SUSTAINABLE FINANCE LAB

FROM NATURE TO FINANCE

Reversing the funding gap narrative

In this paper

The main narrative to finance nature is to mobilise private capital to close the global nature funding gap. This overlooks three characteristics of nature: nature's value is multifaceted, nature is local and its loss is largely irreversible.

Finance instruments proposed to close this gap have not scaled. They try to fit nature to the instrument: making its benefits excludable, treating places as substitutes and financing restoration while loss continues.

We flip the narrative: instead of asking what nature must become to fit the instrument, we start from nature's three characteristics and derive guidelines that any instrument or mechanism should follow to protect nature effectively.

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POLICY PAPER

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Sustainable Finance Lab (SFL) is an independent academic think tank committed to a stable and robust financial sector that serves people and planet. Its network of professors works with researchers and professionals from various disciplines and institutions. Through research and advocacy, SFL drives the systemic changes in the European financial system needed to accelerate the transition to a sustainable economy.

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> This is a Policy Paper. Policy papers are reports produced by SFL members or employees that contain specific proposals and recommendations for the financial sector or policy makers.

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SUMMARY

Nature loss is accelerating. Policy is converging on one response: mobilise private capital to close the global nature funding gap. This narrative shapes national biodiversity finance, the EU roadmap towards nature credits and the agenda of COP17 in October 2026.

Yet the nature finance instruments this narrative relies on remain small. Private finance supplied only US$23 billion of the US$220 billion for nature-based solutions in 2023 (UNEP, 2026). The usual explanation is market immaturity. We argue that the problem lies deeper. The three elements of the narrative - 'private capital', 'global' and 'funding gap' - each overlook a characteristic of nature.

1. **Nature is multifaceted.** Nature provides different goods that each have a different economic character. They can be distinguished by two questions: can people be excluded from using it (excludability); and does one person's use reduce what is left for the other (rivalry)? Although some goods are suited for trade, non-excludable goods like common-pool resources and public goods are not. Nature finance instruments need someone who pays, and for these goods there is no one. They therefore create a tradable unit, lean on public money, or finance only the excludable part.

2. **Nature is local**. Each ecosystem is a distinct combination of species, history and conditions specific to a place, so a hectare of habitat in one place is rarely a substitute for a hