022)¹⁵⁷ that there is a lack of willing investors to finance nature-based projects. Commercial finance predominantly looks to invest in projects at a later stage, with a significant track record and more scalable business models, which can offer lower risks for the money invested. The perceived riskiness of investing in nature has therefore proved to be a hindrance to investment.¹⁵⁸

When engaging with banks and investors, project managers spoke about the claims of banks wanting to be drivers of change through their investments. Many believe there is a fundamental difference between what is being said, and the reality they are faced with. From their perspectives, little progress has been made. All the project managers interviewed expressed an inclination brought on by necessity to favour non-repayable forms of financing. Since the vast majority of project managers involved in nature-based projects are microenterprises, they do not have the capacity to take on large amounts of debt.

Project managers consistently seek recurrent funding to overcome the application burden of continually applying for funding. As private entities have yet to engage with nature-based projects to a significant degree, project managers need to look to non-repayable sources of finance, often paid out on a project-by-project basis. Therefore, project managers are unable to bring a pipeline of projects to a point where they are independently able to raise bank financing.

7.2.9 Data and monitoring, reporting and verification processes

Another key barrier that is often seen as one of the most challenging at a project level is the lack of data and the lack of monitoring, reporting and verification processes. There is currently a regressive cycle in place where the absence of structural funding leads to a lack of clear and consistent data. The lack of data in turn does not enable additional sources of finance to flow in order to scale up these projects. This is due to the inability of these entities to carry out due diligence processes including capital planning and risk analysis, given the lack of available data. Project managers stressed the systematic undersupply of funding for activities not based on returns, which includes a lack of funding for long-term project

¹⁵⁶ More information can be found at the following link: <https://iiasa.ac.at/projects/naturance>

¹⁵⁷ Moersberger, H. et al. (2022). Europa Biodiversity Observation Network: User and Policy Needs Assessment. EuropaBON/German Centre of Biodiversity Research (iDiv).

¹⁵⁸ Ding, H. et al. (2017). Roots of prosperity: The economics and finance of restoring land.

monitoring. Moreover, even when funding for such processes is available, this is mostly done on a project-by-project basis, not as an integrated or centralised strategy.

7.2.10 Capacity constraints

Capacity constraints specifically relate to tasks including engaging with communities on the ground, sourcing relevant data, and the operational burden of applying for regular rounds of funding. One capacity constraint is technical expertise, particularly a lack of financial expertise within projects and cities. This is partially a funding issue since their budgets make it difficult for projects and cities to attract the required financial expertise. It is also due to the lack of relationships within the financial industry to identify where to obtain support. The combination of a lack of sufficient data for nature-based projects and a lack of financial expertise means that often a project does not have the technical capacity to explore different sources of revenue potential, meaning commercial finance cannot easily be engaged to scale nature-based projects.

7.2.11 Impact vs. revenue

The barriers identified above provide context for the need for technical financial capacity to conduct financial analysis and evaluate possible sources of revenue at a project level. When such assistance is not available, it is often the case that projects shift their mandate towards generating impact and non-financial benefits rather than pursuing a commercial approach. In order to close the financing gap,¹⁵⁹ the mandates of nature-based projects need to become more diversified to consider both impact and revenue alongside each other.

7.2.12 Grey infrastructure as a default solution

For municipalities in particular, grey infrastructure¹⁶⁰ is considered the default for project managers of public infrastructure projects. Public authorities tend to have decades of experience in these kinds of projects and have developed a high level of expertise. Alongside the challenge of finding technical experts, several interviewees stressed the need to develop foundational knowledge among municipalities about the cost-effectiveness and co-benefits of nature projects. The International Union for Conservation of Nature (IUCN) suggests that there is currently a need to capitalise on multiple ecosystem services in order to formulate bankable business cases. It is only at the point where co-benefits are monetised that nature-based solutions can build a competitive advantage over traditional grey infrastructure, which is an important factor for attracting wider sources of capital.¹⁶¹

Table 3 Comparative assessment of the barriers facing investors and project managers

Investors		Project managers	
Barriers	Solutions	Barriers	Solutions
Valuing nature	More transparent, available data	Lack of willing investors	Community engagement
Input costs		Data and monitoring, reporting and verification	
Grant addition		Capacity constraints	
Revenue generation	Wider range of financial products available	Impact vs. revenue	Municipality as convener
Revenue uncertainty			
Time horizon		Grey infrastructure as default	

¹⁵⁹ United Nations Environment Programme (2021). State of Finance for Nature 2021. Nairobi.

¹⁶⁰ According to Conservation International, grey infrastructure refers to structures such as dams, seawalls, roads, pipes or water treatment plants. Adapting to the escalating impacts of climate breakdown — particularly for coastlines facing sea-level rise and stronger storms — requires changing our infrastructure.

¹⁶¹ Forest Trends (2017). State of Private Investment in Conservation 2016. Available at: <http://forest-trends.org/releases/p/sopic2016>.

Investors		Project managers	
Barriers	Solutions	Barriers	Solutions
	Ticket size	Need for pricing mechanism	
Standardisation and track record	Incentive realignment through regulation and taxation	Complexity	Technical assistance and capacity building
Place-based complexity, ticket size and due diligence	Incentive realignment through regulation and taxation	Complexity	
Regulation			

Source: BWB

7.3 Investigation of financing tools

The purpose of this section is to investigate the kind of financing instruments currently used by public and private market entities at an EU level to support nature-based projects. This section will also investigate the financing instruments that could be deployed in order to scale up and develop the market.

Based on the project dataset analysed in sections 4 and 5 of this report, the financing of nature-based projects has so far largely relied upon grant funding (32%) and the innovative use of public budgets¹⁶² (36%). Grant funding is not a financial instrument per se but could be considered an umbrella term referring to an array of sources of local or national public funding. Green finance instruments and instruments generating revenue together represent less than 2% of the funding for the projects surveyed.

It should be noted, however, that these figures have been collected by compiling a list of publicly available projects. Private institutions are more strictly governed in terms of confidentiality and privacy, which makes identifying the exact deployment of various modes of financing more challenging.

The results from a 2021 global mapping exercise of nature-based solutions conducted by Finance Earth proved useful in this respect. The findings indicated that of the 200 nature-based projects surveyed globally, only five showed quantitative financial performance target ranges. These were internal rates of return (IRR) of 2-12%, some of which occurred within blended finance structures.¹⁶³ The interviews conducted for this study generated similar findings.

7.3.1 Financial instruments used by development banks

Understanding the extent to which international development banks, including those not based in the European Union, currently fund nature-based projects can provide essential insights and potential guidance on how the sector could be strengthened by using the correct tools and techniques. As would be expected from these kinds of institutions, development banks mostly rely on grants, concessional and market-rate lending, and blended finance structures, supporting the work of existing organisations or complementing private institutions in their financing work.

7.3.2 Assessment of the financial instruments currently used in the European Union

This section explores the financial instruments currently in use in the European Union by all active financiers of nature-based solutions, using the combined results from the survey and the interviews.

¹⁶² Innovative use of public funding, as the expression suggests, refers to non-conventional uses of public funding money such as pooling funding from different government departments or making use of previously untapped sources such as the public health budget.

¹⁶³ Finance Earth (2021). A Market Review of Nature-Based Solutions: An Emerging Institutional Asset Class (commissioned by the Green Purposes Company).

The first question asked market entities about the instruments they use now or that they might have used in previous projects to finance nature-based solutions. A preliminary distinction should be made. Financial instruments are referred to as instruments used to directly fund projects from the perspective of a commercial financial institution, for example through debt, equity instruments or guarantees. On the other hand, other sources of repayment exist that can be used to repay debt or simply to reduce dependency on grant financing. This category includes carbon or biodiversity offsets, cost reductions, payments for ecosystem services and insurance instruments. Such a set of tools can help us to understand what development potential some projects may have over others, and what kinds of revenue sources they may be able to tap into.

The underdeveloped nature of the market discourages financial investors looking for a proven track record and sources of financial viability and favours public sector risk/research capital over market-based loans for project expansion. The current state of the market also limits the availability of financing instruments to only a few commonly used ones. While also offered by development banks and public organisations, loans tend to be more widely used once projects have scaled up and growth capital becomes essential. The small size of most nature-based projects in the European Union, however, prevents this from happening.

Interviews have shown that equity instruments, although rare, are already being exploited by asset owners outside the European Union, mostly in Latin America and South-East Asia, especially by risk capital owners seeking significant value growth in relatively short amounts of time. The results of the interviews suggest that while risk capital equity investments in nature-based solutions have tended to underperform equity investments in other asset classes over the past few years, a minority of organisations claim to be confident that equity investment in nature-based solutions could grow in line with the sector.

The overview of the instruments below considers the following criteria as well as the comments gathered from interviews:

- Standardisation capacity
- Ease of implementation
- Complexity
- Forward or backward-looking
- Frequency
- Effects on the market

Table 4 Overview of the instruments most frequently used

Financial instrument	Standard capacity	Ease of Implementation	Complexity	Frequency	Forward or backward-looking	Effects on the nature-based solutions market
Grant instruments	High	Intermediate	Low	Very high	Backward-looking	<ul style="list-style-type: none"> - Supporting early development stage nature-based projects - Fostering innovation - Limiting the potential growth of the nature-based solutions market due to “grant addiction”
Market rate loans	High	High	Low	Intermediate	Backward-looking	<ul style="list-style-type: none"> - Currently used very little for lack of sufficiently large loan opportunities - Not embraced by most nature-based projects for their high interest rate and the associated burden - Market entities claim they are crowded out by too many grants
Concessional loans	High	High	Low	Intermediate	Backward-looking	<ul style="list-style-type: none"> - Mostly offered by development finance institutions and states, not by the private sector - Seen by many as an intermediate solution between market-rate loans and equity
Equity instruments	Low	Intermediate	Low	Very low	Backward-looking	<ul style="list-style-type: none"> - Potential to help scale small nature-based solution ventures (early-stage equity), especially if concessional - Potential to accelerate the growth of mid-sized nature-based solutions, especially if supported by additional technical guidance by the equity investor - Highly unlikely to expand due to scale, low returns and excess risk

Grant funding

Grant funding is used to describe financing for individuals or companies that does not need to be repaid, such as research and education grants. At present, grants are by far the most common financial instruments for financing nature-based projects in the European Union. Although grants may be sourced from both public and private sources, grants for nature-based projects come almost exclusively from public sources, with a few exceptions. One such exception is the MAVA foundation, a private foundation that also offers grants.¹⁶⁴ From a technical standpoint, grants can be easily standardised thanks to the replicable set of criteria used to select the most promising projects for funding. While the requirements that are attached to grants (such as co-funding or impact reporting) may be complex, their structure is simple. This simplicity is enhanced by the fact that grants are non-repayable and so do not require a repayment structure.

For the purpose of this assessment, it is important to highlight the co-funding requirements that projects are expected to meet. This should help shed light on whether current selection criteria may be preventing the development of financially sustainable nature-based projects. The current rules on co-funding criteria for grant applicants come mainly from the EJP (European Joint Programme) Cofund and the ERA-NET Cofund. The EJP Cofund aims to encourage multiple legal entities (at least five) from several EU Member States to submit joint applications for grants.

As many field experts pointed out throughout the interviews, structuring projects from their inception to take into account multiple and diversified sources of revenue would significantly increase the financial sustainability of projects and ensure a larger scalability potential throughout their development. Once

¹⁶⁴ MAVA Foundation (n.d). MAVA: Investing in people and nature. Available at: <https://mava-foundation.org/>

several revenue streams have been mobilised and the funding comes from more diversified sources than simple grants, projects have a higher chance of developing further so that they can qualify for market-rate or concessional-rate loans.

Loans

As confirmed by interviews, the second most widely used financial instrument for nature-based projects in the European Union is loans, since “innovative use of public budget” cannot be considered a financing instrument. Loans are debt instruments whereby a contracting party incurs a debt by borrowing capital (principal) from banks or other financial institutions and then repays the principal at an agreed interest rate over an agreed period of time.

Several types of loans exist depending on their funding source, collateral and support from public or private entities. The most frequently used loans for nature-based projects are:

I. Market-rate loans: These loans enable the contracting party to borrow capital, paying interest based on their ability to repay and to produce a return. The market rate is generally determined by the average of all the loans offered by lenders.

II. Concessional loans: Also referred to as “soft loans”, these instruments offer more accommodating conditions for the borrower, allowing them to adjust the grace period, the interest rate or other features of the agreement.

III. Subsidised loans: Subsidised loans can offer lower interest repayments on the principal thanks to more or less explicit subsidies provided by government or multilateral entities.

Loans are currently largely under-represented compared to grants and other sources of public money, despite the intention of market entities to deploy them across the European Union. As seen throughout this study, the average size of nature-based projects in the European Union ranges between €1 million and €10 million, which makes them too small for most institutions to earn returns that adequately compensate them for the risks undertaken. Borrowed capital and high interest payments, even if concessional, also represent too high a risk for most of the project leaders interviewed as well as for lending institutions. A more detailed assessment of the two main types of loans is provided below.

Market-rate loans

Based on the market intelligence research conducted through the interviews, market-rate loans are being used to finance large nature-based projects across the European Union by asset managers (through special funds) and by a handful of banks. From a technical standpoint, market-rate loans are easy to implement, are not very complex and only entail a moderate risk for lenders, which is compensated for by interest rates that are adapted to each project’s level of risk. Due to the private nature of the loan agreements between private institutions and nature-based projects, an estimate of the average interest rate cannot be put forward.

Some project managers highlighted the fact that the interest rates payable on market-based loans make them unattractive at this early stage of the market’s development. Additionally, the high availability of grants encourages project managers to favour any possible grant source over loans.

Concessional loans

To address project managers’ claims that interest rate repayments are too high for many projects, some institutions offer more advantageous, concessionary loans. Mostly provided by development finance institutions and state or regional funds as a complementary or alternative solution to market-rate loans, concessional loans offer either discounted interest rates or more accommodating grace periods to reimburse the loan. Using this instrument is a way for institutions to signal their intention to accelerate the development of ventures and sectors they deem to be valuable either for financial or non-financial reasons. They provide a discount on a loan, hedging the additional risk with public resources or private financing. Project managers in the field of nature-based solutions view such loans more favourably, since they take into account the social and environmental benefits that nature-based solutions provide to society at large. They also offer more flexibility in the reimbursement phase and lower the pressure on monthly operational expenses. Private institutions, however, lack incentives to provide concessional loans because they involve similar risks to market-rate loans but offer lower returns.

Equity instruments

Broadly described as “Any contract that evidences a residual interest in the assets of an entity after deducting all of its liabilities,”¹⁶⁵ equity instruments can be split into multiple categories. The following can be applied to the field of nature-based solutions:

Common stock: Issued by a public company aiming to raise funds from the general public. It grants shareholders the privilege of co-ownership of the company and a vote at shareholder meetings commensurate with the proportion of shares they hold.

Preferred stock: Preferred stock or preference shares are securities that represent ownership in a company, and that have a priority claim over common shares on the company’s assets and earnings. The shares are more senior than common stock but are more junior relative to bonds in terms of claim on assets. Holders of preferred stock are also prioritised over holders of common stock in dividend payments.

Convertible debenture: A long-term debt issued by a company that can be converted into shares of equity stock after a specified period. Convertible debentures are quite popular since returns from converted stock are higher than those derived from common bonds.

Equity-like debt instruments: Any debt obligation, loan, guarantee or any other similar arrangement for obtaining funds or credit that carries a right to participate directly or indirectly in the earnings of the entity. The risk taken on by investors therefore results in a rate of return more similar to an equity stakeholder than a debtholder. Such instruments include profit participation loans, contingent loans and quasi-equity, which could be attractive for the nature-based solutions market.

Equity can be structured as either concessional or non-concessional, like loans. In the case of concessional equity the purchaser can claim more shares than the nominal value would have allowed.

Through the interview process, only one investor out of the 19 interviewed said that they had used equity instruments to finance nature-based projects. The rationale behind the use of equity capital is generally justified by the intention to gain more control and the desire to capture growth in a project or firm’s value. However, venture capital and private equity investors struggle to reconcile their relatively short investment horizons (typically five to seven years) with the typical timescales needed for nature-based projects to generate profits. Additionally, the high returns expected by such investors to compensate for the high risks taken by financing early-stage nature-based projects cannot compete with the more lucrative returns associated with highly disruptive and innovative ventures from other sectors, such as technology.

Despite the difficulties, the use of equity to finance nature-based projects is expected to grow over time, especially in forestry, where there is potential to hedge price volatility and where equity offers opportunities for more flexible exits than most debt instruments.

7.3.3 Unused or underused instruments with growth potential

Although many of the investors interviewed had so far failed to overcome the barriers associated with investments in nature, discussions were held about instruments that could potentially help to overcome these barriers in the future. Two financial mechanisms in particular were explored: guarantees, or first loss instruments, and more innovative debt instruments, such as thematic bonds and sustainability-linked bonds. An examination of their key features and uses could provide some insight into how these instruments can be applied at different stages of both a project’s development and the overall market’s growth. As shown in Table 5, these instruments can be used by different public and private entities, depending on their size, risk appetite and interest in specific nature-based solutions.

¹⁶⁵ Deloitte (2020). IAS 32, Financial Instruments presentation.

Table 5 Overview of promising but underused instruments

Financial instrument	Standard capacity	Ease of implementation	Complexity	Frequency	Forward or backward-looking	Effects on the nature-based solutions market
Guarantees	High	High	Low	Intermediate	Backward-looking	<ul style="list-style-type: none"> - Potential effect of boosting private investment in nature-based solutions by de-risking them in a nascent phase of the market - Risk of putting too much responsibility and pressure on public institutions to develop a single market - Appreciated by nature-based solutions project managers for their potential to bring in additional private capital on top of additional sources such as grants
Thematic bonds	High	Low	Low	Intermediate	Backward-looking	<ul style="list-style-type: none"> - Can boost the growth of nature-based solutions in their mid-to-late development stage - Enable investors to verify the claims and tie the issued debt to the exclusive use for projects - Issuing costs are high and are best tailored for large projects
Sustainability-linked bonds and loans (SLBs and SLLs)	High	Intermediate	Intermediate	Intermediate	Forward-looking	<ul style="list-style-type: none"> - Offer more flexibility on how the money is employed and are cheaper than thematic bonds - May lead issuers to set less ambitious key performance indicators and offer less rigorous accountability measures

Source: BwB

Guarantees

Guarantees are instruments whereby a financial entity, generally a public or multilateral financial institution, supports the private funding of a project by assuming responsibility for a debt should the borrower be unable to keep up on its payments. This occurs if a project does not become profitable and does not generate adequate cash flows over time. Guarantees can incentivise additional sources of finance to co-invest, as the risk of investment is reduced by the first loss guarantee. Guarantees shift the risk exposure in a transaction to a level that can be tolerated by private investors.

The financial experts and project managers interviewed had a mixed reaction to the idea of guarantees, which are not used to a great extent for nature-based solutions in the European Union. Some of the interviewees suggested that guarantees could be an effective way to incentivise private investment in nature-based projects; however, others said that they would not be sufficient to attract investment in such an “immature and emerging” sector. Overall, the view was that guarantees could play an enabling role alongside co-funded grants and concessional loans in de-risking the market for nature-based solutions. This would enable projects to scale and gradually entice investors.

Other debt instruments

Interviewees pointed out that as the scale of the market grows, additional debt instruments such as use of proceeds bonds, thematic bonds and sustainability-linked bonds could be used more widely to finance nature-based projects, particularly those issued at the sovereign level or by corporate issuers. Of the thematic bonds currently available on the bond market, the themes relevant for nature-based projects could include green, blue, social, resilience and Sustainable Development Goals (SDGs), as well as sustainability-linked bonds.

- **Thematic bonds at large (green, impact and resilience)**

Use of proceeds bonds apply a transparent project selection process, both pre- and post-issuance, in order to stress the impact delivered by the invested capital. These steps are required to ensure

that proceeds are allocated to projects aligned with the bonds' theme, principles and guidelines (e.g. International Capital Markets Association (ICMA)¹⁶⁶).

- **Sustainability-linked bonds and loans**

There is an important difference between thematic bonds and sustainability-linked bonds. While the project selection process may overlap with those covered by a use of proceeds bond, the interest payments on a sustainability-linked bond are linked to performance, so that issuers receive a discount or pay a penalty depending on whether or not they achieve a certain result. Such future-looking and performance-based instruments are designed to appeal to the issuer's sustainability ambitions by incentivising them to achieve maximum impact. This is done through target setting that is benchmarked against present metrics on the chosen key performance indicators. Importantly, tying the bond to their performance against key indicators ensures vigilance for data methodologies and data collection, which is regularly monitored, maintained and externally verified. The market for sustainability-linked bonds in 2020 was dominated by supranational entities, such as the World Bank and the EIB. Development banks such as the World Bank accounted for 68% of the market.¹⁶⁷ There is also potential for corporations to issue this kind of instrument for nature-based projects, since they can prove steady cash flows, do not have to rely exclusively on the nature-based solutions to pay back the interests and principal, and can benefit from lower costs when the agreed key performance indicators are achieved because of a rigorous monitoring process.

Exchanges with two EU-based asset managers (both with assets under management of over €100 billion) offered a few insights on the two instruments mentioned above. These asset managers expressed a more favourable view on green bonds given their use of proceeds nature and the guarantee that the project will use the proceeds to work towards a given goal. The high costs of green bond issuance, however, requires significant ticket sizes. Due to their structure and easier expenditure approaches, sustainability-linked bonds could be used for projects in earlier stages of development and could help reduce the debt burden of a project or a company if the agreed performance targets are met.

While the issuance of both use of proceeds thematic bonds and sustainability-linked bonds is expected to increase over time, a thread arising from the conversations with interviewees was that sustainability-linked bonds were less credible as it is not in the interest of the issuer to set challenging performance targets. Issuers have an incentive to set easily obtainable targets to increase the probability that their cost of debt will decrease. Setting challenging targets is not built into the pre-issuance calibration process, which to date has hindered demand for these bonds.

- **Collateralisation of future revenues**

Although not strictly a financing instrument, collateralisation is increasingly being used to finance nature-based projects outside the European Union to reduce exposure in case of default. Collateralisation can be applied to loans (for companies) or to loan obligations (for project finance) using future revenue as collateral for debt issuance. One of the main issues holding back the development of nature-based solutions is that projects tend not to generate immediate cash flows and so tend to require longer-term investment.

Some of the interviewees, notably a nature-based solutions debt officer working for an EU-based asset manager with more than €600 billion of assets under management, referenced the collateralisation their company performs for nature-based projects in Latin America. Instead of using land, a more traditional form of collateral for forestry projects, the company started using projected levels of CO₂ removal, based on the most accurate estimates the company could produce, as these can then be sold as credits. This mechanism allows small projects and companies to collect funding even before the carbon credits have been issued and could thereby

¹⁶⁶ ICMA (2022). The Principles, Guidelines and Handbooks. Available at: <https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/>

¹⁶⁷ CBI (2021). Sustainable debt global state of the market 2020. Available at: https://www.climatebonds.net/files/reports/cbi_sd_sotm_2020_04d.pdf

help to foster the development of the sector without the need for collateral in the traditional sense.

8 Assessment of key financial components for nature-based project development

Europe's nature-based solutions sector has a number of promising avenues for growth. This section explores the revenue sources as well as value creation tools that could be mobilised at a project level in order to conserve and regenerate nature. The suggestions use pre-existing value creation opportunities from the literature and case studies from around the world. They also repurpose innovative new sources of revenues to attract investments into nature-based solutions and use information from the interviews carried out with financing entities and project owners. Each revenue stream or value creation mechanism is then assessed to determine its reliability, type of payer, scale, and other similar characteristics.

To this end, Global Canopy, a data-driven company that collects information and modelling data on nature, has developed a framework to assess potential revenue sources based on six main criteria:¹⁶⁸

- **Scale** — funding amount
- **Timeframe** — time period over which funds are collected
- **Level** — where is finance aggregated?
- **Payer** — who is paying and who should pay?
- **Value** — why would clients/users pay?
- **Generation** — type of revenue generation

These financial components enable project selection committees to contextualise and assess in depth the potential revenue streams or value creation opportunities. An aggregate approach to value generation can encourage the development of the most promising projects based on the consistency of their value generation stream, source, reliability and other similar features.

8.1 Credits

Credits are among the most promising revenue streams that could be produced by nature-based projects at the current stage. According to Bloomberg, carbon offset prices in particular are experiencing significant growth and could rise 3000% (€/tonne) between now and 2029 under a tighter regulatory environment.¹⁶⁹ Several kinds of credits have emerged in the past few years that attempt to offset externalities that have previously been unaccounted for. The most frequently used options for credits as a revenue stream for nature-based solutions are presented below.

- a. **Carbon credits.** The emergence of carbon credits as a form of revenue generation has attracted different types of capital providers to invest in certain types of nature-based solutions, especially forestation projects. These credits attempt to crowd in repayable sources of finance to create a positive environmental impact. The credits function by verifying one metric tonne of CO₂, which has either been removed from the atmosphere through interventions such as reforestation, or abated through means of emissions avoidance or reduction.¹⁷⁰ A study carried out by Pérez-Soba et al. (2016) suggests that existing forests in Europe have the ability to sequester approximately 13% of EU greenhouse gas emissions from

¹⁶⁸ Global Canopy (2021). The little book of investing in nature. A simple guide to financing life on Earth. Available at: https://globalcanopy.org/wp-content/uploads/2021/07/LBIN_2020_RGB_ENG.pdf

¹⁶⁹ Bloomberg (2022). Carbon offsets price may rise 3,000% by 2029 under tighter rules. Available at: <https://www.bloomberg.com/professional/blog/carbon-offsets-price-may-rise-3000-by-2029-under-tighter-rules/>

¹⁷⁰ McKinsey (2020). How the voluntary carbon market can help address climate change. Available at: <https://www.mckinsey.com/business-functions/sustainability/our-insights/how-the-voluntary-carbon-market-can-help-address-climate-change#:~:text=A%20carbon%20credit%20is%20a,of%20a%20carbon%2Dreduction%20project.>

the burning of fossil fuels,¹⁷¹ with further research suggesting that agroforestry systems can unlock self-sustaining revenue streams over time.¹⁷²

Such credits can be traded in the voluntary carbon markets for a specific price depending on market dynamics. Even though demand in voluntary markets has increased in recent years (to a market investment of approximately \$170 million in 2019), these funding markets are currently underdeveloped¹⁷³ and are small relative to their estimated dollar values.¹⁷⁴ Although the current price of carbon is not sufficiently high to generate reliable revenue flows on its own, several projects have based prospects of future bankability on the expected increase in carbon credit prices and demand over time. Exchanges with carbon market experts have highlighted that a price that would enable nature-based solutions to fully fund themselves using credits depends highly on the country. In developing countries, where operational and labour costs are lower, a cheaper price for carbon credits is sufficient to break even. In the European Union, where such costs are much higher, the breakeven point is higher. Nonetheless, illustrative of the growth in demand for carbon offsets, it has been projected that carbon credit prices may increase fifty-fold globally by 2050,¹⁷⁵ which will greatly affect how European nature-based projects could generate revenue streams to sustain their operations and encourage the creation of carbon sequestration-related projects to generate revenues.

Currently, the price of carbon credits on the voluntary market varies significantly. \$10/tonne is considered a market strike price¹⁷⁶ by market leaders such as the LEAF Coalition.¹⁷⁷ This could be too low for many projects to cover their expenses. Additionally, the carbon credit market remains underdeveloped and difficult to forecast. Certain market commentators suggest that the validity of carbon credits in the voluntary carbon markets is not sufficiently assured, which increases the risk for investors and makes such investment less attractive.¹⁷⁸ To combat this lack of transparency, the Voluntary Carbon Markets Initiative (VCMI) is looking to publish voluntary carbon credit standards, which will attempt to lend credibility to the carbon credit issuance process.¹⁷⁹ Considering that forests offer an estimated two-thirds of cost-effective potential for nature-based mitigation in order to keep the rise in global temperatures below 2 degrees Celsius, the evolution and scaling of the carbon market is important.¹⁸⁰

- b. **Biodiversity enhanced credits.** Also known as premium credits, these credits are an innovative evolution of the globally recognised carbon credit. While a carbon credit looks to price and reduce the amount of carbon in the atmosphere, a premium credit looks to tackle multiple dimensions of the climate change and nature challenges facing the world today, making it more broadly applicable to a range of nature-based solutions. The biodiversity credit is an adaptation of the carbon credit, as it takes the price of carbon and attaches an additional premium per credit in order to validate the additional biodiversity outcomes

¹⁷¹ Pérez-Soba, M. et al. (2016). Database and classification system of different types of PG/ESS in relation to farming/forestry systems.

¹⁷² World Resources Institute (2017). Roots of Prosperity. Available at: https://files.wri.org/s3fs-public/roots-of-prosperity_0.pdf

¹⁷³ Esmee Fairbairn Foundation (2020). Emerging funding opportunities for the natural environment. Available at: https://finance.earth/wp-content/uploads/2020/11/Emerging_Funding_Opportunities_For_The_Natural_Environment_20201.pdf.

¹⁷⁴ WEF and McKinsey & Company (2021). Forest Trends 2020.

¹⁷⁵ BloombergNEF (2022). Carbon Offset Prices Could Increase Fifty-Fold by 2050. Available at: <https://about.bnef.com/blog/carbon-offset-prices-could-increase-fifty-fold-by-2050/>

¹⁷⁶ Market strike price in this context is the price of carbon an entity such as the LEAF Coalition would be willing to pay to buy a credit.

¹⁷⁷ Leaf Coalition (2021). The LEAF Coalition. Available at: <https://leafcoalition.org/>

¹⁷⁸ World Economic Forum (2021). Natural Climate Solutions for Corporates. Available at: https://www3.weforum.org/docs/WEF_NCSA_NCS_for_Corporates_2021.pdf

¹⁷⁹ Bloomberg (2022). Offsets Watchdog Aiming for Clarity on Net Zero Risks Creating Confusion. Available at: <https://www.bloomberg.com/news/articles/2022-06-14/carbon-offset-claims-watchdog-vcmi-aims-for-net-zero-clarity-risks-confusion>

¹⁸⁰ Griscom, B. et al. (2017). Natural climate solutions.

that have been achieved. These credits are intended to spur nature-positive outcomes while also supporting a just transition.¹⁸¹

- c. **Carbon farming credits.** Essential to the European Union’s decarbonisation strategy and strongly promoted by the European Commission,¹⁸² carbon farming credits are generated through the cultivation of “cover crops”, which are planted without the intention of harvesting. While protecting the soil from erosion and retaining water and nutrients, cover crops (which include barley, oats, legumes and radishes), can sequester significant amounts of carbon that can then be accounted for and sold as credits. Carbon farming falls under the category of regenerative agriculture, which more broadly uses traditional farming techniques such as reducing soil disturbance, avoiding synthetic pesticides, maximising soil coverage, and promoting crop rotation, among others. At the EU level, the Fit for 55¹⁸³ plan stresses the significant role that carbon farming can have in carbon sequestration. However, negotiations are still ongoing for the recognition and calculation of carbon farming credits. The main hurdles are related to monitoring and reporting difficulties as well as the high risk of impermanence, or the risk of early release of stored carbon, as explained in a study commissioned by the ENVI committee of the European Parliament in 2021.¹⁸⁴

Box 1: First ever verified agriculture carbon credit

On 29 June 2022, Indigo Agriculture issued the world’s first verified agriculture enhanced carbon credits. The credits aim to enhance the positive impact of high-quality accreditation by covering both CO₂ reduction and sustainable agricultural practices. The firm believes this milestone marks the creation of a sustainable source of revenue generation for nature-based solutions.

In producing the accreditation, there was particular emphasis on the validity and transparency of the impacts associated with the credit. Indigo combined soil sampling with advanced modelling to be able to generate the credits at scale. To date, the programme has engaged 2 000 farmers across approximately 5 million acres of land. This has resulted in 20 corporates committing to purchase the credits, which has already doubled in price to \$40/credit. So far, the scheme has generated an additional \$26 000 in revenue for the company.¹⁸⁵

- d. **Wetland mitigation credits.** Pioneered in the United States, there are other forms of accreditation for nature-based solutions in different ecosystems that present opportunities to generate revenues from conservation and restoration. In particular, wetland mitigation credits price the mitigation potential of wetland protection and restoration.¹⁸⁶ The initiative looks to mitigate the risks of climate hazards by restoring wetland areas. A mitigation bank¹⁸⁷ is tasked with verifying the quality and type of mitigation, which in turn determines the type and quantity of credits issued. Developers in certain areas, especially if working in the field of real estate, are bound to purchase wetland mitigation credits if they build in areas close to or belonging to a nearby or connected wetland. This helps to maintain a high level of biodiversity and resource protection in a given area. Wetland mitigation credits tend to still be quite rare outside the United States. However, there is significant potential to develop coastal wetland credits in the European

¹⁸¹ Porras, I. and Steele, P. (2020). Making the market work for nature: how biocredits can protect biodiversity and reduce poverty.

¹⁸² European Commission (2022). EU Perspectives on Carbon farming, speech delivered at conference on Sustainable Carbon Cycles. Available at: https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_22_696

¹⁸³ A detailed description of the Fit for 55 programme can be found at the following link: <https://www.consilium.europa.eu/en/policies/green-deal/fit-for-55-the-eu-plan-for-a-green-transition/>

¹⁸⁴ McDonald, H. et al. (2021). Carbon farming. Making agriculture fit for 2030. European Parliament. Available at: [https://www.europarl.europa.eu/RegData/etudes/STUD/2021/695482/IPOL_STU\(2021\)695482_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2021/695482/IPOL_STU(2021)695482_EN.pdf)

¹⁸⁵ Indigo Agriculture (2022). Inaugural Indigo Credit Issuance Unlocks Farmer Access to Multi-Billion Dollar Voluntary Carbon Market. Available at: <https://www.indigoag.com/pages/news/inaugural-carbon-by-indigo-credit-issuance>

¹⁸⁶ Westervelt Ecosystem Services (2022). Mitigation Banking 101. Available at: <https://wesmitigation.com/services/mitigation-banking-101/>

¹⁸⁷ World Bank (2020). Mobilising private finance for nature. Available at: <https://thedocs.worldbank.org/en/doc/916781601304630850-0120022020/original/FinanceforNature28Sepwebversion.pdf>

Union, as explained in a 2021 paper by Conservation International and Wetlands International,¹⁸⁸ given the significant role such wetlands play in carbon absorption with little land usage.

- e. **Other credits.** Other credits exist based on the type of resources that are being preserved or for which an “offset” is issued. One example are “blue credits”, which refer to the protection of marine areas and which could be applied in all the Mediterranean regions of the European Union.

¹⁸⁸ Conservation International (2021). Including coastal wetlands within the European Union climate strategy. Available at: https://ocean-climate.org/wp-content/uploads/2021/07/Policy_EU-Coastal-Wetlands.pdf

8.2 Cost reduction modelling

This report has argued that nature-based solutions have the potential to reduce the risk of climate hazards, improve biodiversity, increase resilience, and simply benefit nature and indirectly produce value for many different types of institutions as well as societies. This is due to nature's ability to mitigate the impacts of climate hazards, increase resilience, and improve the adaptive capacity of existing infrastructure. To date, cost reduction is not considered a long-term sustainability tool. However, if verifiably benchmarked against the future counterfactual, a specific percentage of cost reductions could be considered as the returns on an investment. This could be particularly applicable to corporates, utilities and the insurance industry. By investing in nature-based solutions in high-risk environments, "at risk" institutions are able to take advantage of a magnified reduction in vulnerability. In a 2015 global assessment report on disaster risk reduction, it was estimated that \$6 billion a year of investment in disaster risk management strategies globally would generate \$360 billion worth of benefits relating to the subsequent risk reduction. This equates to a more than 20% annual reduction in new and additional average annual losses.¹⁸⁹

8.3 Product and commodity sales

The most common source of revenue for nature-based projects in Europe comes from the sale of products and commodities stemming from projects such as regenerative agriculture and forestry-related activities. Revenue drivers include foodstuffs such as fruit, vegetables and grains that are produced as a by-product of a healthy functioning forest or arable land. This also includes commodities such as timber, which can be felled in small percentages at regular intervals in order to maintain the health of a forest while also creating a sustainable revenue stream.

8.4 Ecosystem service tax

The ecosystem service tax falls into the larger category of payments for ecosystem services (PES). Payments for ecosystem services are a series of tools that can be used by public or private entities to cover generally undervalued goods such as biodiversity protection projects or resilient water infrastructure. The category also includes:¹⁹⁰

- Direct public payments: These are payments the government makes directly to providers of ecosystem services as a premium on regulated tariffs.
- Direct private payments: These are payments made by non-profit organisations or for-profit companies.
- Tax incentives: Tax incentives are a form of indirect government compensation for landowners protecting ecosystem services. In exchange for committing resources to stewarding ecosystem services, individuals receive tax breaks from the government.
- Cap-and-trade markets: A cap-and-trade programme is one in which a government or regulatory body first sets a limit or "cap" on the amount of environmental degradation or pollution permitted in a given area and then allows firms or individuals to trade permits with each other in order to meet the cap. More details will be explored in the recommendations section.
- Certification programmes: Certification programmes designed to reward producers who protect ecosystem services have been developed for a variety of products, including wood, paper, coffee and food.

Tax incentives can be the most reliable direct form of revenue stream for nature-based projects to aim for, although it might be hard to qualify for them in the first place. The intention of tax initiatives such as these is to adjust the incentive structure for the entities at risk of the levy to disincentivise their polluting activities. While appreciated by managers of nature-based projects since they represent non-repayable

¹⁸⁹ UNISDR (2015). Making Development Sustainable: The Future of Disaster Risk Management. Global Assessment Report on Disaster Risk Reduction. <https://www.undrr.org/publication/global-assessment-report-disaster-risk-reduction-2015>

¹⁹⁰ Ecosystem Marketplace (2022). Payments for Ecosystem Services. Available at: <https://www.ecosystemmarketplace.com/payments-ecosystem-services/>

subsidies, they are non-scalable, especially if significant growth in the market for nature-based solutions and biodiversity protection is forecasted, as this would require private as well as public financing.

This section presented an overview of the main revenue streams currently in use in Europe and worldwide by project managers to ensure their activities generate a steady cash flow. These revenue streams should be factored in or even partially required when assessing the potential financial sustainability of projects for any new investment made by an EU entity, whether the Commission, the EIB or others.

8.5 Insurance

As discussed above, insurance companies are particularly well positioned to tackle long-term physical risks through risk-hedging programmes based on nature. Interviews with insurance providers and companies have highlighted a growing willingness to engage in such investments in Europe. A report published in 2022 by the International Bank for Reconstruction and Development and the World Bank¹⁹¹ stressed that insurance can promote investment in biodiversity in three ways:

- i. Asset protection
- ii. Liability reduction
- iii. Facilitation of capital inflows from the financial markets. Ideally, efforts to protect biodiversity will include a combination of instruments, not only insurance.

As investors, insurance companies can contribute directly to preserving biodiversity by channelling capital into biodiversity-positive investments. As the World Bank points out, however, such investments remain very limited. Risk management could be enhanced by combining the results of catastrophe and climate risk models. This enhanced risk management by insurance companies could create more collaboration and synergies, for instance, at the municipal and local level, as insurance companies acknowledge that investments in nature-based solutions lead to lower costs in the long run.

Two examples have been pointed out in this regard:

- a. **Parametric insurance.** A term describing an insurance contract insuring against the occurrence of a specific event. It pays a set amount that depends on the actual magnitude of the event based on specific parameters. A third party, normally a state agency, is in charge of assessing whether that parameter has been hit. The likes of SwissRe and AXA have been using this instrument to increase their capacity to work on pre-assessment and open data analysis, notably concerning coral reef protection (in the context of cyclones).¹⁹²
- b. **Community insurance** for nature-powered mitigation (written by an insurer and purchased directly by local government) is also described in the Natural Capital Financing Facility guide.¹⁹³ The reduced risks can lead to lower insurance premiums. This has happened in the United States along the Missouri River for the construction of natural water barriers, as well as in the Netherlands for the installation of green roofs.¹⁹⁴ As mentioned previously, insurance can improve access to financing and potentially improve pricing/interest margins as certain risks are transferred to other parties.

There are, however, challenges within the sector. Insurance sector interviewees expressed the concern that competitors would act as “free riders” on their nature-based investments, benefiting directly or indirectly from investments they have not made. As a result, certain insurers may be reluctant to offer community insurance solutions. The risk of allowing their competitors to benefit without helping to finance investments in nature is currently prohibitive for many companies. If initiatives to encourage insurers to invest in nature-based solutions succeed, they could provide a source of revenue for projects related to climate and ecosystem resilience. The use

¹⁹¹ World Bank and IBRD (2022). Insuring Nature’s Survival: The role of insurance in meeting the financial need to preserve biodiversity. Available at: <https://www.financialprotectionforum.org/publication/insuring-natures-survival-the-role-of-insurance-in-meeting-the-financial-need-to>

¹⁹² NAIC (2022). Parametric Disaster Insurance. Available at: <https://content.naic.org/cipr-topics/parametric-disaster-insurance>

¹⁹³ EIB (2018). Investing in nature: Financing conservation and nature-based solutions. Available at: <https://www.eib.org/attachments/pi/ncff-invest-nature-report-en.pdf>

¹⁹⁴ Munich RE (2021). Nature’s remedy: Improving flood resilience through community insurance and nature-based mitigation. Available at: https://www.munichre.com/content/dam/munichre/mram/content-pieces/pdfs/reinsurance-solutions/TNC_Whitepaper.pdf/jcr_content/renditions/original/TNC_Whitepaper.pdf

of insurance mechanisms for value creation is currently still in an exploratory phase, but the insurers and project managers interviewed expressed their interest in continuing to explore these models until a viable solution is found.

Summary of potential revenue sources for nature-based solutions

Revenue stream	Scale	Timeframe	Level	Payer	Value	Generation
Credits	Large	Long (production takes a long time)	International and local	Companies	High demand for credits	Direct revenue generation through the creation of offsets
Insurance	Large	Long (depending on the willingness of insurers)	Local and national	Insurance companies	Insurers are hesitant to fund nature-based solutions due to the risk of free riders	Premium-paying customers and indirect benefits through reduced physical risks as a by-product of the nature-based projects
Cost reduction modelling	Intermediate	Short to medium-term	Limited to the project/directly affected community	No direct payer. Whoever finances the nature-based project covers the cost reduction indirectly	Companies and nature-based projects are ready to fund nature-based solutions that lead to lower costs	Indirect revenue generation. Investment in the nature-based project reduces risks and resource waste
Product and commodity sales	Intermediate	Short to medium-term	Depends on the project	End consumer	Depends on the product sold	Direct sales. Products and commodities are generally a secondary benefit of any nature-based project
Ecosystem service tax	Potentially large depending on the regulator	Depends on the regulator	Local and national	Polluting companies	Companies or projects tend to be unwilling to support such schemes but would do if compelled to by regulation	Revenue generated by taxation and redirected towards nature-based projects for pollution reduction and similar activities

Source: BwB

9 Recommendations and conclusions

9.1 Financial recommendations

The market research completed during the project has led to the conclusion that the market for nature-based solutions in Europe is still too underdeveloped for there to be a single solution. As a result, several recommendations are made for the European Union to help accelerate the development of the nature-based solutions field in Europe, from a financial, economic and policy perspective. Studies by Kremen and Merenlender (2018) and Kabisch, Net et al. (2016) still accurately reflect the situation facing financial investors:

“Further work is urgently needed to test the effects of employing equity, risk-sharing arrangements rather than debt finance for NBS, such as by conducting randomized control trials to examine the effects of moving from traditional to more innovative forms of financing. Finally, because the investments relate to human, social and natural capital, not just material and financial capital, there is also a need to greatly improve the measurement of these forms of capital. The failure to recognize expenditures on human, social and natural capital as assets, depreciated accordingly, partly explains the lack of investment in NBS projects.”¹⁹⁵

The following recommendations aim to support the development of the nature-based solutions sector into a more mature, effective and functional one. This will give projects access to a larger set of financing instruments for growth and development and help them to obtain diverse support.

9.1.1 Increasing mainstream financing for nature-based projects

The 58 interviews conducted with private sector companies, NGOs, consultants and project managers clearly highlighted the limits of a fragmented, small and underdeveloped nature-based solutions sector, and how these limits affect the increased use of mainstream financing for nature-based projects. The need for larger, better-structured nature-based projects, which take into account the needs of financial investors at an earlier stage of their development, is a fundamental requirement for creating scale in the EU market for nature-based solutions. Over 90% of respondents to our survey highlighted the unique role that the EIB could play in strengthening project development through early-stage/venture capital-style funding. This type of funding would require longer-term scaling capital for investments to be made. One example of pre-feasibility finance could be to set a requirement for an early-stage nature-based project to display at least the potential to produce cashflows within two years after the first venture investment is made.

The most promising instruments that could be used are: (1) concessional loans and pay-for-result grants following the REDD+ model,¹⁹⁶ (2) debt issuance through the securitisation of natural capital already owned by projects, using this as collateral for loans (land, CO₂ emissions, produce production, and more), and (3) guarantees for projects that are most likely to receive co-funding from private institutions. Such interventions should include technical support, which was frequently highlighted as an ongoing requirement by the project leaders we interviewed.

9.1.2 Supporting corporate investment in nature-based solutions with diverse debt instruments

A highly promising but still under-represented sector that could help accelerate the development of nature-based solutions is direct corporate investment from companies such as utilities. In contrast to national governments, municipalities and foundations, whose incentives to develop nature-based solutions are typically non-financial, the main driver for corporations to invest in nature-based solutions is to strengthen the resilience of their operations and/or reduce their operational or reputational risk

¹⁹⁵ Seddon N., Chausson A., Berry P., Girardin C., Smith A., Turner B (2020). Understanding the value and limits of nature-based solutions to climate change and other global challenges. *Philos Trans R Soc Lond B Biol Sci.* 2020 Mar 16;375(1794):20190120. doi: 10.1098/rstb.2019.0120. Epub 2020 Jan 27. PMID: 31983344; PMCID: PMC7017763.

¹⁹⁶ Wong, G. et al. (2016). Results-based payments for REDD+: Lessons on finance, performance, and non-carbon benefits.

exposure. An opportunity exists to support the key players in the sector by raising funds for nature-related investments. This could be in the form of loans (including performance-linked loans) or guarantees to help fund (or co-fund) corporate investment in nature-based initiatives.

9.1.3 De-risking mechanisms

Another solution that could remove the barriers to investment in nature-based solutions is the use of de-risking mechanisms. Some relevant de-risking mechanisms for the EIB could be the following:

- a. **Guarantees.** Explored above, guarantees would encourage the private sector to take on risk that they would not normally take on if not shared with other financiers. Although guarantees are unlikely to accelerate the sector's growth at this time as a standalone instrument, they could help to attract additional sources of financing if used with other mechanisms.
- b. **Securitisation.** As securitisation enables banks or other capital providers to access a secondary market,¹⁹⁷ capital can be reinvested. Creating a model for securitising small-scale natural assets could thus significantly reduce the cost of financing and free up funding to accelerate this process. The securitisation process starts by grouping assets with similar characteristics and then selling them to a separate entity, usually a special purpose vehicle, to protect the assets from any outside claims by creditors. In the nature-based solutions sector, this passes through an effective assessment of asset values. The capital structure is then built to apply various claims on both the cash flows and market value of the project in the form of debt, equity and hybrid structures. Securitisation takes this process a step further, issuing distinct and marketable securities (tranches) out of the trust, in order to create securities such as asset-backed securities. These can be sold in the financial markets. One way of creating highly rated securities is by prioritising the payback of certain tranches from low to high risk in a waterfall account.¹⁹⁸
- c. **Risk hedging through insurance intervention.** This is where risk reduction through natural hazard mitigation and adaptation could be combined with a risk transfer through insurance companies.¹⁹⁹ The purpose of this is to better align environmental outcomes with risk management goals, which would then create opportunities for the development of nature-based projects in Europe.
- d. **Contingent loans/equity-like debt.** These share the risk on the success of projects/revenues, while having the possibility to overcome the illiquidity and unsuitability of certain nature-based project structures for traditional equity such as cooperatives. By their very nature, pricing commensurate with the risk can lead to high interest rates but blending could help to lower prices.

In the above examples, the EIB would take on a mandate with greater levels of risk in order to mobilise additional sources of capital for the nature-based solutions sector in Europe.

9.1.4 Liquidity facility

It has been stressed multiple times that the illiquidity of investments in nature-based solutions with long-term investment horizons makes them best suited for investors capable of taking on long-term risks (such as insurance companies and pension funds). Insurance and re-insurance companies in particular would be the ideal investors in nature-based solutions since they benefit from lower payouts. However, the insurance/re-insurance sector is currently under scrutiny following the 2016 Solvency II²⁰⁰ regulation. Due

¹⁹⁷ The **secondary market**, also called the **aftermarket** and **follow-on public offering**, is the **financial market** in which previously issued **financial instruments** such as **stock**, **bonds**, **options** and **futures** are bought and sold.

¹⁹⁸ A waterfall account in this scenario is where different investors are distinguished by tranches depending on the priority of repayment. For example, if income is generated by the special purpose vehicle, the senior (low risk) investor would be paid first. Only when the investor is paid in full would lower priority investors be repaid, until either all investors have been repaid, or the special purpose vehicle runs out of income.

¹⁹⁹ Reguero, B. G. et al. (2020). Financing coastal resilience by combining nature-based risk reduction with insurance.

²⁰⁰ IRRD (n.d). Solvency II Review and Insurance Recovery & Resolution Directive (IRRD). Available at: <https://www.insuranceeurope.eu/mediaitem/575085ef-edfa-47f9-aea1-4b411ce2f436/Key%20messages%20on%20the%20Solvency%20II%20Review%20and%20IRRD.pdf>

to this regulation, insurance companies are expected to invest in more liquid assets in order to reduce the amount of regulatory capital they are required to maintain. This means that even though there is a willingness to provide capital for the regeneration of nature, the regulatory challenges are too great to overcome at present. To help these investors, a further recommendation is to consider creating a liquidity facility that would provide secondary market liquidity for nature-based projects to this investor category. Such a facility would benefit financing partners that understand the value of investing in nature-based solutions for their long-term business case — whether from a risk perspective or otherwise — but who are unable to do so due to the lack of liquidity within their portfolios or due to a constraint within their operating environment. The provision of a liquidity facility would enable these entities to invest a greater amount of capital in nature-based solutions in areas that are currently most at risk from natural hazard events (since these regions have the greatest potential to reduce the long-term costs of the financing institution). However, more work is needed to understand the degree to which a liquidity facility could benefit other financing institutions looking to invest nature.

9.1.5 Diversification and bundling of financial and structuring tools tailored to each project

As this report has emphasised throughout, no single financing instrument can be used as a solution to scale the deployment of nature-based solutions. Grants are currently the largest tool to foster the growth of nature-based solutions in the European Union, but when it comes to investments yielding a return, the key feature is diversification of funding sources and risk reduction. As was pointed out during the 58 interviews, what nature-based projects need is a diverse pool of funding to cover all relevant activities. Grants could cover technical assistance, then a combination of concessional loans and market-rate loans, alongside equity injections, could provide sufficient cash to develop activity. Public institutions should consider adding a layer of additional safety for borrowers by providing de-risking mechanisms such as guarantees. As the size and complexity of the structure grows, it could be possible to incorporate even more sophisticated instruments that attach a coupon adjustment or outcome payments such as impact bonds, sustainability-linked bonds and resilience bonds.²⁰¹

This report recommends that the EIB and the European Commission facilitate greater collaboration with multiple investors in the market, including development finance institutions, private investors and NGOs, to thoroughly support the development of nature-based projects throughout their seed and growth periods, offering complementary, joint solutions tailored to each project. All in all, a broad suite of products is recommended to meet the needs of early-stage ventures. The outcome of this would be a more coordinated and streamlined blend of repayable and non-repayable financing that would engage and reflect the needs of a variety of different stakeholders such as investors and corporates.

9.1.6 Using grant and equity financing to support innovative partnerships and constellations

As has been highlighted throughout this report, a small percentage of public sector funding, which dominates the nature-based solutions landscape in Europe at present,²⁰² is not currently being used to leverage additional sources of repayable and non-repayable capital. To improve this, innovative ways of using grant funding should be explored.

Combining grants with equity risk financing, for instance, to support innovative partnerships and constellations (whether public-private, public-public or private-private) could unlock multiple revenues and benefit streams. This way, grants will only be provided to projects that demonstrate either the potential to generate revenue in the future in a self-sustaining manner, or if the viability assessment proves a significant reduction in climate or nature risk, which can therefore attract the interest of at least some private capital in the form of equity.

The first challenge this mechanism would overcome is the shift in the grant addiction mindset to one where project managers are thinking more about the revenue potential of nature-based solutions. The second challenge this structure would overcome is that grant financing would de-risk private investment in projects, making the investment more attractive. This would create a positive incentive structure for investors to enter the sector and create nature-positive outcomes.

²⁰¹ Vaijhala, S. and Rhodes, J. (2018). Resilience Bonds: a business-model for resilient infrastructure.

²⁰² UNEP (2021). State of Finance for Nature 2021. United Nations Environment Programme.

9.1.7 *Financial technical assistance*

The main shortcoming of the proposal to use financial instruments such as guarantees as a means to develop nature-based solutions in Europe is that it requires a long pipeline of bankable projects. The research in this report suggests that the market for nature-based solutions is still too nascent to be receptive to the use of guarantees as a financial instrument to scale up investment. The lack of financial expertise at a project level is therefore a major barrier that needs to be addressed. This manifests itself through a project's inability to prove financial bankability. The reason this is a problem is because more private capital is required to overcome the funding gaps in nature at present. It is therefore recommended that the EIB or other EU-sponsored entities take a more active role with respect to advisory services at a project level, in particular with respect to financial technical assistance. Project managers interviewed in this report identified the lack of financial expertise as a problem in Europe and said that they could benefit from advisory services tailored to their needs.

9.2 Policy and regulatory recommendations

The central premise of the first section of recommendations is that private sector investment in nature-based solutions will not increase significantly without intervention by governments to provide a profit motive for private sector participation. This is because the public good nature of many nature-based investments means that private investors cannot obtain sufficient benefits to justify investment. While there are many other barriers that must also be addressed (such as information gaps and coordination challenges between public agencies), without reforming the fundamental markets in which nature-based solutions operate, self-sustaining nature-based investments will not be made on a wide scale.

This subsection explores opportunities to introduce market reforms in ways that will foster private sector investment in nature-based solutions, and produce self-sustaining markets over the long term.

As previously discussed, there are two ways to incentivise private sector investment in nature-based solutions, as illustrated by the carrot and stick analogy:

- **The carrot:** To provide private entities with a financial incentive for investing in nature-based solutions (a “carrot” or reward).
- **The stick:** To impose financial burdens on private entities that do not invest in nature-based solutions or that are responsible for the negative effects requiring nature-based solutions to resolve them (the “stick” or negative consequences).

In each case, it is important to recognise that private entities must be directly targeted in order to provide them with the appropriate incentives to motivate private investment in nature-based solutions.

9.2.1 *“Carrot” or reward incentive structures*

These would provide private entities with financial rewards for producing the outcomes sought by governments from nature-based solutions. With such a measure, an entity would receive a financial payment for delivering the outcome sought by policymakers from a nature-based investment. This approach avoids the public good market failure of private investors being unable to derive a benefit from their investment, by directly rewarding them for the intervention, in whole or in part.

The entities targeted by the scheme could be those directly causing the environmental harm requiring a nature-based solution (such as farmers who pollute nearby rivers), or it could be other entities not immediately causing the harm that nevertheless have the potential to contribute to additional nature-based solutions (such as subsidies for green roofs on existing dwellings in urban areas).

Payment for ecosystem services (PES) schemes are reward-based incentive schemes that provide payment for environmental outcomes deemed significant by policymakers. The most obvious example of a reward incentive structure is the common agricultural policy's financing of nature-based solutions through targeted agri-environment-climate measures (AECMs). In this system, farmers receive funding from the European Union and Member State to implement nature-based solutions on private land.

Reward-focused incentive structures have the advantage of typically being voluntary rather than coercive. They also have the political advantage that no economic activity is being directly restricted as part of the scheme, so there are no obvious “losers”. However, pure reward-focused schemes allocate scarce public funds away from other purposes. Reward-focused incentive schemes are particularly useful where private benefits from the investment tend to be relatively high, such as green roofs, which add to asset values and reduce heating/cooling costs. This ensures strong demand and allows for co-funding (subsidising only a proportion of the investment cost).

The major weakness of reward-focused schemes is that, while they motivate private involvement in nature-based solutions by rewarding positive behaviour, they may not spur additional private financial investment. If the full cost of a nature-based project is covered by the incentive payment, then no private funds are being allocated to the project through the scheme. It is possible, however, to develop co-funding schemes to reflect the fact that nature-based schemes may generate both public and private benefits. These can be an effective way to incentivise private investment, but the co-funding must be carefully balanced and may not be used to a great extent if poorly calibrated.

Examples of reward-focused incentive structures include:

- **EU level:** Common agricultural policy (CAP) agri-environment-climate measures (AECMs)
- **Member State level:** Multifunctional land distribution in Denmark²⁰³
- **Local government level:** Several cities in Germany offer subsidies for installing green roofs, which in return reduce public costs of stormwater management and flooding. The city of Hamburg subsidises 40% of the installation costs of green roofs and offers a reduction in water management fees.²⁰⁴

9.2.2 “Stick” or negative consequence incentive structures

The inverse of reward-focused incentive structures are punishment-focused incentive structures — the “stick” rather than the “carrot”. These instruments punish entities that do not provide the nature-based solution desired by policymakers, or otherwise restrict or add costs to those causing the environmental harm that results in the need for a nature-based solution. This category includes direct “command and control” regulatory controls that may require certain outcomes — while not strictly an incentive structure, regulatory controls punish entities that do not comply with policy goals by preventing economic activity (for instance, a planning control requiring that new buildings and redevelopments add a green roof²⁰⁵).

While often overlooked as a means of incentivising private investment in nature-based solutions, regulatory requirements are very effective at introducing additional nature-based solutions to different ecosystems, with the expense incurred by private agents targeted by policymakers. The main advantage of regulatory interventions is that they can directly target the activity in question, by prohibiting or limiting certain behaviours. For example, at a national level, a country could restrict the removal of particular vegetation types. At a local level, a city could require a percentage of land area in a new urban development to be reserved for green public open spaces. The main disadvantage of regulatory interventions is that they can be quite inflexible and therefore costly to implement. This of course depends on their design and implementation, and there are ways to combine regulatory underpinnings with the ability to trade in order to minimise these disadvantages (discussed further below).

It is important to understand that not every regulatory instrument is effective at stimulating private involvement in nature-based solutions. Each regulatory instrument must be designed to directly target private entities to encourage them to take action. For example, the Water Framework Directive is an ambitious piece of EU legislation seeking to improve the environmental status of bodies of water across the European Union. While this legislation has prompted significant investment in water body improvement, it is not clear whether it has motivated significant private sector investment (particularly

²⁰³ https://www.ecologic.eu/sites/default/files/publication/2021/CarbonFarming_CaseStudies.pdf

²⁰⁴ Hamburg (n.d.). Gründach und Grüne Fassaden Hamburg. Available at: <https://www.hamburg.de/gruendach/>

²⁰⁵ Urban Green Council (2021). NYC's Sustainable Roof Laws. Available at: <https://www.urbangreencouncil.org/content/projects/nycs-sustainable-roof-laws>

from the agricultural sector). It appears that public agencies have undertaken and financed the majority of nature-based projects (though often with financing ultimately obtained from banks or capital markets), while private entities (such as farmers producing water pollution from “diffuse” sources) have yet to make a significant contribution. The implication for EU agencies is therefore that not every regulatory measure at EU level relevant to nature-based solutions will lead to action by private entities. A plethora of regulatory tools is available at local and national level that can influence nature-based solution outcomes, including planning controls.

Examples of punishment-focused incentive structures include:

- **EU level:** Natura 2000 areas limit certain activities by private landholders that may harm sites.
- **Member State/regional level:** Spatial planning laws that can directly influence land developments are often provided with a framework at national level, guiding regional and local implementation. National legislative frameworks are particularly important in guiding regional and local governments in implementation.
- **Local government level:** A requirement for new buildings of sufficient size to include a green roof has been in place in Copenhagen since 2010.²⁰⁶

9.2.3 Carrot and stick incentive structures — cap and trade

As noted above, both “carrot” and “stick” incentive structures have strengths and weaknesses when it comes to effectively incentivising private investment in nature-based solutions. Cap-and-trade mechanisms typically include a regulatory component in that they restrict or prohibit certain outcomes, while allowing relevant entities to trade.

The most recognised example of a cap-and-trade system is the EU Emissions Trading Scheme (ETS), which caps emissions from certain sectors and allows emission permits to be traded between those sectors. However, cap-and-trade systems have also been established for biodiversity and more recently for water pollution:

- **Biodiversity:** Biodiversity Net Gain (United Kingdom)²⁰⁷ is a national scheme that restricts additional biodiversity loss from economic activity, but allows those whose activities may produce biodiversity losses to purchase an additional biodiversity improvement or creation from other suppliers, requiring an additional percentage (hence a “net gain”) beyond that which is lost.²⁰⁸ With the use of metrics to quantify units of different types of biodiversity, and rules governing the ability to trade between them, this system offers the potential to cap the further loss of biodiversity produced by affected activities while minimising the economic cost of that cap. It also invokes the “polluter pays” principle by directly targeting the source of the environmental harm, who in turn pays for the nature-based solution. At the end of 2021, the United Kingdom passed new legislation that requires all new significant building developments to achieve a biodiversity net gain of at least 10%.²⁰⁹
- **Water pollution:** Nutrient Neutrality (United Kingdom)²¹⁰ is a national scheme that restricts additional pollution loads to water bodies in designated catchment areas that have been identified as suffering from excessive nutrients loads. Within these catchments, any developments that would increase pollution loads to water bodies must produce or otherwise purchase an equivalent pollution load reduction from within the catchment area. This allows

²⁰⁶ Tomorrow.city (2019). Copenhagen’s green future is built on the rooftops. Available at: <https://tomorrow.city/a/copenhagens-green-roofts>

²⁰⁷ Natural England (n.d.). Biodiversity Net Gain. Available at: https://naturalengland.blog.gov.uk/wp-content/uploads/sites/183/2022/03/BNG-Brochure_Final_Compressed.pdf

²⁰⁸ Local Government Association (n.d.). Biodiversity net gain. Available at: <https://www.local.gov.uk/pas/topics/environment/biodiversity-net-gain>

²⁰⁹ New Private Markets (2022). UK breaks new ground with biodiversity credit. Available at: <https://www.newprivatemarkets.com/uk-breaks-new-ground-with-biodiversity-credit/#:~:text=The%20UK%20passed%20its%20long,net%20gain%20of%2010%20percent>

²¹⁰ Local Government Association (2022). Nutrient Neutrality FAQs. Available at: <https://www.local.gov.uk/pas/plan-making/archive/nutrient-neutrality-faqs>

additional economic activity to proceed, but removes the environmental harm associated with that activity while incentivising a broad range of entities to provide nature-based solution outcomes, and the polluter pays for the outcome (invoking the “polluter pays” principle).

One of the main advantages of these cap-and-trade systems is that the driver for investors in nature-based solutions is not the private financial benefit of the investments themselves, which we have established is extremely difficult to monetise in most cases. Instead, the driver for investment is the profitability of the economic activity that would cause the environmental harm, which can be orders of magnitude higher than the cost of investing in a nature-based solution. For example, the economic return from a housing development is likely to be disproportionately higher than the cost of offsetting biodiversity losses and increased nutrient loads caused by the development. The main disadvantage of this type of system is the complexity of establishing effective but pragmatic rules and structures to govern the system. Doubts have been raised about carbon offset^{211, 212} and biodiversity²¹³ offset schemes in different parts of the world, particularly about the additionality produced by these schemes.

The public good nature of the environment means that it is highly unlikely that private entities will increase their investment in nature-based solutions to the levels needed to address EU policy goals without changes to incentive structures. This places considerable responsibility on public agencies, either to bear the financial burden of nature-based solution projects themselves, or to design and implement schemes to incentivise private entities to take action.

As noted above, the introduction of “carrot” or reward incentive structures may be effective in motivating private entities to implement nature-based solutions, although public sources are likely to continue bearing the financial burden with such schemes. Where existing funding sources exist (such as the common agricultural policy), these could be reformed to improve effectiveness and efficiency and remove perverse incentives. Otherwise, some degree of regulatory intervention will be required to significantly increase the scale of private investment in nature-based solutions. This could include direct command and control requirements for the use of nature-based solutions in certain settings (such as requiring green roofs on new buildings in cities) or as underpinnings for cap-and-trade schemes such as with carbon, biodiversity or water pollution. Fortunately, a large range of relevant policy tools exist that could be employed at different levels of government to directly incentivise the private sector.²¹⁴

9.3 Additional recommendations

9.3.1 *Mainstreaming nature-based solutions in EU legislation*

There are many pieces of EU legislation that directly address actions or markets involving nature-based solutions. These could include provisions to encourage those affected by the legislation to consider such solutions without making them mandatory. This would help overcome the information failure mentioned in earlier sections of this report. For example, the Floods Directive includes the use of natural water retention measures but does not require that they be considered before “grey solutions” are adopted. Similarly, the Urban Wastewater Treatment Directive is considering greater inclusion of stormwater management measures, and could again require nature-based solutions to be considered for managing stormwater flows before other options. Such measures would align with the European Biodiversity Strategy for 2030 objective that each city of more than 20 000 inhabitants develop an “ambitious urban greening plan”.

This analysis has demonstrated that the current scale of the common agricultural policy’s annual expenditure on actions akin to nature-based solutions in agricultural areas could be large enough to

²¹¹ Carbon Market Watch (2017). New study adds urgency to end UN carbon offsetting scheme. Available at: <https://carbonmarketwatch.org/2017/04/18/press-statement/>

²¹² ABC (2022). It's become a rort': Insider blows whistle on Australia's greenhouse gas reduction schemes. Available at: <https://www.abc.net.au/news/2022-03-24/insider-blows-whistle-on-greenhouse-gas-reduction-schemes/100933186>

²¹³ Bezombes, L. et al. (2019). Do biodiversity offsets achieve No Net Loss? An evaluation of offsets in a French department.

²¹⁴ Climate Focus BV (2014). Linkages Between REDD+ Readiness and the Forest Investment Program. Available at: <https://climatefocus.com/publications/linkages-between-redd-readiness-and-forest-investment-program/>

significantly address the sector's need for nature-based solutions over the next 10 to 15 years, if undertaken efficiently and effectively. No other ecosystem has such a dedicated public funding source. However, previous analysis has found that outcomes do not positively reflect the large scale of investment and that a lack of monitoring and reporting limits our understanding of the effectiveness of this expenditure. Meanwhile, the overall structure of the common agricultural policy's payments on a per-hectare basis encourages agricultural expansion into marginal areas. Reforming the policy to encourage greater use of nature-based solutions is an obvious opportunity for the European Commission.

9.3.2 *“Friction” market-based instruments*

Revolving funds involve purchasing properties from the commercial real estate market and actively restoring them to ensure high-level protection of key environmental values, before reselling them to the commercial property market. Evidence suggests that if carefully managed this can generate profit and protect the environment at a low or even negative cost (due to profit from property sales covering management costs). Application in the European Union would require more detailed consideration, but structurally it could take the form of an EU entity with access to funds, and with individual Member States incorporating the potential to access these funds for revolving land purchases that align with the fund's requirements and strategic Member State considerations.

10 Review of the Natural Capital Financing Facility (NCF)

The following section sets out the European Investment Bank's assessment of its experience in implementing the Natural Capital Financing Facility (NCF) pilot financing instrument, drawing on staff working documents and the experience of key staff over its implementation period up to the end of 2022.

10.1 Introduction to the Natural Capital Financing Facility

The Natural Capital Financing Facility was a pilot financing instrument to address the common financing challenges encountered by projects addressing biodiversity and/or ecosystem service loss. It was jointly created by the European Commission and the EIB and launched in 2015. After two extensions totalling three years, the mandate expired at the end of 2022.

The premise behind the facility was that there is not enough financing available for the European Union to meet its biodiversity and climate change adaptation policy objectives, and that a lack of financing is a key factor preventing Europe from reaching its biodiversity targets and climate adaptation ambitions.

The aim of the Natural Capital Financing Facility was to “provide a proof of concept to demonstrate that biodiversity and climate adaptation projects can be financed through innovative and sustainable market-based mechanisms in addition to existing grant-based financing” (NCF delegation agreement²¹⁵). The facility was set up under EIB management, using the EIB's standard market-based principles for risk assessment and pricing, as this was thought to have the greatest potential to generate interest from market-based sources of private capital. The EIB applied its normal approach for assessing and pricing risk, but a guarantee provided by the European Commission enabled it to consider operations beyond its normal risk appetite.

The Natural Capital Financing Facility sought to create and showcase a pipeline of replicable interventions, and the aim of this “proof of concept” was to demonstrate the attractiveness of investing in natural capital and ultimately to address the perceived lack of investment in the area by leveraging private and other repayable forms of finance.

A diverse range of products was made available under the facility, namely direct loans, loans for financial intermediaries (for on-lending to several smaller projects) and indirect equity (through equity funds). Direct equity is not available under the EIB's Statutes, though high-risk and structured debt financing operations are possible. The delegation agreement mandated a financing range of between €5 million and €15 million, which is significantly below the normal volume for EIB operations (projects are typically over €30 million/€40 million with loans of more than €20 million, but most projects are over €100 million with loans of more than €50 million).

10.2 Natural Capital Financing Facility — structural features and investment policy

Structure of the Natural Capital Financing Facility

The repayable financing provided to promoters under the Natural Capital Financing Facility came from the EIB's own funds, raised on the international capital markets. The default risk is shared with the European Commission by virtue of a guarantee of up to €50 million, allocated in equal parts from the EU LIFE sub-programmes for environment and climate action financing. In addition, the Commission funded a technical assistance envelope of €10 million to act as the NCF Support Facility.

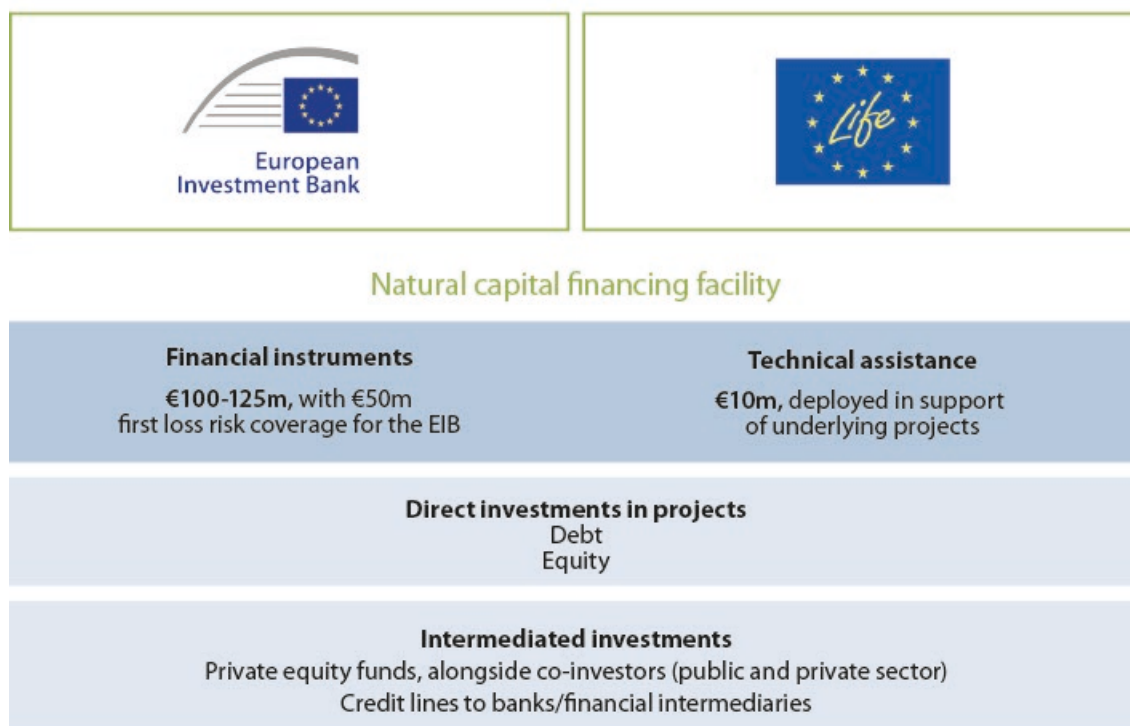
The European Commission's guarantee provides up to 95% coverage of potential losses on individual projects, with the EIB retaining 5% for alignment of interest (as “skin in the game”). The losses from the Commission cannot exceed the €50 million cap, net of management fees (not exceeding 6% of the facility). Based on an expected level of risk on a small portfolio of innovative projects in the area of nature,

²¹⁵<https://www.asktheeu.org/en/request/2804/response/10225/attach/4/1%202%20Delegation%20Agreement%20EU%20EIB%20Natural%20Capital%20Financing%20Facility.pdf>

the guarantee was expected to enable a target covering both debt and equity operations of €100 million to €125 million, the principle being that the residual risk on the overall portfolio should remain acceptable to the Bank

The structure of the Natural Capital Financing Facility is represented in Figure 33 below, showing its two core elements: the NCFI Investment Facility (the EIB financing provided under the risk sharing arrangement) and the NCFI Support Facility (the technical assistance).

Figure 33 Structure of the Natural Capital Financing Facility²¹⁶



Investment policy

The aim of the Natural Capital Financing Facility’s investment policy was to achieve a portfolio of nature-based projects with a range of business models, financing types and locations. Individual financing would be in the range of €5 million to €15 million, with the facility contributing a maximum of 75% of the eligible investment cost for individual projects (higher than the normal EIB maximum of 50%). This facility was expected to lead to between 9 and 12 operations, with an overall financing contribution of €100 million to €125 million. The average size of individual operations was expected to be in the order of €10 million and approximately two operations per year were expected.

The maximum duration or tenor of the financing was originally 15 years. This was revised upwards in 2017 with the first extension of the facility, to a maximum tenor of 25 years, which was more reflective of green infrastructure projects (often a mix of green and grey components in an urban environment) and more in line with the typical tenor that the EIB is able to offer for infrastructure and urban projects.

Eligibility criteria centred on expenditure related to physical natural/green elements in four types of project categories, families of revenue and business models, for biodiversity and climate adaptation:

- Payments for ecosystem services
- Green infrastructure
- Biodiversity offsets
- Innovative pro-biodiversity and adaptation businesses

²¹⁶ Taken from EIB and European Commission (2015). Introducing the Natural Capital Financing Facility. Available at: <https://www.eesc.europa.eu/sites/default/files/resources/docs/gi-050515-09-ranaivoson-speech.pdf>

All projects would also have to demonstrate a contribution to the specific objectives of the EU Biodiversity Strategy and EU LIFE Regulation.

In addition, there was a cross-cutting innovation requirement, particularly for pro-biodiversity businesses. No definition of innovation per se was provided, and a case-by-case approach was applied. However, it was decided early on that financial innovation in itself would not be sufficient, even though the mandate put emphasis on this.

Other criteria applied at portfolio level to reduce concentration risk and ensure diversity included:

- Total support in any single Member State capped at 20% of the EU guarantee
- Support for direct operations (without an intermediary) in any Member State capped at 15%
- Support for intermediated operations in any Member State capped at 15%
- Support for individual project categories capped at 35% of the EU guarantee.

A mechanism was introduced to allow a change in portfolio restrictions toward the end of the facility's lifetime, if required.

10.3 Natural Capital Financing Facility — deployment and environment

Deployment

The Natural Capital Financing Facility's first loan was signed in April 2017.²¹⁷ An overview of the projects financed under the facility is provided in the table (Figure 34) below (including smaller projects reached through intermediaries). Figure 35 below shows the level of deployment over time.

In total, the facility approved 12 operations and signed 11, including two with financial intermediaries that reached five smaller projects. A total of €82 million in signed financing from the EIB was achieved, with some cancellations before the end of the investment period on 31 December 2022.

Although the target volume of €100 million in signatures was not reached, despite the extensions to the mandate period, the rate of deployment towards the end of the facility's investment period had almost reached the level originally anticipated of approximately two operations of €20 million per year. The target number of operations was reached, with 11 signed operations, as well as the desired geographical spread. The most important observation is that the sizes of the operations submitted to the Bank were often well below the anticipated average of €10 million, explaining the shortfall in relation to volume.

A very broad range of financing approaches were used to deploy the facility, some highly innovative for the area of biodiversity and climate:

- Equity investment via an investment fund (so-called indirect equity)
- Contingent loan financing for an equity investment fund with accrued interest and repayment conditional on sale of the fund's underlying fund assets
- Contingent loan for a project developer, with accrued interest and repayment conditional on revenues
- Loan for a special purpose vehicle, with equity injected by the project promoter
- Plain vanilla loans for financial intermediaries and public bodies, including a municipality under a state guarantee
- Several "linked operations" in which smaller loans from the facility were linked to larger EIB financing transactions under a common appraisal and negotiation process.

The project categories and business models were very diverse, although forestry and urban green infrastructure were the most common. However, no significant operation in agriculture was financed.

In addition, no project fitting the payment for ecosystem services project category could be presented, although several of the projects were related to the concept, as discussed further below. The green infrastructure project category fit closely within the definition of nature-based solutions, but most

²¹⁷ <https://www.eib.org/en/products/mandates-partnerships/ncff/in-a-nutshell/index.htm>

projects under the facility either fell squarely within the definition or had relevant aspects or elements, as shown in the table below.

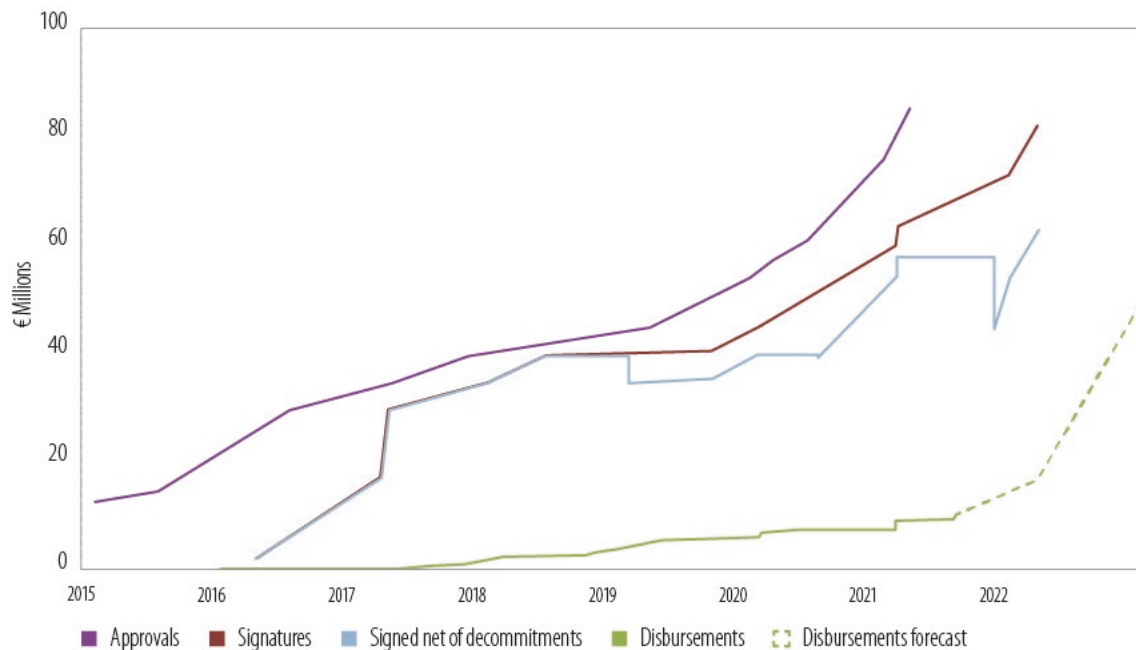
Figure 34 List of projects signed under the Natural Capital Financing Facility

Note: Amounts in brackets show the remaining financing after partial cancellation post-signature

Project	Country	Signed *	Business/revenue model	Nature-based solution relevance
Ginkgo III — Green Infrastructure	EU	€15.0m <i>Linked with a larger operation</i>	Remediation and redevelopment of polluted urban brownfield sites acquired at reduced cost due to risks, for sale to a range of buyers, including investors and housing companies. Reduction of urban sprawl and incorporating green infrastructure in new developments for resilient and attractive neighbourhoods.	Yes, inherently.
HBOR Natural Capital MBIL	HR	€15.0m (€1.5m) <i>Linked with a larger operation</i>	National promotional institution lending to SMEs, carving out a pilot initiative for pro-biodiversity SMEs and projects, coordinating with other EU/subsidy instruments.	No, ultimately no schemes included nature-based solutions.
Eco Lika	HR	Suboperation of HBOR Natural Capital MBIL	A wool waste recycling project, turning it into a high-value organic fertiliser (wool pellets) and also serving as a slug repellent, mulch material and water absorber.	
OPG Lajko Dalibor	HR	Suboperation of HBOR Natural Capital MBIL	Family farm investments for certified organic farming.	
Irish Sustainable Forestry Fund	IR	€12.5m (€7.4m)	Aggregating a portfolio of forests properties, converting them from low-value, poorly managed forests to close-to-nature principles (continuous cover forestry). Enhancing value by lowering overall risk at forest and portfolio level, enhancing measurement methods more in line with close-to-nature forestry and establishing smoother cash flows from timber compared to clear-fell.	Not directly, but contributes to more resilient forests.
Romania Forest Regeneration SLB	RO	€9.5m	Acquisition of semi-mature forests and enhancing value through ecological principles, for close-to-nature management with low-disturbance high-value timber extraction. Forestry Stewardship Council certification, enhancing carbon measurement and synergies with protected areas.	Not directly, but contributes to more resilient forests.
Alzette River Renaturalisation	LU	€9.0m	Phased plan to renature the Alzette River, restoring it to its natural course and profile and reopening the floodplain. National water agency coordinating the design of measures being implemented at municipal level, negotiations with landowners and relevant funding sources for each river section.	Yes, flood risk management.
CDC Biodiversité	FR	€5.0m (€4.4m)	Acquisition and restoration of large landscapes, funded through the sale of biodiversity compensation units defined under French law.	Not primarily, but contributes to restoring landscapes that will be more resilient.
Athens Resilient City and Natural Capital	GR	€5.0m	Development of green infrastructure elements as part of a city-wide 2030 urban resilience plan, specifically the adaptation	Yes, inherently.

Project	Country	Signed *	Business/revenue model	Nature-based solution relevance
		<i>Linked with a larger operation</i>	components of the Athens Climate Action Plan.	
Wallonia Wastewater and Biodiversity SPGE	BE	€4.5m <i>Linked with a larger operation</i>	Leveraging the commitment in Wallonia to save the endemic pearl mussel in order for the regional wastewater and water resource utility to invest in wastewater treatment beyond the requirements of the Water Framework Directive, in small settlements. Also includes renaturing for water supply catchments.	Yes, contributing to safe drinking water and using nature-like wastewater treatment solutions (reed beds) in small towns.
Eau de Paris Biodiversity	FR	€3.8m <i>Linked with a larger operation</i>	Biodiversity strategy reinforcing the regional nature agenda to ensure continued access to water resources. Building on buy-in from customers and the owner-municipality as well as legislative drivers to address biodiversity in the network and resource infrastructure, in support of regional nature connectivity. Funding from user fees and subsidies.	Partly, with green infrastructure on buildings for water and heat management.
Rewilding Europe Capital	EU	€2.0m	Set-up of Europe's first dedicated microlender to pro-biodiversity businesses in regions of high nature potential and rural abandonment, extending Rewilding Europe's small grant programme to larger project financing.	Partly. Peatland restoration also restores the original hydrology, with benefits in terms of reducing peaks in runoff and water quality downstream. Also includes active and sustainable management to reduce fire risks, benefiting communities.
Snowchange	FI	Operation under Rewilding Europe Capital	Accelerating the restoration of boreal peatlands as part of traditionally indigenous landscapes, upfront financing against a range of biodiversity donations. Exploration of greenhouse gas exchange in rewilded peat areas.	
Vale Das Lobas	PT	Operation under Rewilding Europe Capital	Restoring a manor in an idyllic valley to convert it into a nature and health sanctuary with eco-homes for ecotourism. Creation of a no-hunting zone with the local community and implementation of biodiversity restoration measures.	
Rio Maçãs	PT	Operation under Rewilding Europe Capital	Aggregating communal landscapes on low-cost, long-term leases to reduce wildfire risks for communities and generate sustainable revenues. Clearing undergrowth, creating fire breaks and introducing herbivores. Revenues from felling of non-native trees, long-term revenue streams from nature-based products, native forest plantation.	
Szczecin Affordable Housing Green Infrastructure	PL	€0.8m <i>Linked with a larger operation</i>	Integration of blue and green infrastructure into social housing, improving appeal, liveability and climate resilience.	Yes, inherently.

Figure 35 Natural Capital Financing Facility deployment over time



Market environment and external developments

The Natural Capital Financing Facility was conceived as a market price instrument. Projects involving nature are generally sensitive to the cost of finance. Within the European Union, the environment for such projects is relatively rich in public grants and grant-providing foundations.

By extension, interest in using repayable finance such as the Natural Capital Financing Facility has been sensitive to macroeconomic developments and shocks, including natural disasters and war. A particular development was the historically low interest rate environment, which affected the uptake of EIB loans in general and also those under the facility.

The cost of finance from the facility was a challenge for smaller/riskier standalone projects, since the riskiness of projects verges on equity (high) risk, making loan pricing difficult and often unsustainable for emerging impact-oriented investments, where more equity-like financing would be more appropriate.

A strategy of embedding the Natural Capital Financing Facility's operations within larger EIB financing transactions brought benefits and efficiencies of scale. The opportunity to provide technical assistance not just for preparation, but post-signature in implementation and monitoring, has acted as a significant driver for interest in financing, and also as a de facto subsidy element.

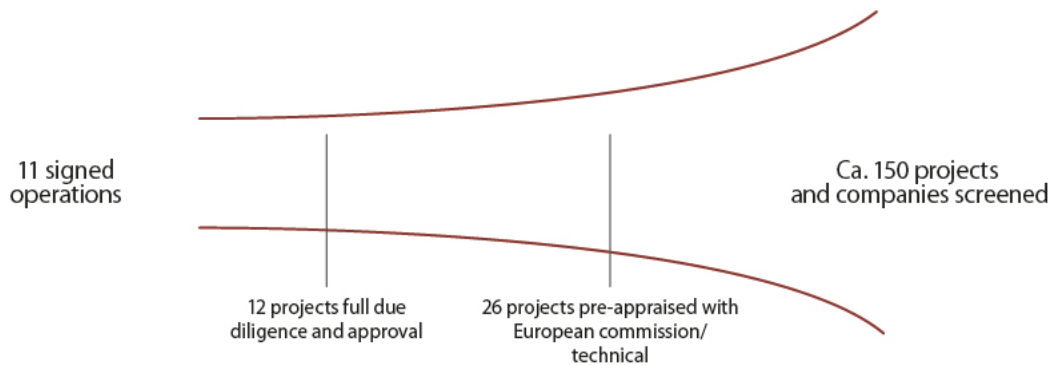
In spite of the challenges and macroeconomic shocks over the lifetime of the facility, there was a perceived increase in interest in the facility and its relevance. The operational team witnessed an improvement in the maturity of project sponsors, especially among implementation-oriented NGOs, as they increasingly developed their own financial expertise. Towards the end of the facility's implementation period, the biodiversity agenda grew in importance and visibility and the Natural Capital Financing Facility's climate-nature links were validated, culminating in the revised EU Biodiversity Strategy and Green Deal. The actual rate of the facility's deployment reached the original expected pace of approximately two projects per year towards the end of the mandate.

The "deal funnel" and observations on attrition of potential projects

Projects were sourced in a variety of ways, including via the EIB website and thematic email inboxes as entry points, from reviews of project pipelines prepared by various consultancies commissioned by the European Commission, and through personal contacts of the Natural Capital Financing Facility's staff. At least 150 projects were screened for consideration, of which 26 were formally subjected to advanced analysis (with several more analysed in some depth). This screening included approval of eligibility by the European Commission and/or provision of technical assistance from the NCFE Support Facility in

anticipation of a financing operation. The resulting “deal funnel” and the main reasons for projects not going forward are outlined below in Figure 36.

Figure 36 The Natural Capital Financing Facility’s deal funnel



Typical characteristics of projects that did not pass the screening stage

- Too small, the majority of prospects being below €1 million in size (with many below €0.5 million)
- Self-evidently unable to repay finance, therefore in need of a grant
- Unmitigated/startup risk, and hence too risky for the facility’s mandate
- Pro-biodiversity solution and technology providers not eligible because of a lack of direct nature-related capital expenditure, needing startup/seed financing, working capital or growth capital
- Significant portion of financing for land acquisition costs, not eligible for EIB financing
- Projects proposed outside the European Union/in the United Kingdom post-Brexit referendum in 2016
- Equity funds approaching the facility after 2020 because of a change away from such financing following a revision of the EIB equity strategy.

Typical characteristics of projects not proceeding from pre-appraisal/technical assistance to approval/signature

Few projects taken on board by the Natural Capital Financing Facility were in a form that was immediately bankable, with most requiring sustained dialogue in order to reach a satisfactory structure. Certain projects involved complex stakeholder relationships with long lead times, eventually taking them beyond the possibility of completion within the facility’s investment period.

Five equity funds were in dialogue with the facility when the EIB mandate for Europe-focused equity funds was ceased and transferred to the European Investment Fund (EIF). One project not shown below (Ginkgo 3) was restructured and signed as a debt operation under the facility. The facility team’s discussions with the other four investment fund promoters/managers were discontinued due to the change in the Bank’s equity strategy.

The EIB’s requirements for investing in equity funds set a high bar in terms of a demonstrable track record of successful exits (profitable sale of underlying fund assets by the fund manager), private investment by the core team responsible for investment decisions (alignment of interest with investors for the full term of the life of the fund vehicle), as well as overall governance (so as to avoid potential conflicts of interest), in addition to requiring a market-based rate of return on investment. In an emerging area such as natural capital/biodiversity investing, track records in the sector are scarce. Moreover, deal flow from a narrow or emerging sector can be a challenge and projects in the natural capital space can have long lead times and be illiquid, requiring substantial engagement and lowering potential returns on investment. In general, these projects can struggle to generate a standard return to compensate for the risk assumed. In the case of nature, this is in part because of the underlying (slow) natural growth rates. Thus, many of the funds encountered would have needed greater flexibility than that offered by the market-standard EIB fund requirements, potentially including a below-market return requirement.

In summary, the core reasons for not being able to proceed to signature included:

- Alternative/grant source of funding found
- Inability to complete the project within the facility's investment period
- Inability to structure an alternative solution to or find alternative financing for land acquisition
- Equity funds ultimately unable to meet the demanding market-oriented requirements of EIB equity fund investments
- Loss of mandate to invest in equity fund (transferred to the EIF at the end of 2020)
- Loss of political support, changing priorities and adverse macroeconomic developments
- Reduction in the target market for nature-based solutions due to Brexit.

From project approval to signature

Generally, signature proceeded efficiently after approval. However, the EIB's contractual requirements are substantial and specific to its role as a public policy-driven bank, while many borrowers were not very experienced in dealing with large lenders. In some cases, legal negotiations were protracted, but this did not ultimately block the facility's deployment.

Time lag between project signature and disbursement

As can be seen from Figure 35 above, disbursements only began to pick up pace towards the end of the Natural Capital Financing Facility's investment period. A key reason for this was the pilot nature of the mandate. The attrition experienced by the facility in general was largely reflected in the level of deployment through the intermediaries "co-piloting" the facility in their respective markets.

Another key explanation is the lead times for developing plans and designs through the mainstreaming approach linking projects with other EIB operations. These lead times were compounded by delays in mobilising the enabling technical assistance, for reasons discussed below. In addition, under the linked operations approach, borrowers have generally drawn on the main EIB loan first, as there is not always a relative financial advantage from the Natural Capital Financing Facility loan.

Certain macroeconomic developments/external shocks also led to implementation delays.

With design and works procurement falling into place and higher private sector involvement towards the end of the investment period, disbursements are expected to pick up pace from 2023 onwards.

Indirect deployment

A key delivery channel for the Natural Capital Financing Facility has been through entities aggregating several investments. These have included corporate/public investment programmes and, more indirectly, actual intermediaries, implying a degree of delegation in project assessment. Intermediaries are closer to their respective markets and are better able to assess, price and manage risk in these markets.

The Natural Capital Financing Facility's intermediaries included the **Croatian national promotional institution HBOR**, a microlending entity called **Rewilding Europe Capital**, the special purpose habitat banking entity **CDC Biodiversité**, the dedicated sustainable forestry fund **SLM Silva**, as well as the urban brownfield development fund **Ginkgo 3**.

The **Rewilding Europe Capital (REC)** operation provided three examples of small innovative pro-biodiversity businesses and projects (see box below). However, this project has absorbed only €1.4 million out of the €2.0 million signed and €6.0 million approved and has not been able to conclude a new project since 2019. Reasons for the limited deployment include many of the potential projects requiring upfront financing for land acquisition costs, which are not eligible for EIB financing, and the scarcity of entrepreneurs in the targeted rural, biodiverse landscapes. Other key reasons reflected the facility's general findings, namely a general dearth of projects able to service repayable debt, long lead times for landscape-type projects and — in some cases — an expectation of more attractive financing from other sources.

Rewilding Europe Capital — Supporting the first pro-biodiversity SME lender in Europe

The expansion of human settlements, farming and forestry over the last few centuries has left Europe with scarce natural, wild areas. Landscapes have been depleted or degraded by unsustainable

practices. In some areas, landscapes have been shaped through low-intensity uses that have supported rural communities for centuries, maintaining high levels of biodiversity. Recent changes have resulted in land abandonment as a consequence of urbanisation, economic trends and a lack of opportunities for younger generations, resulting in a reduction of traditional livelihoods. Action is required to restore the degraded landscapes, make space for nature, and support local livelihoods in order to deliver benefits for nature, climate and local communities.

The NGO Rewilding Europe was established in 2011 with the core mission to rewild large European landscapes by restoring natural processes, bringing back large and ancient species as ecosystem engineers, and supporting local livelihoods. The NGO is funded by a variety of donors such as the Dutch Postcode Lottery. As part of its rewilding approach, Rewilding Europe aims to foster local nature-related businesses that can thrive and contribute to these rewilded landscapes.

In 2013, Rewilding Europe set up Rewilding Europe Capital (REC) to manage a programme of small loans to support the development of pro-nature businesses and provide training for the development of these businesses. Wanting to scale up its efforts to transform rural economies, Rewilding Europe sought the capacity to go beyond small microloans to larger financing for SMEs and increased cooperation with other financiers, building on its experience.

The Natural Capital Financing Facility was a key enabler, structuring a loan to Rewilding Europe Capital in 2017, with equity provided through the parent NGO. A feasible cost of financing for the typical small and startup SMEs operating in the biodiversity impact space has been possible through a reduced interest rate from the Natural Capital Financing Facility. Rewilding Europe Capital has also benefited from being part of Rewilding Europe and its wider network of local teams across ten landscapes in Europe to build the network and pipeline, raise REC's profile, and support the technical capabilities of the potential end borrowers. Technical assistance has also been provided through the NCCF Support Facility to develop the capacity of Rewilding Europe to operate as a lender, explore the feasibility of carbon-related revenue streams and identify opportunities for further investment.

The operation with the Croatian national promotional institution (the Ministry of Finance, the Ministry of the Economy and Sustainable Development and the Croatian Bank for Reconstruction and Development — **HBOR**) yielded only two projects out of a total of 107 that were considered, using only a fraction of the €15 million available from the Natural Capital Financing Facility. As opposed to Rewilding Europe Capital, which covers landscapes throughout Europe, this was a single country operation. While Croatia has significant biodiversity potential, boasting one of the highest shares of protected areas in the European Union, it is also one of the highest per capita beneficiaries of EU grants. Grants are readily available in Croatia for the land-based and sustainability-related sectors of interest to the Natural Capital Financing Facility.

HBOR took a keen policy interest in the Natural Capital Financing Facility. As a national promotional institution, HBOR also plays a key role in coordinating different financing sources, including EU grants. Its own repayable financing — behind which the Natural Capital Financing Facility was positioned — is classed as concessionary by the authorities. The allocation of grants was highly efficient, often maximising the level of grant funding, which maximised the permissible level of concessionality under EU state aid rules. The result, however, was often that a loan from the Natural Capital Financing Facility through HBOR for the remaining financing would lead to a breach of these EU state aid rules, so was not possible. A significant challenge was also how to explain the facility's narrow and often hard-to-interpret eligibility criteria within the organisation and to borrowers, as they were not simply aligned with standard EU SME criteria. This point also speaks to the complexity and overall administrative burden associated with the facility that many stakeholders mentioned during the preparation of this report.

Through the lens of a national entity such as HBOR, a more strategic approach would have been preferred, embedding support for nature in sectoral policies and institutional contexts, and with a stronger financial advantage for borrowers. Overall, the Natural Capital Financing Facility operation has raised HBOR's profile and skills in sustainable finance. However, the facility was considered too complex for the Croatian market. Going forward, HBOR's recommendation is to use EU-wide frameworks, such as the EU taxonomy, to create standardised project typologies. The work and capacity building under the

facility will help absorb future funding under the National Recovery and Resilience Plan and has helped prepare an effective technical assistance strategy under the current InvestEU programme (2022-2027).

The operation with **CDC Biodiversité** was split into two financing agreements, one for the continued development of an existing site in the Camargue region in southern France, to be repaid from revenues from the sale of biodiversity credits, and another for the identification and development of new sites. The financing for the Camargue region site was disbursed quickly, while the other financing has been slower to deploy. The main reason for this is the need for upfront financing to acquire large contiguous sites with high biodiversity potential (at a relatively low cost per hectare, given that the sites typically have limited alternative economic uses). The Natural Capital Financing Facility has been unable to meet this need due to the ineligibility of land acquisition costs, which have proved difficult to finance through other sources. Another key challenge has been finding suitably large and contiguous sites, given that the majority of rural landscapes are under agricultural or forestry regimes, often with local political resistance, high costs of acquisition and fragmentation.

In the case of the CDC Biodiversité business model, this is a continuous process of matching an acquired site with suitable sponsors in the form of infrastructure project developers seeking biodiversity offsets with specific requirements. This can slow the pace of interventions but provides the certainty of having sequestered the spatial integrity and biodiversity potential from the start.

The Natural Capital Financing Facility was a cornerstone investor in the **SLM Silva Fund** under the Irish Sustainable Forestry Fund operation. While there was an original approval and commitment of €12.5 million, based on the expectation of a target fund size at final closing with other investors of €50 million, this had to be scaled back to €29.5 million. Part of the explanation was that the novelty and limited geography of the strategy dictated that a realistic level of deployment meant a relatively small fund size. This in turn meant that it did not match the volume requirements of large institutional investors, instead appealing more to smaller investors and investors looking for a particular sustainability angle, or to learn about the sector. Deployment to date has been satisfactory, though delayed somewhat due to the impact of COVID restrictions on project development and bottlenecks in national licensing.

SLM Silva Fund — Converting fragmented, poorly managed forests to a large close-to-nature forestry portfolio

The SLM Silva Fund is a specialised fund for sustainable forestry in Ireland. It signed a first agreement with investors in 2018 with the Natural Capital Financing Facility as a cornerstone investor and is now reaching the end of its investment period. The strategy of the fund is to acquire semi-mature timber plantations for a large portfolio, developing them under a continuous cover forestry (CCF) management regime to ensure a greater diversity of species and tree ages over time. These properties are often on marginal land of former agricultural properties converted to forestry on the back of afforestation subsidies. However, they are often poorly managed, resulting in dense and low-biodiversity monocultures and sub-optimal stands for timber.

Continuous cover forestry (similar to close-to-nature forestry management) is an alternative to the widely used clear-fell and replant system that perpetuates monocultures. This forestry approach maintains permanent forest cover and promotes a mixed forest structure, providing stable conditions for biodiversity and soils. The fund has a specialist team of foresters that is very dedicated to promoting and improving the science and practical knowledge of continuous cover forestry management in Ireland and throughout the European Union.

Pooling smaller properties into a portfolio diversifies risks, improves valuation and makes investment more appealing for larger investors. Significant work is carried out to screen potential properties for suitability and profitability, with approximately one out of ten properties screened being acquired. The fund then performs the necessary thinning and planting operations to convert and optimise the forest properties for the continuous cover forestry regime. The fund has been working on enhancing valuation methods for this approach, which generates future cash flows that are more even and from a more complex species composition than from the clear-fell and replant system.

The NCF Support Facility is contributing to the fund's development of the evidence base and guidance to replicate continuous cover forestry in Ireland and beyond, in addition to assisting with the selection of forest properties, and providing practical training for foresters and contractors. This support

includes a carbon monitoring protocol and sustainable forest certification roadmap as well as biodiversity indicators for integration into conventional forest inventory and planning systems. Long-term sample plots are being established in accordance with relevant industry protocols. A study is also being undertaken of sustainable deer densities that are compatible with the natural regeneration of Irish woodlands. SLM Silva was named Environmental Fund of the Year (Europe) 2022 by Environmental Finance.

EIB-linked operations and mainstreaming

The green infrastructure project category showed promise, with the EIB being a key lender to many cities and utilities throughout the European Union. It became evident that green infrastructure, climate adaptation measures and biodiversity enhancements were generally not being planned, financed and implemented in isolation as standalone projects. Instead, they were often embedded within larger investment strategies or investment programmes. There were several clear reasons for this, such as:

- Access to space and surfaces being the key ingredient and being available in synergy with larger planning and design resources, including water management infrastructure
- Economies of scale with larger operations in terms of implementation and financing at corporate level
- Greening and biodiversity enhancement often achievable with modest additional cost and benefiting from a general willingness to pay
- A growing trend for more hybrid solutions combining green and grey infrastructure for resilient and integrated water and heat management solutions.

In order to reach these investments through the Natural Capital Financing Facility, the EIB piloted an approach of linking smaller operations to larger financing agreements, drawing on a common set of appraisal documents and leading to a joint financial offer and negotiation. An offer of technical assistance for design, implementation and monitoring played a key role in these arrangements. This approach involved additional people within the EIB beyond the Natural Capital Financing Facility team.

The first opportunity to do this more explicitly was in Athens (Greece), embedded within a larger urban development programme. This was followed by a small operation in Szczecin (Poland) for social housing and two operations with water utilities (one in Southern Belgium (SPGE) and the other in Paris (Eau de Paris)), and finally with an equity fund, Ginkgo Fund 3, investing in urban brownfield sites. The operation with HBOR in Croatia followed similar principles, as it was concluded at the same time as a larger financing agreement for Croatian SMEs and mid-caps.

Clients and the client-facing officers of the Bank have mostly experienced the linked operations under the Natural Capital Financing Facility as an opportunity to create visibility and enhance the profile of their nature and biodiversity-linked activities.

Athens Urban Resilience — Green Infrastructure in urban renewal

Dense construction makes up 80% of the land surface of Athens. Asphalt and concrete retain heat during the extended heatwaves to which the city is increasingly exposed, raising temperatures by up to 10°C compared to the suburbs and making it one of Europe's hottest cities. Hard surfaces also prevent water from seeping away and contribute to local flash flooding.

Athens has made climate adaptation central to its Athens Resilience 2030 Strategy, prepared in 2017 in collaboration with the 100 Resilient Cities (100RC) initiative of the Rockefeller Foundation. In 2018, the EIB provided a flexible loan in support of the resilience strategy and urban and territorial investment plans. To complement this financing, a smaller Natural Capital Financing Facility operation was concluded with the city in support of nature-based solutions, providing technical assistance to develop green infrastructure options and designs in selected locations throughout the city. In addition to the facility's technical assistance, further assistance has been provided for the development of energy efficiency measures in buildings and other urban development measures.

At least 25% more green areas are expected to be created, introducing several climate adaptation measures with biodiversity enhancements, such as green corridors and birdhouses in the four selected locations. Procurement of works for the greening of public squares began at the end of 2022, after mobilising and implementing the technical assistance. These works will include measures at the Plato Academy, Exarchia corridor, Lambrini Square and Lycabettus Hill.

The operation has shown the potential for engaging with cities and other promoters that have adopted formal climate policies but need assistance to translate these plans into actual measures. It has demonstrated the importance of implementation assistance down to a detailed level. The greening of urban environments faces coordination challenges between authorities, such as for traffic planning and substantial permitting requirements — in the case of Athens from 20 different services. There was also a need for substantial stakeholder consultation with the residents and business owners affected by the projects.

10.4 Technical assistance

General

The NCFF Support Facility provided technical assistance for a very broad range of subjects and purposes. A list of assignments under the facility is set out below, amounting to a total level of commitment of €4.8 million out of the €10 million budget.

Title	Objectives/results	Amount € (‘000)
Smaller assignments		
Irish Sustainable Forestry Fund (SLM Silva)	Early-stage support for the fund to assess the number of forest sites for sale that were suitable for a continuous coverage forestry approach.	31
Seastainable Ventures	Support for a blue natural capital promoter to identify suitable financial and legal structures for the project, including fund structures.	17
Case Study Handbook for Hybrid (Grey-Natural) Infrastructure Solutions	Development of a handbook with practical examples of integrating natural elements into “grey” or “traditional” infrastructure to achieve the infrastructure objectives.	35
Financial Structures for Conservation, Pro-biodiversity and Nature-based Solution Adaptation Projects — A Guide for Beginners	Development of a guide for NCFF-type projects and their developers covering legal and financial structuring, enabling them to have a more informed discussion with financiers.	35
Rewilding Europe Capital (REC)	Development of a monitoring and investment management platform for REC investees to feed into and access data, improving REC reporting of the financial performance and impact of its operations.	34
Inventory of greenhouse gases for landscape rewilding actions in boreal Finland	Support for the Snowchange Cooperative, a Rewilding Europe Capital client, in assessing greenhouse gas exchange and sequestration potential on peatland sites as part of their Landscape Rewilding Programme.	34
Study on land degradation and investment opportunities in the Mediterranean region	Identification, mapping and characterisation of degraded land in Spain, Portugal, Greece and Italy, as well as potential opportunities for investing in landscape restoration and ecosystem resilience.	35
SLB Romanian Forest Regeneration	Assessing a proposed pipeline of forest assets in Romania and identifying measures to increase biodiversity and climate resilience as well as potential non-wood revenue streams.	31
Digital Twinning Forestry Industry 4.0	Piloting forest digitalisation for SLB sites to enhance sustainable forestry management, including biodiversity.	50
Green Deal Neighbourhood Vienna	Support for the development of the first “Green Deal Neighbourhood” in Vienna’s 6th District, integrating nature-based solutions at a district	50

Title	Objectives/results	Amount € ('000)
	level (50 000 inhabitants), including comprehensive stakeholder engagement.	
Scoping Natural Capital Financing Facility intervention for long-term value from Irish peatland restoration	Initiating the development of a framework to finance and implement large-scale peatland restoration, using a landscape approach to create synergies between climate, biodiversity and community benefits.	49
Design of an NCF operation focusing on sustainable ecosystem management in Castilla-la-Mancha	Structuring a possible project and governance framework for a bioeconomy and ecosystems services programme, creating value from non-timber and timber revenue streams from the region's forests, with public-private cooperation and for the benefit of the rural economy.	49
Project implementation /post-signature		
HBOR Natural Capital Croatia	Support for HBOR in identifying NCF-eligible operations across Croatia, supporting final beneficiaries and building HBOR's natural capital capabilities.	934
Athens Resilient City — Integrating green infrastructure in project design	Technical support and capacity building for the Municipality of Athens to develop a set of schemes for urban renewal, which will integrate green and blue infrastructure components, including designs and permitting and tender documents.	500
SLM Silva Fund	Support for the Fund developer in promoting the active management of private forests and the wider development of continuous cover forestry (CCF) management as an alternative to the clear-fell system in Ireland. Includes the training of Irish foresters and harvesters in this approach, the development and testing of a range of biodiversity indicators and the development of a protocol to collect carbon data at portfolio level.	721
Rewilding Europe Capital	Strengthening internal processes and procedures, identifying new projects, supporting final beneficiaries in developing their projects, developing biodiversity indicators and assessing the potential for carbon credits through restoration projects.	340
Wallonia wastewater and biodiversity	Development of indicators for measuring the impacts of biodiversity and climate change adaptation measures. Identifying options for scaling up existing nature-based solutions to enhance water quality, and various biodiversity-enhancing measures in water catchments and around the utility infrastructure.	449
Eau de Paris	Broad support for implementation of their biodiversity strategy, including the development of biodiversity indicators, studies on the impact of planting hedges and other vegetation, the implementation of a restoration project in the Vals de Seine and the development of a payment for ecosystems services scheme for farmers contributing to the protection of water catchments.	449
Gingko Fund	Advising the fund on the development of resilient neighbourhoods embedding nature-based solutions and suggesting biophilic design solutions, working alongside the fund's core project team. Preparation of guidance for future projects and stakeholders.	1 000
		4 843

The possibility to use the NCF Support Facility, not just for project development, but also for project implementation and monitoring, provided a great deal of flexibility and gave the Natural Capital Financing Facility a strong advantage over other instruments. For intermediaries, it was possible to offer technical assistance to strengthen project pipeline building after signature. In the case of “mainstreaming” scenarios, emphasis tended to be on optioneering, design and monitoring, including the design of indicators, as well as capacity building. Another key differentiating factor was the ability of the facility to provide extensive technical assistance to private promoters (whereas the InvestEU Advisory Hub can only provide limited cost-free advisory support to private sector promoters).

There was a significant difference in assignment budgets between pre- and post-signature technical assistance, partly due to the requirement to ensure a direct link between the NCF Support Facility and any financing from the main facility itself. Importantly, technical assistance was seen as a strong incentive for promoters to turn to the Natural Capital Financing Facility and was often perceived as a de facto concessionary/grant element, an advantage in a market otherwise dominated by public grants. In addition to directly supporting design and implementation, the technical assistance provided often enabled new areas of study for promoters. It was also able to mitigate the transaction costs of additional monitoring and reporting requirements with resources for this specific purpose.

For early-stage concepts, a “seed technical assistance” approach was adopted, entering into small-budget assignments that were rapid to deploy in order to test prospects and structures. 5% of the resources deployed by the NCF Support Facility were used for this purpose. Even smaller assignments could require significant staff input to ensure appropriate scoping and procurement. There were also small market development assignments as well as cooperation with promoters on methodological development, as many of the promoters were at the leading edge in their respective sectors.

The limited experience of the Natural Capital Financing Facility with full optioneering, feasibility study, design and tender documents was due to the length of the process, which required at least two to four years to complete, when taking into account the detailed scoping and procurement of such technical assistance services. If engaged at the point of arranging the financing, this implied a significant time gap of several years between loan signature and disbursement.

The technical assistance was managed such that the EIB was the contracting authority, with a process for defining its scope and for evaluating tenders that closely involved beneficiaries, following normal EIB practice and procedures. Development of the terms of reference could sometimes be a lengthy process that faced resource bottlenecks (the ability to dedicate time to the task), not least at the level of the project promoters. The internal process could also be lengthy for conclusion of the associated legal documentation, which for larger contracts also included a second legal document (a cooperation agreement with the beneficiary of the technical assistance).

While contracting by the EIB no doubt made bidding more attractive, in many cases the market response to tenders for consultancies was very limited, resulting in retendering delays. This could partly be explained by the fact that the services required were often broad in terms of the expertise and types of services they needed, against a limited availability of expertise in the consultancy market. Many of the most relevant service providers were also unfamiliar with the EU/EIB technical assistance procurement environment. Having been involved in the procurement and implementation of nature-based solutions through the GrowGreen project, the report authors can confirm that there is only a limited pool of experts in nature-based solutions, which makes obtaining technical advice challenging.

Another possible factor is that contract sizes were in some regards not sufficiently attractive compared to other larger EU-funded contracts because of their complexity. However, response rates could be improved through market engagement before launching procurement.

Specific lessons from the NCF Support Facility

Small assignments deployed as seed technical assistance for project development and structuring have been very useful in giving a clearer view on the feasibility of projects, creating buy-in for projects and building cooperation locally between the Natural Capital Financing Facility and a variety of stakeholders. These have generally been awarded directly to individual consultants, sometimes with local knowledge, given their small size and the need for rapid and timely interventions to seize opportunities and forge partnerships. For the future, dedicated sources and partnerships could be organised to facilitate scoping and the preparation of terms of reference, in order to systematically apply a “seed” funding approach.

It also needs to be recognised that many of the projects would have benefited from seed funding for developing their projects with the experts and teams already in place, often being highly skilled and suitable. In many cases, rather than a lack of skills being the main bottleneck, the main issue was the lengthy project preparation/lead times during which the project had no revenue streams available to pay the team/staff developing the project. Procurement rules for consultancies do not facilitate this, with direct support being more akin to seed equity/grants for startups.

Many projects with complex stakeholder environments require substantial and lengthy development before revenues and loan financing can become a reality, providing a fundamental rationale for public support. Private entities cannot generally spend the time and money to play such a long-term role in project development. It may include upstream work to facilitate public sector involvement, where institutional arrangements are not conducive or are unsuitably resourced.

A key lesson has been that landscape-type projects, especially those involving the repurposing of land, have special sensitivities for which the deployment of external consultants is sometimes not optimal. The necessary cultural embeddedness and trust-building, as well as messaging, requires a longer-term presence that can build on opportunities as they arise. Alternative forms of assistance, for example through supporting peer networks, in-community representatives, rangers or NGOs, or entrepreneurship training might be more suitable. In particular, in certain rural areas, the availability of local individuals with the entrepreneurial skills and motivation can be limited. In addition, the role of alternative project developers such as NGOs could be strengthened, or social entrepreneurship support models expanded. Other complementary and enabling approaches could also be considered, such as investing in methods, data and monitoring that can provide a more conducive environment for project development, entrepreneurs and investors.

10.5 Observations on the design of the Natural Capital Financing Facility

Eligibility and intervention logic

The eligibility rules were defined based on four project categories:

- Payments for ecosystem services
- Green infrastructure
- Biodiversity offsets
- Innovative pro-biodiversity and adaptation businesses.

Costs eligible for financing by the Natural Capital Financing Facility were generally those related to the living or nature components of investments within the project categories. The focus was therefore not on a “whole business” approach. In principle there was some flexibility, catering for the pilot nature of the mandate. However, interpretation was often necessary, especially since biodiversity investments were often part of broader investment strategies. The EIB’s own eligibility rules also set limits vis-à-vis market demand, especially regarding the key issue of financing land acquisition.

There was not always a good fit between the proposed business and revenue models and EIB eligibility criteria/classification within the NACE framework for economic activities, which does not include the concept of benefits/revenues generated by ecosystems themselves.

There was a mechanism for ex-ante clearance by the European Commission for each operation. However, the eligibility rules were not always easy to communicate because of the need for significant interpretation. Project categories sometimes overlapped or were not fully comprehensive. This created some uncertainty when trying to work through intermediaries.

As the living/natural components were typically not capital intensive, there was a tendency to drive down eligible project costs. For green infrastructure projects in particular, there was always a need to exercise judgment when determining the degree of inclusion of hard components that were essential for establishing the living parts, when in fact the green elements were part of an integrated plan and financial whole.

Similarly, for pro-biodiversity businesses, the eligibility criteria were not tied to the usual SME and innovation criteria for European Commission and EIB financing that provide flexibility to cater for the general growth-related financing needs of such companies. This largely excluded the emerging solution and technology providers in the nature space from the Natural Capital Financing Facility, through which scalable impact could otherwise be achieved, albeit without a direct link between proceeds from the EIB loan and specific works or living components.

The cross-cutting innovation criterion did not have a clear definition, whereas in other EU innovation finance options, there is a clear scale of technology readiness levels (TRLs) to support eligibility criteria.

In practice, it was necessary to adopt a contextual approach — what might be mainstream in one country or sector may not be considered mainstream in another. A definition of innovation extending to innovation in business and partnership models would facilitate a bridge between innovation finance and the world of nature finance.

No project was formally put under the payment for ecosystem services project category. In practice, many green infrastructure projects bore similar traits, but with generated savings/benefits being internalised, rather than contractualised. In addition, carbon sequestration — while generally considered an ecosystem service subject to the development of credits — does not fit well with the notion of payments for ecosystem services being a relatively local transaction based on local savings/benefits, as was primarily intended under the Natural Capital Financing Facility. However, several projects had a carbon dimension, though using this as the basis for revenues was still under development. Carbon markets were generally not found to be a sufficiently reliable source of revenues for these projects.

Ultimately, only one project emerged under the biodiversity offsetting project category. This was largely because few countries have enacted the necessary legislation and procedures to allow specialised entities for this to develop, with France a notable exception.

Fundamentally, EIB eligibility is based on the notion of the value added of the proceeds of EIB financing being linked to a physical intervention. It has been EIB practice not to consider land acquisition as such, but rather as a non-eligible purely financial transaction. The net result is that the EIB, and by extension the Natural Capital Financing Facility, has only been able to address the recurring need for upfront financing of land acquisition to a limited extent. Promoters have struggled to finance land acquisition through other sources, rendering the facility's higher than usual maximum intervention rate of 75% ineffective in such cases. Notably, the source of the Natural Capital Financing Facility — the EU LIFE programme — permits land acquisition financing if it is related to the Nature 2000 programme.

There are a number of reasons why the EIB — as a rule — has sought to avoid financing land acquisition. These include reputational risk associated with speculation and potential accusations of land-grabbing, as well as the lack of transparency that this can create with regard to the investment strategy. Land value increases can potentially far outweigh the value generated through the core business activities of a project. In agriculture, financing land acquisitions is strictly avoided, while in forestry, some flexibility has been applied. The price/valuation of forested land is closely linked to the timber value of the living biomass. However, such is the sensitivity of the issue that financing for afforestation in anticipation of EU-funded afforestation subsidies has been deemed ineligible because it might be construed that the EIB financing is associated with land acquisition. In addition, in a fund context of multiple co-investors, the practice has been to notionally attribute land acquisition to other investors in the fund.

Working capital financing by the EIB is subject to specific eligibility criteria associated with supporting European SMEs and innovation. A more explicit link between these criteria and the needs of nature-based solutions under the Natural Capital Financing Facility would have been beneficial.

It can also be said that the project categories did not encompass the full range of business models or motivations for investing in nature. It was evident from several Natural Capital Financing Facility projects with water utilities, for instance, that there is a basic willingness to pay for nature in communities and among customers that can be mobilised under the right circumstances in both the public and private sectors. This is particularly the case where there is a long-term alignment of the business or strategy with nature or nature-related supply chains, for instance where long-term access to resources or social licence is a concern, or where there is a desire to lower risks such as wildfires or flooding. There is an opportunity in such cases to cater for the financial needs relating to these strategic or transformational (long-term) investments, possibly embedded within a broader set of financing needs.

In general, investments should be made with more long-term strategic benefits for the business in mind. A “pure play” focus on immediate revenues from nature co-benefits risks being unnecessarily narrow. Corporates are engaging with nature and climate for a large variety of reasons, such as investing in carbon negative assets to offset uncertainties surrounding future carbon emissions taxation. Both public and private sector entities may invest to avoid fines or other compliance costs. Corporate social responsibility actions by companies are also important, based on company values or with a view to brand building vis-à-vis customers or staff recruitment and retention.

The focus of the Natural Capital Financing Facility on less capital-intensive elements, combined with its other narrow eligibility criteria, was a key determining factor in the rate of the facility's deployment.

It also became evident from the implementation of the Natural Capital Financing Facility that aspects of established concepts and methods for project analysis and descriptions do not fit nature well, and that suitable eligibility criteria may ultimately require a more adapted conceptual and economic assessment framework.

10.6 Key lessons

Overall market fit

When analysing the performance of the Natural Capital Financing Facility, it is important to look at both the context of the market in which it operates and the timeframe in which it has been operating.

Although there was strong push to scale up the use of nature-based solutions in 2022, it remains an extremely difficult environment in which to develop nature-based projects that appeal to external investors seeking a return on their investment — a point repeatedly made in this report. This was even more so the case when the facility launched in 2015.

The market failures, challenges and barriers facing the Natural Capital Financing Facility described earlier are reflected in the small number of nature-based projects that have managed to attract private investment seeking a financial return since 2015. The database of over 1 300 EU projects compiled for this report contains exceedingly few projects of this nature — only five projects were found where private entities were the main investor seeking a financial return (although we note that significant data gaps exist). Most private investment in projects in our database comes in the form of philanthropy and donations rather than investments seeking a financial return — notwithstanding substantial private capital from capital markets being channelled into utility or public sector investments in regulated areas either directly or via intermediaries.

As with any new entity, particularly a pilot instrument, it took time for the Natural Capital Financing Facility to develop a fuller understanding of the market landscape and to develop opportunities. Interviews with the finance sector have revealed that no other entity operating over a similar timeframe invests in the same large scale or variety of nature-based solutions in the European Union. The facility has therefore succeeded in identifying and investing in nature-based projects with repayable finance and has brought innovation to the financial structuring of nature-based investments. The facility also succeeded in establishing itself as a focal point for stakeholders investing in nature. Another notable achievement was the early adoption of a combined approach to biodiversity and climate finance.

It is evident from the external and internal challenges that deployment could have been faster under different risk coverage and eligibility criteria. Conversely, the projects signed complied with market-standard requirements. The observed acceleration in deployment towards the end of the facility's mandate demonstrates a gradual growth in market demand.

Nevertheless, the deployment of the Natural Capital Financing Facility fundamentally reflects the challenges of developing investable projects that produce a high proportion of public good outcomes, even though there can be significant willingness and ability to pay in society. The facility also demonstrated the considerable role that the public sector retains in important areas of nature financing, but also the scope for new and more ambitious approaches and partnerships.

It should be noted that any future market-based demonstration instrument similar to the Natural Capital Financing Facility may have limited impact if the market itself is not yet scalable. A broader set of instruments that are coordinated with grants and evolving regulation and that offer stronger support for earlier project stages and ventures, with mechanisms designed for sharing risks in real transformation, may be more likely to generate deal flow and scale.

Space for nature and the nature of active restoration

Space and connectivity are at the heart of all Natural Capital Financing Facility projects. Such projects require setting aside or changing the use or management of land or — in the built environment — surfaces. In a project and finance context, land ownership provides a means of control, generating value from growth and investments and providing collateral to secure financing. The competition for land and water with land-based economic sectors and energy and water abstraction is central to the nature restoration agenda, as are the consequences of pervasive pollution pressures. In particular, nature restoration in the European Union faces the challenge of fragmented land tenure/ownership.

This issue makes project development complex, given the scarcity of land, holdouts, compensation issues and complex legal processes. From conversations with stakeholders, it is clear that in several EU jurisdictions the perception is that land ownership in the prevailing legal and political environment is the safest method of control, permanence and capturing benefits (e.g. against resource extraction interests or infrastructure). Variations of the theme include land trusts or community-owned land (e.g. community land arising from absentee landlords in Portugal, accessed by the Rio Macas project, or registration under Indigenous and Community Conserved Areas (ICCA) by the Snowchange Cooperative as a standard for governance and cultural objectives).

It is also apparent that conservation easements (voluntary, legal agreements that permanently limit land use in order to protect its conservation values) in combination with positive obligations (as opposed to pure restrictions on land use) and financial incentives are not used extensively in the European Union (as opposed to in the United States). Part of the explanation lies in the prevalence of area-based subsidy schemes for agriculture that cover most land not under forests or classified as urban zones, largely expanding and locking in land for farming through subsidy dependency and land price inflation. Opportunities have been opening up in unplanned fashion in depopulated or degraded areas (the strategy pursued by Rewilding Europe Capital), but land prices can still remain relatively high. On active farmland and in forested areas, land prices can prevent opportunities to generate a reasonable return from converting the area to nature-friendly land uses.

The challenge of acquiring or otherwise sequestering land at a reasonable cost runs through many of the Natural Capital Financing Facility's projects, including the Irish Sustainable Forestry Fund (poorly managed and fragmented forest properties), SLB (poorly managed, semi-mature mixed forests), Rio Macas (leasing of poorly managed and fire prone wooded community land) and Snowchange (purchasing destroyed former peatlands). The Ginkgo 3 fund's urban brownfield development strategy also rests on the ability to acquire contaminated urban plots at a discount in order to overcome the risks and costs of remediation prior to development. Heavily degraded land in a nature restoration context will often require significant initial outlays in addition to long lead times before seeing sufficient growth and potential returns.

An important observation is that the strategy of restoring or rewilding landscapes does not follow the typical notion of capital expenditure/operational expenditure and well-defined periods of implementation, or the notion of useful economic life. The upfront investment is effectively for the purpose of creating the enabling conditions for a long-term plan. These are primarily space, continuity and connectivity with other biodiversity-rich sites, as well as restorative actions such as planting, removing undesired vegetation, or restoring hydrology. Nature itself does the growing and follow-on expenditure is mainly related to course correction of natural growth and addressing hazards, for example from climate or invasive species, eventually rolling into a management and monitoring regime that may be de facto never-ending. There will therefore potentially be an extended period of necessary expenditure, linked to natural growth and the unpredictability of ecosystems, tending towards a perpetually evolving natural asset. Depending on the environment, growth rates and risks, there will be greater emphasis on either growth or ecosystem resilience to shocks (e.g. in slow growth arid or high latitude areas).

Some replicable approaches and potential scalability

Sustainable forestry

Among the sectors showing promise for financing at scale is sustainable forestry. This involves managing forests and plantations for profit, but emulating natural levels of disturbance and protection, and even enhancing ecosystem features. It is not to be confused with natural forests, but is important for achieving

greater ecological connectivity and large functional water systems and ecosystems. The many facets of European Union and EIB policy on forestry are covered elsewhere.

Much of Europe's forest landscapes are under public management, often mining old growth and focusing on replanting for rapid growth, clear-fell and monoculture when managed as plantations for timber. There is significant scope for increased protection of the few remaining old forests and trees and the restoration of landscapes and water catchment areas. Public subsidies for afforestation on public and private land have also led to many cases of poor species choices and mismanagement in recent decades.

Sustainable forestry does in fact cover a broad range of investment strategies and an enormous number of landscapes, climates and vulnerabilities, with different growth rates and species variation. It includes a variety of sometimes mixed motivations such as producing sustainable timber for construction, resuming active management to reduce fire risks, and generating revenues from biomass for fuel and chemicals. Investment strategies can entail optimising existing stands of trees and replanting for a mix of regular flows and asset appreciation.

Forests and their ownership in the European Union are more fragmented than in the United States and other regions, rendering them less attractive for private investors looking for large transactions. The key to scaling forest investment in the European Union is therefore to nurture structures to overcome the challenges created by this fragmentation and to reduce transaction costs. Although industry standards for forest management are evolving, there is little substitute for skilled and motivated foresters and forest rangers with the necessary expertise to manage multiple objectives and risks, combining knowledge of tree growth, climate, soils and water. The experience of the Natural Capital Financing Facility has been that there are relatively few forestry enterprises in the European Union practising close-to-nature forest management as their main focus.

The following measures have the potential to accelerate investment, beyond shifting demand towards certified sustainable timber and forest products:

- Improving sustainable and close-to-nature forestry by promoting this approach and providing training covering areas such as the practical management of stands²¹⁸ and appropriate carbon sequestration paradigms (e.g. fast vs. slow growth environments)
- Improving remote-sensing infrastructure for site identification and monitoring
- Developing the general and local evidence base for mechanisms to provide incentives for managing non-financial objectives, such as linking forestry to water resource management
- Developing pre-financing mechanisms to support results-based subsidies for appropriate afforestation or conservation/restoration that may also require acquiring or setting aside land
- Developing de-risking mechanisms (insurance-like guarantees) to cater for risks in the early stages of transforming management regimes or restoration/afforestation.

The EIB and the European Commission's Directorate-General for Agriculture (DG AGRI) recently initiated a scoping study for an EU forestry advisory programme to support public and private promoters in identifying, developing and structuring investment projects along the whole forest value chain.

SLB — Sustainable forestry management in Romania

Sustainable forest management plays a crucial role in achieving climate, environmental and social goals. Forests are complex ecosystems, harbouring high levels of biodiversity and providing key services for the economy and society, including carbon storage above and below ground. Managing commercial forests according to principles that aim for close-to-nature dynamics and disturbance levels allows for the maintenance and recovery of forest ecosystem characteristics (e.g. tree species, age composition and dead wood percentage) and soil health.

SLB Group is a wood trading and forest management firm active in France, Romania and Brazil. It has a diversified business in which trading provides a stable recurring income and forest development provides appreciating asset values. This is achieved by protecting and developing forests for growth

²¹⁸ A forest stand is a contiguous community of trees that is sufficiently uniform in composition, structure, age, size, class, distribution, spatial arrangement, condition or location on a site of uniform quality to distinguish it from adjacent communities. A forest is a "collection of stands".

and production of the best quality wood, working with air circulation and light through careful thinning, and carefully considering local ecological factors. Resilience of the forests against climate risks is a key consideration.

This was the basis for a €9.5 million long-term loan under the Natural Capital Financing Facility for the development of approximately 2 800 ha of forests in Romania with a view to enhancing their management through closer-to-nature forest management practices, natural regeneration, and other measures that will increase the resilience of forest ecosystems against climate risks.

The forests targeted by the project are located mainly in the hilly and low-mountain areas of the Eastern and Southern Carpathians of Romania, including forests with a broad range of broadleaved and coniferous tree species. The forests are mainly semi-mature, typically aged between 50 and 80 years, with some older than 100 years.

The project aims to implement sustainable forest management principles and achieve full Forest Stewardship Council (FSC) certification. It includes interventions to ensure regeneration with local and resilient tree species and other biodiversity enhancements, as well as enabling infrastructure for sustainable forestry and recreation. The regeneration and management of each of the forest properties is based on a thorough understanding of local ecological conditions and synergies with nearby protected areas. In some cases, this will be on land previously degraded by agriculture, with the replanting of local species such as acacia, oak, beech or hornbeam. Actual forestry operations will aim to protect and conserve the forest ecosystems and their biodiversity, with special attention given to preserving soils. The project aims to enhance local capacity and technical skills, providing opportunities for communities in some of the least developed regions of Romania.

The Natural Capital Financing Facility also provided support to explore new digital forest inventory technology on SLB sites in cooperation with the Romanian company Forest Design to integrate remote sensing and digitalisation solutions in sustainable forestry management. This entailed generating digital twins of forests, based on digital terrain models and portable terrestrial Lidar scanning, applying artificial intelligence and machine learning systems. Among other conclusions, these approaches provided a more accurate and higher estimate of wood biomass than conventional measurement and valuation methods. With a broad range of applications, including forest surveillance, these technologies are also becoming more affordable.

Suitably large and continuous sites are key to project development

A key challenge in the European Union is finding suitably large and continuous sites, given that the majority of rural landscapes are under agricultural or forestry regimes where there may be local opposition to projects, high acquisition costs and fragmentation. The restoration model in itself will often require securing a site that has sufficient biodiversity potential and/or connectivity upfront, often before the full plan is in place or funding/revenues for all the desired physical interventions have been secured. If sites have to be acquired on the private market, opportunities are seized as soon as sites become available. In many cases, such as in the case of CDC Biodiversité (involving the sale of credits to biodiversity offsetters) or where outcome-based subsidies/grants are made available, the financing required will be in the form of bridge financing or working capital.

The technical, scientific, legal and social skill sets and business models required to identify and develop sites for biodiversity do not only serve the classic nature protection scenarios above. They could potentially serve an increasing range of clients seeking nature-positive actions, for instance through socially conscious corporate sponsorship, high-quality carbon credits seeking to lock in additional impacts, or other voluntary support for biodiversity. They could also apply to more mixed settings where areas for biodiversity are set aside within commercial land use or where land use is developed at scale for multiple objectives, as is increasingly the case.

The following can be considered ways to nurture project development and developers:

- Facilitating contact between solution and technology providers and project developers and sites, including a combined business model and technology innovation space

- Financing tools to enable land swaps or temporary land holding structures, and providing bridge capital for land restoration transactions (e.g. against reimbursement by output-based grants)
- Developing a landscape project paradigm for the European Union, integrating landscapes and sectors, and bringing project development expertise to the stakeholders involved
- Establishing strategies for community benefits and best practice for community ownership, as well as exploring mechanisms to deploy financial resources through communities
- Investing in large-scale mapping of land ownership, accountabilities, uses and restrictions and land for open access
- Investing in large-scale mapping of ecosystem and vegetation types, and ground-truthing the latest generation of European remote sensing data.

Utilities and nature

Utilities are embedded within their local landscapes and none more so than water utilities. This is because of the need to develop and safeguard access to water and to negotiate the topography to transport it. Water utilities take up space in the much larger natural water cycle. This involves natural processes, for instance in topsoil and aquifers, that purify and buffer the resources, and water bodies that absorb residual pollutants in treated effluent.

In general, utilities occupy large spatial footprints and operate with long-term assets and investment decisions, driven by regulation and drawing in vast amounts of capital for investment or maintenance (either directly from consumers or from capital markets, or through special purpose or commercial intermediaries). They often take decisions on spatial planning and water resource allocation. However, they act on their strategic interest in long-term access to sufficient water resources through collaboration with other entities, communicating with decision-makers and developing relationships with communities. The large spatial footprints and inherently long strategic and financial planning horizons, together with optioneering and cost-benefit analyses as common practice or a requirement, make utilities uniquely suited to rational investment decisions on potentially cost-saving nature-based solutions.

Depending on governance structures, in-house capabilities and public acceptance, utilities often demonstrate the potential for flexibility in the type and level of ambition of solutions, even within a regulated environment. They can mobilise their broad skill sets and financial capacity (skills, cash and creditworthiness) to enter into partnerships when necessary to achieve solutions across administrative silos and in partnership with public and private entities. This can go beyond minimum or standard regulatory requirements, as long as there is political will and a willingness to pay can be mobilised for what is often only a marginal extra cost to the community. This is particularly relevant through the lens of the long-term relationship between providing access to water and the nature agenda, as well as shaping appealing green infrastructure in cities for surface water management.

The following measures, among others, could be pursued to maximise the potential role of utilities in delivering nature-based solutions:

- Preparing combined ecological and financial models demonstrating the avoided cost in operations against milestones in ecological restoration in catchment areas, as a basis for incorporation in ecosystem payment schemes and user fees
- Results-based financing and regulatory measures incentivising public sector innovation and de-risking partnership actions in urban landscapes and catchments
- Leveraging utility actions with carbon mitigation, adaptation and biodiversity finance.

The water sector in nature — Two Natural Capital Financing Facility operations with water companies

The strong connection between nature and water services is demonstrated by two Natural Capital Financing Facility operations with water utilities, one with the Walloon utility SPGE (Belgium) and the other with Eau de Paris (France).

A €4.5 million loan from the Natural Capital Financing Facility was provided to Belgium's Société Publique de Gestion de l'Eau (SPGE), the water resource and wastewater utility of Wallonia, to enhance wastewater treatment and protect and renature water resource catchments, alongside a larger €150 million loan for its multiannual investment programme. Consultancy services have been provided under the facility to assist SPGE in the development of suitable indicators to demonstrate the effects of environmental investments as well as a methodology for assessing the impact of measures preventing sewer overflows.

In particular, the loan will support the efforts of SPGE, which is working with all the local stakeholders such as the Walloon public administration and Natura 2000, to re-establish the conditions enabling the freshwater pearl mussel to return to the rivers and streams of Wallonia. The freshwater pearl mussel can live to an extraordinary age but has seen a 90% decline in Europe over the last century. Its complex lifecycle makes it very sensitive to water quality — it is a bioindicator for river health. The necessary water quality is beyond the regulatory requirements of the Water Framework Directive, for which it is necessary to install wastewater treatment in small communities (and for which cost-effective nature-like reed bed systems are being used). This is possible with public support and backing from the owner of SPGE, the Region of Wallonia. Working on impact indicators and methods is important for reinforcing political and public support.

The second loan of €3.8 million was for Eau de Paris for a range of measures falling within the utility's biodiversity strategy, alongside €130 million in EIB financing for its multiannual investment plan. Eau de Paris' mission is to become an agent of the ecological transition and to improve biodiversity in the areas in which it operates. These ambitions are laid down in the company's biodiversity strategy, underpinning its commitment to biodiversity at all stages of the water cycle. Eau de Paris works closely with the river basin body Agence de l'Eau Seine-Normandie and the City of Paris, the company's owner, in setting its priorities for renaturing and urban greening. Eau de Paris must also maintain relationships with a very large number of communities and local authorities beyond Paris itself, because water is sourced far outside the city.

The strategy builds on the extensive infrastructure network in the Île-de-France Region as a framework for ecological connectivity, as well as its close relationships with local authorities and influence over significant surface areas around its infrastructure. The loan is complemented with consultancy services to assist Eau de Paris in enhancing its biodiversity monitoring processes and to support specific projects to enhance ecological connectivity. This consultancy support includes biodiversity surveys and the design of endemic vegetation to create ecological corridors along viaducts. It also includes the development of a tool for strengthening public awareness of the company's involvement in nature.

The project includes measures to establish biodiversity corridors with native vegetation along aqueducts, river barrier removal around selected hydraulic structures, and wetland restoration at sites of particular biodiversity interest. It also includes the greening of buildings, some of which are historical buildings, which will contribute to heat management in Paris. The large aqueducts transport water from intakes located outside Paris to the city itself. Eau de Paris operates 470 km of such aqueducts. While most of the aqueducts are underground, many sections are above ground and visually striking. As the aqueducts cross large distances in the countryside and through suburbs, their greening will contribute to continuity between natural and urban areas.

Proactive engagement with clients for mainstreaming

The EIB sometimes encounters promoters with climate or urban development policies, strategies or plans that are open to exploring green infrastructure design variants and biodiversity enhancements. With the appropriate financial incentives and technical assistance, it is possible to promote the expansion, improvement and acceleration of greening and other biodiversity elements.

The opportunity lies in leveraging existing planning and implementation capacity, balance sheets and revenue models, building on political and managerial strategic orientation, as well as a willingness to pay among clients and potential cross-subsidy mechanisms.

This approach to mainstreaming has the potential to be replicated and scaled among both public and corporate clients. Under the Natural Capital Financing Facility, the model was primarily applied to public sector entities (including utilities). However, it could also be applied to other counterparts such as corporates, as increasing numbers enter into a variety of pledges and plans for climate, nature and sustainable supply chains that could benefit from tailored financial terms and other support.

The timing and manner of engagement are key points, and to scale this approach it will be necessary to streamline the process as much as possible for all parties involved, and to have the right incentives. This could potentially include tailored financial value added for the transformational and/or nature-related component of the financing package. The possibility of offering technical assistance down to a very practical level during implementation would be important.

Streamlining and incentivisation could include the potential application of a 100% contribution rate for biodiversity within the context of larger financing transactions. With the amounts likely to be relatively small compared to the main financing component, but engagement taking place at a later stage in the process, not having to identify co-financing would streamline the process. The process would not crowd out other sources of financing, but rather incrementally “crowd in” the capacity of the promoter to deliver nature-based solutions.

Two key aspects to consider to develop a proactive mainstreaming strategy while maintaining simplicity for clients would be:

- Providing an entry point for high-quality guidance. In addition to statutory due diligence requirements such as compliance with Do No Significant Harm (DNSH) criteria, a more voluntary setting providing advisory services could be developed and advertised. These services could include tools or guidance to enable entities to find out what links they have with biodiversity hotspots/ecosystems in their vicinity or supply chains and support for stakeholder engagement.
- Providing effective and efficient incentivisation, potentially tailoring financial support by linking smaller components under a de-risking mandate or grants, and providing flexible technical descriptions to enable options and designs to be refined.

General lessons and recommendations for nature-based solutions projects

Competition for space and land ownership (including land prices) remain the key challenges for restoration efforts and nature-based solutions:

- Financing for land acquisition is often essential for restoration efforts by private and non-profit entities. Land could be the main object of investment or it could be set aside within commercial strategies. The high cost of land is also one of the main challenges, as it is subject to market forces and cycles, and often prices in public subsidies, including for nature-harmful activities. Avoiding this upfront expenditure and financing need through other strategies is preferable. However, for restoration and conservation in the European Union, fully acquiring land is still the preferred strategy to ensure coherent landscapes for the purpose of long-term development control. This situation is not always conducive to convincing a maximum number of private landowners to engage with the nature agenda and may ultimately cause new frictions over the use and access to land and inflate land prices. Voluntary agreements, rather than outright purchases, may be more cost-effective and preferable for maximising engagement, at the cost of losing some long-term control. However, in many jurisdictions, ownership is the safest long-term option and may be necessary. Easements with obligations are not widely practised in the European Union as opposed to the United States). The optimum strategy is patience, in-community dialogue and strategic purchases timed with the economic cycle, but the nature agenda requires accelerated action. An alternative, at least initially, would be to maximise the repurposing of land under public ownership.
- In the land-based sectors (agriculture and forestry) seeking transformation or restoration, investment strategies requiring land acquisition rely on being able to do so at a cost that does not affect viability, potentially through a sufficient rebate to compensate for costs and risks on upfront redevelopment/restoration, or the availability of significant subsidies. Indebtedness is often an obstacle to change, such as switching to different practices in agriculture. Negotiating with public landowners of forests for sustainable active use and management under benefit-

sharing arrangements is one strategy to avoid the cost of upfront land acquisition and the requisite financing, but is ultimately insufficient.

- The effectiveness of new incentive schemes in shifting present land use towards carbon sequestering and nature-positive activities in agriculture, compared to existing schemes, is as yet unproven, but will become evident in the coming years.
- The prevalence of result or output-based sources of grants or payment, often in amounts covering much of the outlays for restorative actions and potentially even the land acquisition, mean that entities involved in landscape restoration require bridge financing or working capital.
- For nature-based solutions (though not natural carbon strategies), the main differentiating factor compared to general rewilding or restoration is that the desired effect in the landscape is a solution tied to a specific area with a significant population or economic activities, such as a city or catchment near a city, and a specific timeframe, having the character of an investment seeking a benefit stream. Typically, establishing the necessary programme of interventions may require dealing with a range of owners and sectors, putting even greater emphasis on stakeholder engagement and coordination, strategies for holdouts, and combining multiple funding streams.

Scaling investment in nature, including nature-based solutions, in the European Union will require a coherent and coordinated spectrum of instruments and regulation:

- There are viable business models that support the protection or regeneration of nature or the provision of nature-based solutions, but they do not usually generate the financial returns that traditional investors can get elsewhere or are unable to compete with existing financial returns and subsidies on existing uses of the land. Many still require subsidies or grants to fill funding gaps, especially for early stages of transformation or restoration.
- Early-stage support for potentially viable, innovative business models and partnerships is the greatest unmet need, as well as tailored de-risking for special purpose intermediaries, for which standard market-based risk management and pricing are not a good fit.
- Without a subsidy, the typical small project size (often an order of magnitude or more smaller than projects at corresponding maturity in venture capital investments), the level of complexity and the lack of compensation for high risk and illiquidity have fundamental implications for the cost coverage of any instrument deployed to develop them.
- Support for nature investing needs to move towards a family of instruments, catering for the range of risk, investment sizes and maturity of counterparts — similar to the approach taken for supporting innovation as a public policy goal.
- A coordinated approach to investment grants, subsidies and repayable finance is necessary in order to enable efficient deal flow, boost innovative examples and overcome revenue gaps.
- There are parallels with other financing techniques such as social impact investing, where the promoter and beneficiary (in this case nature) are not the same. These are similar to the financial techniques used under the Natural Capital Financing Facility, such as contingent loans and first loss contributions (the equity injection from Rewilding Europe in Rewilding Europe Capital). There is potential to build on this for direct and indirect investing.
- At the market end of the spectrum, mainstreaming through engagement with technical assistance and financial value added can leverage promoter capacity and latent customer willingness to pay for additional investment in nature.
- There is an opportunity to bring together rapidly developing solutions and technologies for mapping and measuring rapid interventions across large areas, and early and growing projects and project developers for nature and nature-based solutions in an incubator-like environment.
- The area of investing in nature in the European Union will continue to benefit from a focal point for sharing lessons learnt and forging new partnerships, for instance with key non-profit organisations and the financial sector.

The public sector will continue to play a key role and could play a significant role in catalysing nature-based solutions:

- Nature-based solutions are nature as a public utility. Increased regulation has the potential to create mandatory investments, similar to other sectors created by regulation (public sanitation,

safe transport, minimum healthcare provision, etc.), drawing in significant private capital from international capital markets, as well as new forms of revenue.

- A challenge to date with ecosystem services payments as the basis for revenue models has been the imprecise economics to justify user charges. Other approaches, similar to utility regulation, may be considered. These are primarily based on cost and specific implementation responsibilities within objectives set for a regulatory cycle, after which assumptions are revised based on an improved understanding of ecosystem response and evolving legislation. Another principle can be sufficiency, for example to estimate and charge the additional cost required for the actual management of an ecosystem to be able to provide the desired services and ecosystem health, on top of funding available from economic activities/other sources. One such example would be paying forest managers for benefits to water resources.
- Often there are regulatory boundaries and split responsibilities that need to be overcome, and therefore a question of attribution of financial burden and risk. As long as the action is a sound financial case for one party, there is a basis for overcoming such barriers. However, in other cases it is less clear and action requires the resources of multiple parties. Another issue relates to any legal liability that might arise from putting user fees at risk on solutions effectively co-designed/implemented with nature with nature-specific risks.
- Instruments and strategies to facilitate such innovative cooperation, where regulatory boundaries need to be negotiated or liability issues are at stake, remain largely unexplored. Risk sharing on project outcomes for urban and larger landscapes would be one instrument to facilitate new cooperation, as would targeted de-risking using insurance approaches. There is nevertheless a need for political will and regulatory backing to try these new approaches.
- There is significant scope for innovation in the public sector in dealing with the complexities of nature-based solutions in open and urban landscapes. These include supporting the formation of partnerships across various levels of administration, utilities and private entities to leverage capacity and willingness to pay. New EU legislation, guidance or earmarked funding could facilitate new structures that have the means to integrate multiple revenue streams and channel funding to different sectors, much like a river basin authority, and that might also be assigned to existing entities.

There is demand for new forms of development support for nature-based solutions:

- Enhanced assistance will be needed in the following instances, among others:
 - Seed grant/technical assistance, partly in support of existing expert teams on the ground
 - Financial structuring technical assistance, especially for carbon finance
 - Technical assistance to accompany proactive dialogue with promoters for mainstreaming
 - Capacity building for financial institutions and assistance for end borrowers
 - Long-term assistance partnerships with regions and cities for landscape-level project development, drawing in climate adaptation, nature and circular economy
 - Long-term monitoring.
- New approaches to working with multiple stakeholders need to be tried, including assisting stakeholder engagement at local level through integrated community entities.
- The market and methodologies for expertise in nature project development need to be developed and suitable procurement strategies refined.
- One important area in which the technical assistance service could provide additional support is the monitoring and reporting of nature-based solutions projects. There is a significant gap in knowledge about monitoring the implementation and performance of nature-based solutions and such monitoring is also expensive to undertake. Providing support to undertake monitoring across projects would assist in building an important evidence base for nature-based solutions over time.

There is a need for more flexible eligibility rules built on a better conceptual model to underpin investing in nature:

- A more fit-for-purpose approach to eligibility criteria for nature investing across different strategies and instruments needs a conceptual model for what constitutes value added in terms of ecosystems and desired outcomes.

- Eligibility criteria will need to be broader to enable a more “whole business” approach than under the Natural Capital Financing Facility, and create more synergies with other sustainability paradigms such as the circular economy and climate mitigation, while maintaining a sufficient emphasis on the nature agenda.
- Nature-based solutions inherently seek to quantify benefits and risks and can be a driver for a review of an eligibility framework based on outcomes in ecosystems. However, to achieve the goal of ecosystem restoration, nature-based solutions will need to be conceptualised at large landscape scale.

10.7 Summary of observations with relevance to instrument design

Small deal size and complexity

Standalone projects and enterprises in the natural capital/nature-based solutions space are for the most part looking for financing of less than €5 million and often of less than €1 million. There are currently few standalone projects of more than €5 million and most of these are with a limited number of corporates or equity funds active in land-based activities in Europe. Nature-only transactions of more than €10 million are rare.

The vast majority of nature-based projects with repayable finance are currently carried out as part of urban/utility infrastructure programmes. The corporate sector is showing interest in funding climate investments or de-risking/sustainability in supply chains. It is facing pressure from investors, consumers and employees, with reporting on nature and climate also posing a new challenge.

There is an unmet demand for financing innovative and early-stage proposals that requires a combination of suitable seed/early-stage financing using a range of financial products and soft support. These early-stage, innovative, or long-term transformational proposals are generally not able to service financing on market terms, requiring a grant element and/or below-market risk pricing. A broad spectrum of sectors and structures is illiquid or requires long payback periods. These are often embedded in bespoke and local stakeholder configurations, and are often cooperative.

Paradigms dealing with low capital intensity/integration of nature and nature-based solutions — aggregation and mainstreaming

Intermediaries are emerging that operate on the basis of focused strategies, aggregating smaller schemes in the land-based sectors for conversion to more sustainable management. Some are attempting to capitalise on complementary new revenue streams such as for carbon sequestration. Nevertheless, these strategies are not yet mainstream and there are still few promoters and institutions with significant track records. New revenue forms also entail significant market and regulatory risks. They may require long commitments by investors and will often not offer acceptable returns for the majority of larger investors for the risks borne.

Support for these emerging intermediaries will require risk sharing and other forms of support not readily available in Europe at present. Broad and complex strategies are likely to remain unviable, calling for a dedicated public instrument for the more early-stage and innovative projects and enterprises across different sectors.

A few commercial banks with large customer bases in agriculture are attempting to support their customer base in transitioning to more sustainable practices. However, this is not reflective of the majority of financial institutions at present, which are only just starting to show an interest and have limited capacity in the area of nature and environment. Commercial banks will be best served with instruments that can be integrated readily into their own systems and business priorities (see further below). It could be worth encouraging cooperation among banks to create sufficient scale of evidence to accelerate the adoption of new asset classes.

As described in the report, biodiversity and nature-based solutions can be developed further within larger programmes, building on the planning, implementation capacity and revenue models of strong promoters, a concept that is termed here as “mainstreaming”. This would involve expanding, improving or accelerating nature-related actions within their strategies or programmes.

The mainstreaming approach can in principle be applied to both the public and corporate sectors. Fully developing such an approach will require a process and guidance to increase promoters' understanding of the opportunities and risks, as well as technical assistance. There is also potential to provide targeted financial value added or de-risking for specific investment components, provided that a streamlined process can be created for integration with the financial offer of the larger programme as a whole and the overall economics of doing so makes sense. In the corporate sector, investment components based on corporate social responsibility, transforming supply chains, decarbonisation or other long-term sustainability strategies may be catalysed through tailored financial terms and a lower cost of capital than for financing overall.

Intermediation and portfolio guarantees

For policy and impact-related topics such as innovation, support for SMEs and social enterprises, the European Union has offered a number of guarantee instruments²¹⁹ for de-risking portfolios held by financial intermediaries. These can be for portfolios of loans or (sub-)guarantees, and even equity.

The Natural Capital Financing Facility was not created with a tailored de-risking product for intermediaries, only debt or intermediated/indirect equity through fund structures. Given the potential importance in the area of natural capital and nature-based solutions, it was therefore decided to cooperate with the European Investment Advisory Hub (EIAH) to explore the potential market interest in a tailored guarantee for financial intermediaries interested in natural capital (see box below).

With the exception of a few banks heavily active in agriculture and certain leaders in impact investing, portfolios with a decidedly pro-nature dimension are currently too small to suit portfolio guarantees. There would therefore currently appear to be no basis for a dedicated portfolio guarantee instrument in this area.

Generally, bank lending is subject to risk policies mandating certain types of risk, within boundaries for overall exposure and asset classes. Most existing guarantees do not change the actual type of risk for the intermediaries; rather, they allow exposure to be shared. Such guarantees are not particularly suited to breaking ground in new or unfamiliar areas or radically changing the approach in a known asset class. A more flexible approach is required for new areas, for which other types of risk sharing with a strong policy orientation may be considered. These could include first loss or insurance-like de-risking targeting specific risks related to hazards or business model assumptions, which materially changes the nature of the risk. In order to promote the entry of new intermediaries and to develop the earlier stages of a potential market, a more tailored approach would be more appropriate. However, too much complexity will hinder uptake as the beneficiaries need to be able to rely on the speed and effectiveness of the protection, without further conditions being imposed.

²¹⁹ For example, EaSI for social enterprises, COSME for SMEs, Innovfin SME Guarantee for innovative SMEs and mid-caps, PF4E for energy efficiency and their successors under InvestEU.

Market study for a nature finance guarantee window

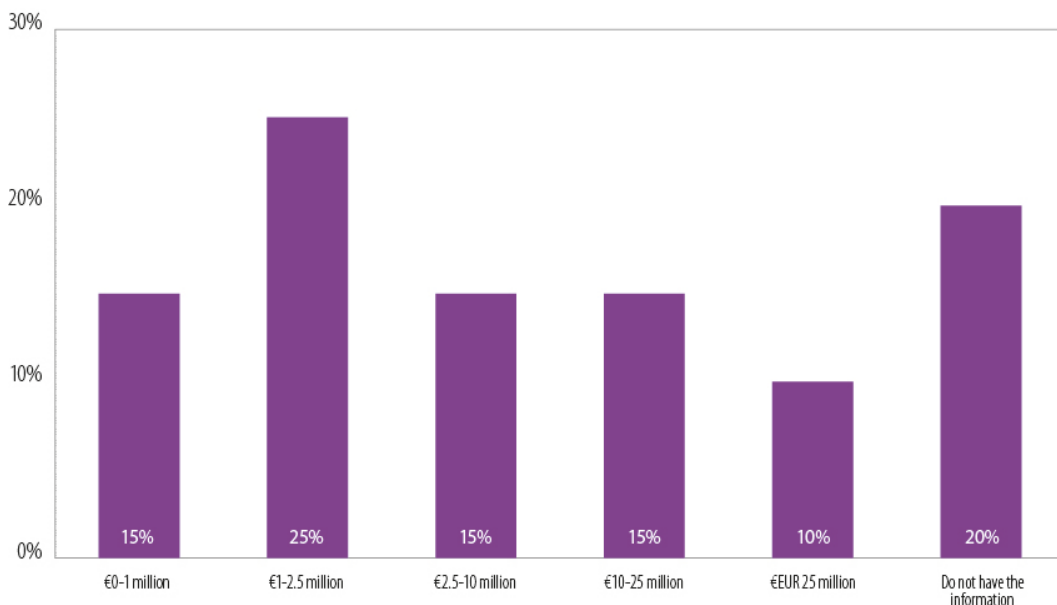
- **A survey of European financial intermediaries — banks, funds and impact investors**

A survey was carried out in 2022, funded by the European Investment Advisory Hub, in cooperation with the Natural Capital Financing Facility. In all, 220 European financial institutions were approached. There was an 11% response rate to an online questionnaire, followed up by 15 interviews. The survey demonstrated, on average, interest but limited knowledge in the banking sector of financing for nature or awareness of nature-related risks and an absence of tracking of nature in portfolios, a significant explanatory factor behind the limited response.

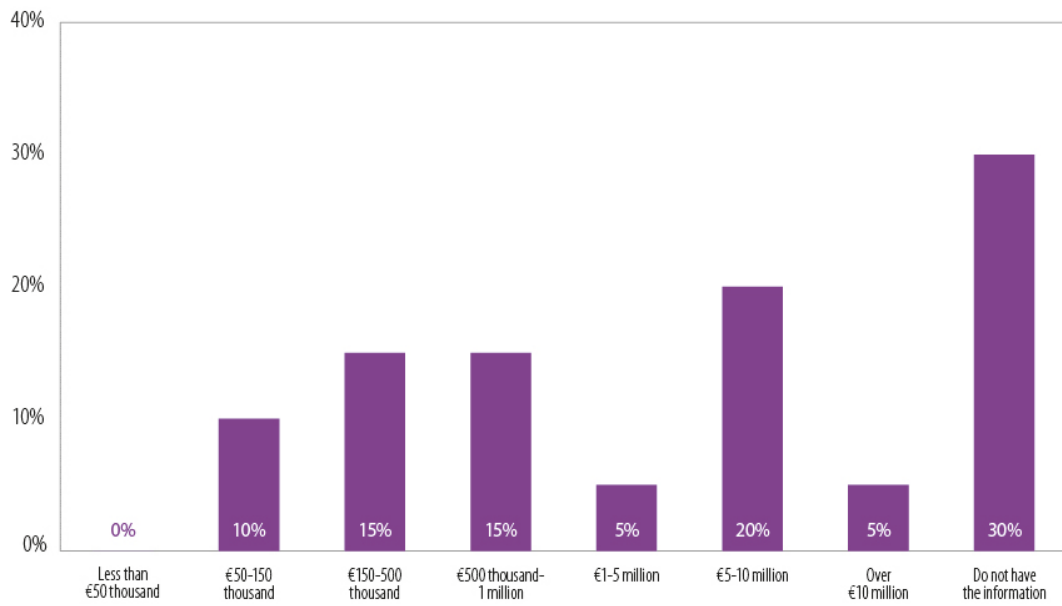
The responses received demonstrated a perception of underdeveloped regulation to drive investment in nature and low maturity or viability of projects, including the lack of collateral. Among those with experience in financing nature, the majority of financed projects were reported to be below €1 million in size, with many below €0.5 million or as low as €50 000.

Most respondents saw the need for technical assistance at the level of the institution as well as for project development and structuring. A general point of view expressed among intermediaries is to avoid complicated eligibility rules or costly/burdensome administration and reporting.

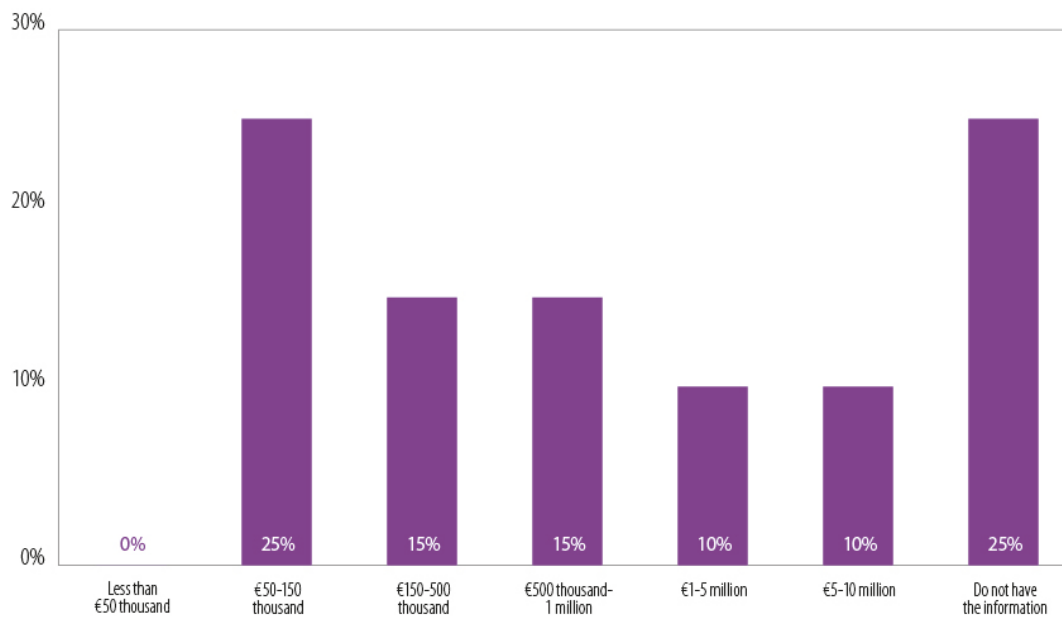
Could you please specify what average amount of annual financing you provided for nature finance projects in the past three years (both debt and equity)?

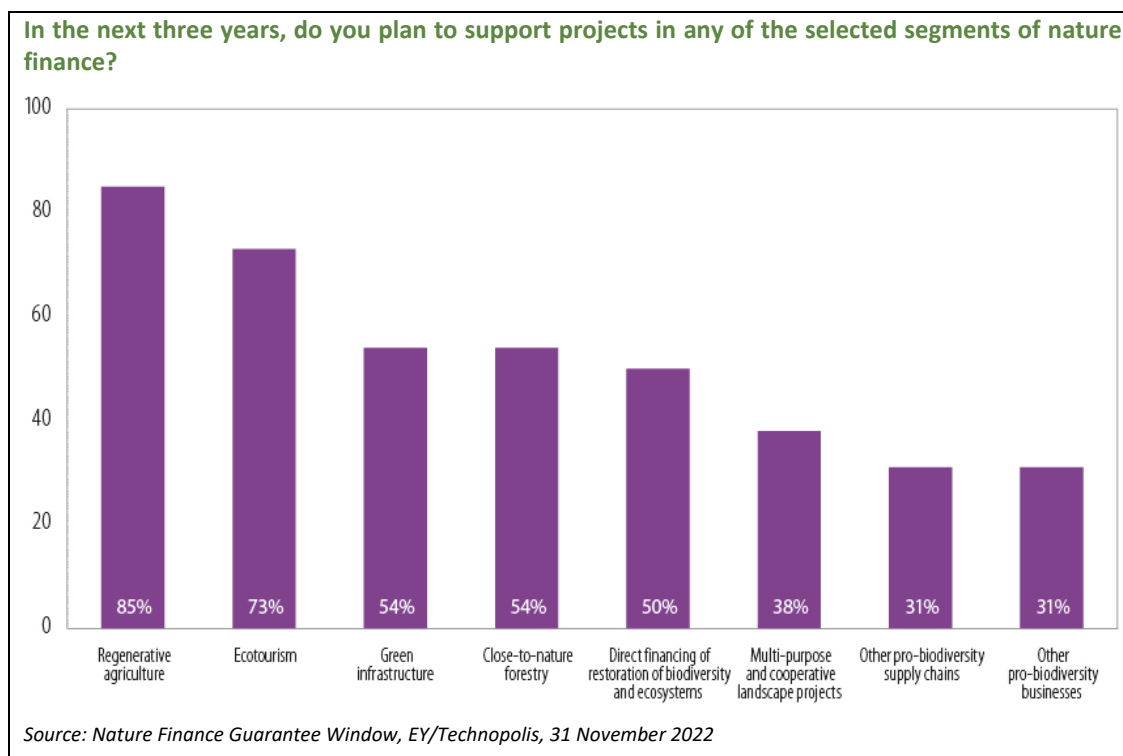


What was the typical size of a single project supported related to nature finance (in terms of total financial needs required by the project sponsors)?



What was the typical financing amount provided by your institution for an individual nature finance project?





Deal flow — eligibility criteria and coordination with grants

For sufficient deal flow and impactful projects, the financial offer must respond to the risk/return characteristics and facilitate the desired outcomes on the ground. Given the continued need for concessionality/grants, close coordination of grants and repayable finance will enable more efficient deal flow. If not coordinated at instrument level, the repayable financing instrument will experience an inefficient process of origination and development. Opportunities to integrate nature in more mainstream investing will also be missed. This also includes soft support such as technical assistance for all stages, from scoping to implementation.

The character of nature-based solutions is often such that multiple benefit streams need to be included in the overall economic assessment and financial structure for the solution to be considered viable. This will require appropriate flexibility in eligibility criteria (framed by strategies targeting the relevant EU policies):

- A “whole business” approach, allowing more strategic incorporation of nature into business models, able to leverage a broad range of motivations, sources of revenues and avoided costs, and the ability to present an integrated financing package including other policy areas.
- Elements necessary for creating high biodiversity strategies, such as land acquisition/sequestration when necessary and unavoidable for creating scale and ecological connectivity, or setting aside areas for nature conservation within land-based investment strategies.
- Where appropriate, simple SME and adapted innovation eligibility criteria for early-stage proposals.

Countries outside the European Union may also be considered (based on country eligibility criteria under Horizon Europe) in order to (1) include rich biodiversity areas acting as reservoirs for EU nature and migration routes, and (2) leverage the European Research Area to develop and integrate technology and data into nature-positive strategies and business models.

A brief review of some elements of InvestEU and comparison with the Natural Capital Financing Facility

The Natural Capital Financing Facility, reviewed in depth in this report, was designed as a market-based instrument able to provide a range of financial products. Although it was able to do much smaller

operations than the EIB would normally consider, it could not cater for the typically small projects. The majority of operations were below €5 million and there was significant demand for financing for even smaller projects.

After the Natural Capital Financing Facility pilot programme, the facility's eligibility criteria were carried over into the InvestEU programme, a comprehensive EU guarantee to enhance the risk-taking capacity of the EIB Group's own resources for various areas of financing. For its share in implementing the InvestEU programme, natural capital or nature-based solutions projects are subject to normal EIB operational policies, in particular a minimum size of financing operations of approximately €20 million.

The vast majority by volume of the InvestEU guarantee requires that normal credit risk procedures and full market pricing of risk be applied to operations, similar to the Natural Capital Financing Facility, in order to avoid market distortion. A small component of InvestEU, the so-called thematic window, allows a very high degree of risk coverage and a departure from normal risk approaches, but does not provide concessional financing per se. It is looking for risk-commensurate remuneration, albeit without a market benchmark in many cases because of the degree of innovation required for eligibility.

InvestEU as is therefore does not respond to the demand for concessionality that is often encountered in the nature space, nor is it able to support projects of the small typical sizes. It is also worth recalling that InvestEU operates behind EIB lending and only applies to a subset of this lending, being invoked in situations when (large) financing operations are beyond the normal risk appetite of the EIB. Biodiversity and nature-based solutions are generally not capital intensive enough to be the trigger, and much will be undertaken by public borrowers that are not the target of the InvestEU programme. Nevertheless, biodiversity and nature-based solutions are eligible under EIB lending in general and InvestEU specifically, so such components may nevertheless form part of larger projects benefiting from the InvestEU guarantee, although they will seldom be the entry point. In general, during early engagement, it is not known with certainty if and which guarantee instrument may ultimately be applied.

In the summer of 2022, a new Sustainability Guarantee was launched under InvestEU, with a broad set of sustainability-linked eligibility criteria, including nature-related investments. The broad scope of these criteria could potentially allow nature investments to be introduced more flexibly in synergy with other themes. For example, there may be synergies between energy efficiency and green infrastructure in buildings and the urban environment. It is likely that financial intermediaries, as well as end clients, will need improved metrics and technical assistance in order to benefit from specific themes such as nature. Support has been put in place for guidance on eligibility in the form of the Green Eligibility Checker (greenchecker.eib.org). Technical assistance is available through the so-called Green Gateway.

The market has not yet proven itself to be a significant factor for the replication and growth of investment in biodiversity and nature-based solutions, for reasons explored in depth in this report. Globally speaking, market forces are currently operating against these objectives. A substantial body of regulation and policies at EU level aim to rectify these dynamics, the effectiveness of which will become apparent in the coming years, as will the scope for commercial investment.

Other policy areas such as renewable energy have successfully been developed over decades with substantial public support including subsidies and guaranteed revenues. Ecosystems are key infrastructure for liveability and sustainable development and are well suited to similar approaches, if regulation, relevant subsidies, structures and data can be sufficiently developed.

Numerous financial instruments and grant sources exist throughout the European Union — including national instruments and foundations — that are relevant for biodiversity restoration and the expansion of nature-based solutions. However, such instruments are not coordinated.

Importantly, whereas for infrastructure and corporates there is a spectrum of instruments servicing different stages of development, with natural incentives for investors to finance the progression, such a concept has not yet emerged for biodiversity and nature-based solutions (with perhaps the exception of forest investment strategies based on asset appreciation). A shortage of sites dedicated to developing nature and biodiversity, high upfront costs, lack of revenues and potential for revenue growth, gaps in data, the long-term nature of investment and illiquidity all play a role.

A significant step for nature financing in the European Union would be to better coordinate financing instruments and to design a more complete financing spectrum for nature-based projects that could carry

concepts through from their early stages until they are able to access more regular sources of financing and more predictable revenues. Across the board there needs to be better coordination of repayable and non-repayable finance. A broader and more complete range of financing solutions and institutional expertise would provide opportunities to accelerate partnership models and solutions for future scaling. An illustration of a possible spectrum of instruments is shown in Figure 38 below within the framework of repayable EU finance, highlighting some key gaps.

At project level it would be beneficial to consider effective and efficient risk-sharing arrangements that can cater for the physical risks facing biodiversity and nature-based investments, in addition to the specific inherent developmental phases and uncertainties of natural processes, for example using insurance approaches and milestones for reduced risk.

Transformational finance for landscapes will need to address short-term revenue shortfalls. Effective risk sharing at portfolio level for emerging special purpose intermediaries will often need to go beyond regular pari-passu risk sharing to cater for the physical and market risks of natural capital and transformations, while maintaining alignment of interest among all parties.

In parallel to an enhanced financial ecosystem there needs to be a corresponding range of advisory services responding to the needs of nature-based solutions projects at different stages. Technical assistance will be needed in the following instances, among others:

- Seed grant/technical assistance, including funding for existing expert teams on the ground/close to communities
- Financial structuring advisory for carbon finance/ecosystem payments
- Development of integrated ecosystem and financial models to support landscape/multi-sectoral strategies and outcome-based risk sharing
- Process guidance and advisory to accompany proactive dialogue with promoters for mainstreaming
- Capacity building for financial institutions and assistance to end borrowers
- Long-term assistance partnerships with region and, cities for landscape-level project development, drawing in climate adaptation, nature and the circular economy
- Long-term monitoring of biodiversity impact and the performance of nature-based solutions.

For new dedicated instruments to truly catalyse large-scale action, more effort will be needed to make regulation effective in increasing protection, driving investment and mandating new revenue streams, similar to other environmental sectors providing public goods.

Regulation to reduce barriers to innovative cooperation, for example in areas of overlap or gaps between the responsibilities of different public entities, would also help to make nature-based solutions more widespread. For landscape-level/multi-benefit projects involving several sectors and implementing entities, it may be beneficial to explore the creation of new regulated structures to facilitate governance, financing and implementation, with direct access to complementary subsidies or guarantees. Investing in data infrastructure for nature will provide a new and effective tool for project development and accountability, catalysing new investment and the entry of new investors.

Scaling actions and investment in ecosystem health and nature restoration will depend on political will to repurpose or set aside land, and making land use more efficient (e.g. when used for food production). There also needs to be a reform of subsidies currently creating an uneven playing field for sustainable business models and new entrants. These are significant bottlenecks to scaling today.

An important aspect for designing future instruments over the medium term will be to consider how to efficiently manage and spread risks of an accelerated scaling strategy against the regulatory and market uncertainties, as well as physical risks. The long-term nature of investing in nature may sequester significant resources for funding gaps and de-risking at scale. Further work can be done as market volume increases to explore natural points of stepping down risk coverage and possible warehousing (holding projects with a view to passing them on at a later stage) and refinancing to enable the recycling of funding and to address the illiquidity of many investments.

Figure 38 — Spectrum of potential instruments for biodiversity and nature-based solutions

Towards a spectrum of instruments for biodiversity and nature-based solutions

High risk, pre-bankable	High risk, pre-bankable with possibility to remunerate risk, but few comparable market instruments	Low/medium risk, bankable
Concessionary Full risk coverage of instrument Operational costs fully subsidised €0.5 - €7.5m	Non-concessionary Full risk coverage of instrument > ca. €15-20m	Non-concessionary No/partial risk coverage of instrument Large projects
<p>Gap in financial offering: “European Landscape Accelerator”</p> <p>Dedicated instrument for small, innovative and early-stage projects:</p> <ul style="list-style-type: none"> • Innovative partnerships (public and private) • Leveraging of nature and sustainability tech and data solutions • Special purpose aggregators <p>Dovetailed with EU grant ecosystem, including seed funding compartment (< 0.5m).</p>	<p>InvestEU Thematic</p> <p>Enterprises with replicable innovative technologies and business model innovation. Possibility for integrating multiple sustainability paradigms (natural capital, circular and bioeconomy, climate mitigation and adaptation).</p> <p>Aggregators for smaller schemes in land-based sectors with high market risk, but able to remunerate risk.</p>	<p>Own risk, InvestEU General Debt Biodiversity and nature-based solution eligibility criteria and taxonomy alignment included in large financing operations.</p> <p>Mainstreaming in the public and corporate sectors, and possible tailoring of financial terms for specific components.</p> <p>EU Sustainability Guarantee for financial intermediaries with broad eligibilities.</p>
	<p>Gap in financial offering: “Nature Blending Facility”</p> <p>Grants linked to large lending.</p>	

To fill these gaps and opportunities, some concepts for further consideration are listed below. They aim to complement existing EIB/European Commission/InvestEU instruments:

“European Landscape Accelerator”

- Fully subsidised instrument providing small amounts of concessionary financing (< €7.5 million);
- Both direct and intermediated operations
- Building on experience from the European Innovation Council fund (for innovation) in terms of inherent proximity to grant instruments, creation of an accelerator platform and sharing knowledge, as well as separate management and governance
- Ability to provide a broad range of financial products, learning also from impact financing: self-liquidating equity-like debt, outcome-based financing, embedded insurance-like features/guarantees, etc. (equity is typically not suitable for nature projects or cooperatives, but can be applied to small corporates)
- A complementary seed financing facility to support early-stage project/enterprise teams
- An accelerator environment in partnership with experienced NGOs with long-term presence on the ground, and leveraging the European Research Space for sustainability tech
- Based on the level of demand experienced by the Natural Capital Financing Facility and organic growth, initial funding of €200 million to €300 million, with an option for replenishment
- Separate governance, open to key partners, with own eligibility framework and procedures.

“Nature Blending Facility”

- A pool of grant resources, possibly also for use as direct guarantees, for streamlined deployment alongside standard EIB/InvestEU financing
- Streamlined approval and deployment together with EIB operations
- Potentially large grants for flagship projects.

Expanding mainstreaming and “linked operations” for the corporate and public sector

- Extended engagement with promoters to explore awareness of nature risks and opportunities for nature-positive actions
- Creation of a body of best practices for promoters willing to engage
- Offer of technical assistance from development to implementation
- Based on the experience of the Natural Capital Financing Facility with linked operations, opening up the possibility for targeted use of guarantees/grants to tailor financial terms for embedded

nature-based components (e.g. concessionality, longer tenors/grace periods commensurate with transformation/restoration)

- Streamlined with the appraisal, approval, negotiation and reporting process for larger financing operations.

Appendix 1: Interviews performed

Investors and experts			
	Category	Investing in EU nature-based solutions?	Assets under management ¹²⁶
1	Asset manager	YES	€1bn
2	Asset manager	YES	€1bn
3	Asset manager	YES	Undisclosed
4	Asset manager	YES	€200m
5	Asset manager	YES	€5bn
6	Asset manager	NO	> €100bn
7	Asset manager	YES	> €200bn
8	Asset manager	NO	€200m
9	Banking institution	NO	> €1tn
10	Banking institution	NO	> €1tn
11	Banking institution	NO	>€500bn
12	Banking institution	NO	> €5bn
13	Banking institution	YES	> €500bn
14	Development finance institution	NO	€1bn
15	EU agency	NO	N.A.
16	EU Member State finance ministry	YES	Government budget
17	Foundation	YES	Undisclosed
18	Impact investor	YES	€5bn
19	Insurance company	YES	> €500bn
20	Insurance company	YES	> €100bn
21	Insurance sector representative	NO	N.A.
22	Inter-governmental agency	NO	N.A.
23	Inter-governmental agency	NO	N.A.
24	Nature-based solution consultant	NO	N.A.
25	Nature-based solution data experts	NO	N.A.
26	Nature-based solution consultant	NO	N.A.
27	Nature-based solution consultant	NO	N.A.
28	Nature-based solution consultant	NO	N.A.
29	Nature-based solution consultant	NO	N.A.
30	Nature-based solution consultant	NO	N.A.
31	Nature-based solution knowledge institute	YES	Undisclosed
32	NGO	NO	N.A.
33	NGO	NO	N.A.
34	NGO	NO	N.A.
35	Non-profit	NO	N.A.
36	Research institute	NO	N.A.

Nature-based solution project managers		
	Sector of operations	Financing source
37	Multiple sectors	N.A.
38	Forestation	Horizon 2020; national subsidy; municipal grant
39	Climate resilience	60% EU LIFE funding; municipal grant
40	Climate resilience	Multiple grant funding
41	Multiple sectors	Horizon 2020; government funding
42	Urban nature-based solutions	Horizon 2020; ICRA (regional funding)
43	Forestation	Not disclosed
44	Climate resilience	Arcadia, a charitable private fund
45	Biodiversity	Horizon 2020; municipal funding
46	Marine conservation	Horizon 2020
47	Urban nature-based solutions	Horizon 2020
48	Water management	Horizon 2020
49	Multiple sectors	Horizon 2020
50	Urban nature-based solutions	Horizon 2020; municipal funding
51	Multiple sectors	Horizon 2020
52	Climate resilience	Horizon 2020
53	Water management	Horizon 2020
54	Forestation	Horizon 2020
55	Urban nature-based solutions	Horizon 2020; municipal funding
56	Water management	Horizon 2020
57	Agriculture	Horizon 2020
58	Habitat conservation	Foundation grant funding

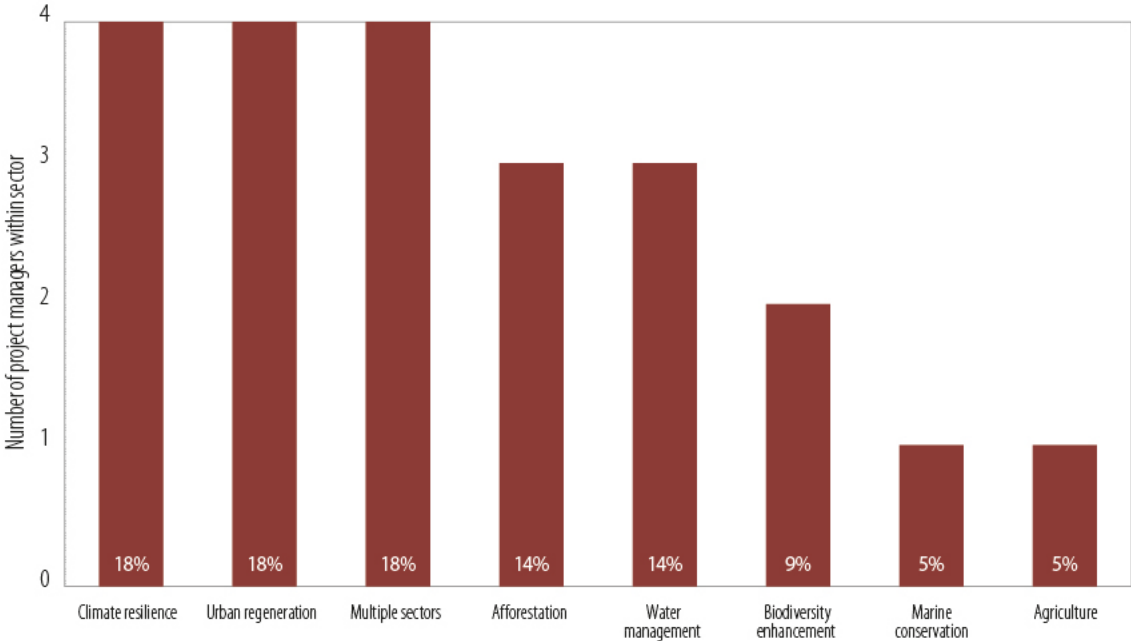
Appendix 2: Nature project managers interviewed

This appendix provides an overview of the 22 project managers interviewed based on different criteria, such as the sector of operations, financing source(s), and years since start of activities.

This category of interviewees includes both standalone projects such as the ones selected by Horizon 2020 for its grant and research funding, and projects promoted by long-established companies.

This overview will help to better understand what portion of the market has been utilised and put the collected data into perspective.

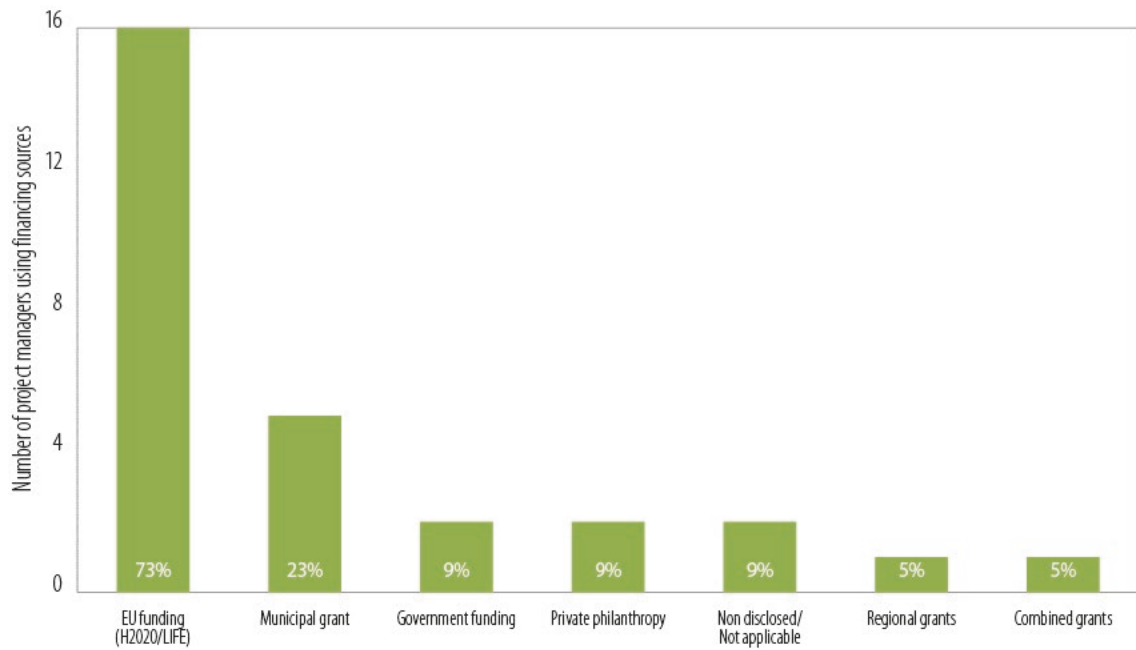
Figure A.2.1 — Sectoral division



Source: BwB

Figure A.2.1 shows that, in terms of the sectors in which the interviewees operate, the largest three among the interviewee pool are climate resilience and urban regeneration (both 18%) followed by afforestation (14%). There are eight sectors, with a rather even split among the different sectors for nature-based solutions.

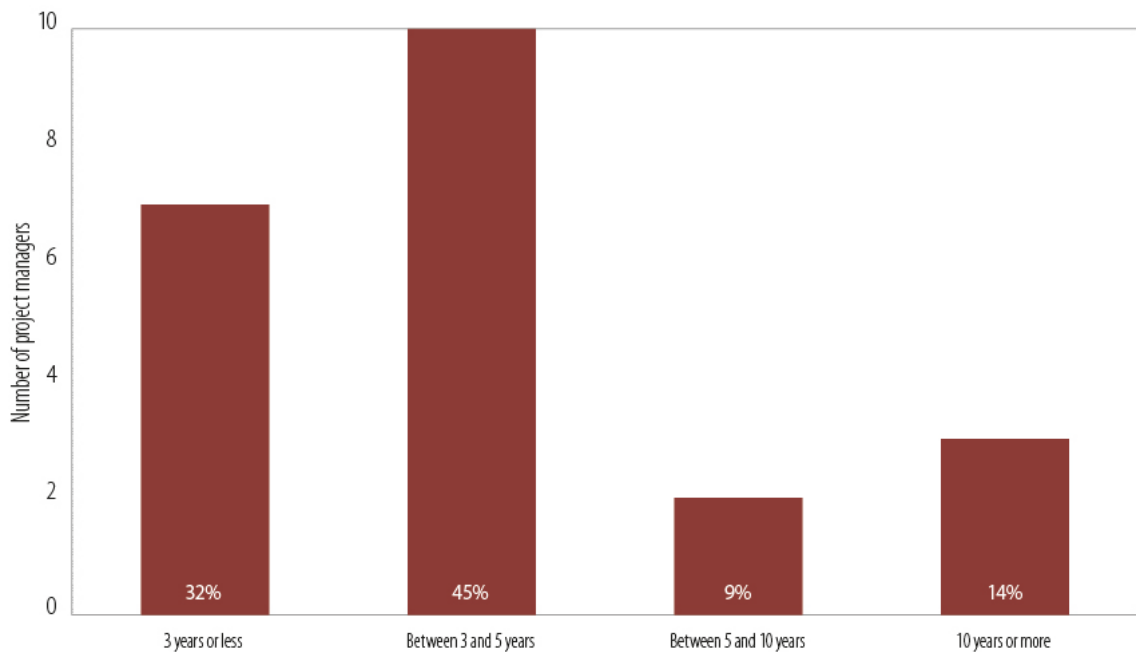
Figure A.2.2 — Breakdown of financing sources²²⁰



Source: BwB

As can be seen in Figure A.2.2, the vast majority (90%) of disclosed financing sources of the nature-based projects interviewed come from public sources. Among these, most of them have received funding from the European Union, either through the Horizon 2020 programme or EU LIFE, while municipal grants represented the second largest source of funding.

Figure A.2.3 — Years in operation



Source: BwB

²²⁰ The percentages do not add up to 100 because a single project can make use of several funding sources at once.

When it comes to the years in operation of the nature-based projects, as illustrated in Figure A.2.3, 77% of them have been established for no longer than five years (no earlier than 2016), while only 14% are part of long-established company initiatives dating back more than ten years.

This figure supports the argument that there is value in committing resources to a sustained increase and interest in the creation of early-stage nature-based projects. This will provide a pool of projects that are either approaching or should theoretically be approaching an expansionary phase, to grow and to become suitable for traditional debt instruments or equity rather than subsidies and public funding. The outcome of the interviews, however, contradicts this point.

Appendix 3: Survey and response summary

Response count	
Total respondents	117
Complete answers	35
Partial answers	82

Survey questions		Number of responses
1	What type of investment organisation do you work for?	52
2	What is the overall amount of your company's managed/deployed assets?	50
3	Does your company invest in nature-based solutions (NBS)?	
4	If yes, how many NBS projects does your company/institution finance each year as a proportion of its overall investments?	
5	What percentage of your annual investments do you think your company will allocate to NBS projects over the next 12-24 months?	30
6	Approximately how much, on average, has your institution invested in each NBS project?	
7	Which NBS sectors do/did your institution invest in the most? (Select up to two)	24
8	Which NBS ecosystems/sectors do you expect to be more popular and/or profitable in the future? (Select up to two)	
9	At what stage of investing of the NBS project did your company participate the most?	28
10	At what investment stage do you believe the funding of NBS projects could be the most effective?	
11	Where were the projects you financed mostly located?	
12	What was the average duration of the projects you financed?	
13	Which investment vehicles do you currently use to finance NBS?	24
14	Which investment vehicles do you expect to be used more in the NBS market in the next 12-24 months?	
15	Which investment vehicles do you expect to be used less in the NBS market in the next 12-24 months?	
16	In general, which type of financial instrument provides the best investment performance and advantages?	
17	Which one of the following issues do you consider the main obstacle to investing in NBS solutions?	37
18	What do you consider the main driver when investing in NBS solutions?	
19	What do you consider to be the single major risk?	
20	Do you believe that the opportunities and potential of NBS have been overlooked so far?	35
21	Do you think that financing NBS projects at an earlier investment stage could support further development of the field?	
22	Do you believe that NBS could become more bankable?	
23	Are you aware of the number/type of NBS projects currently being developed or funded at EU level?	37
24	What do you estimate the total annual deal size of NBS projects at the EU level to be? (in €)	6
25	Do you believe a specific continent or geographic area is most likely to make successful use of NBS projects in the future?	37
26	Which one?	18
27	What key factor would allow you to increase the frequency or the size of your investments in NBS projects?	37
28	What do you anticipate the potential growth of the EU NBS ecosystem to be over the next decade?	

Appendix 4: Criteria for assessing financing instruments

Standardisation capacity. When handling a large number of requests for funding, the existence of a standardised approach applicable to all candidates can improve the efficiency of capital deployment and support emerging sectors' growth.

Ease of implementation. In terms of deployment, it is crucial to consider difficulty of structuring. This includes ease of implementation and the level of due diligence and monitoring required.

Complexity. The harder it is to issue an instrument, the slower capital will be deployed for incoming projects. An assessment of each instrument will therefore be provided based on the tasks required to make it fully operational.

Forward or backward-looking: This indicator shows which financing instruments rely exclusively on data that are already available (track record) to determine the overall cost of financing, or whether they also take into account future performance such as KPI-related instruments.

Frequency. In order to provide a benchmark of the most common instruments at the EU level, a scale from "very low" to "very high" is used to rank the instruments. Given the lack of comprehensive datasets that include both public and private funding, the study makes use of estimates relying on data provided by respondents alongside the publicly available data and the dataset presented in the first section of this report. Bearing this in mind, the scale can be estimated to follow these criteria: very low (less than 1% of overall EU-funded projects), low (between 1% and 5%), medium (between 5% and 10%), high (between 10% and 30%), very high (more than 30%).

Effects on the nature-based solutions market. To provide a comprehensive overview of the effects of selecting a financing instrument over another in the long run, the insights collected through the market intelligence on nature-based solutions research will be shared through this indicator.

Investing in nature-based solutions

State-of-play and way forward for public
and private financial measures in Europe



InnovFin
Advisory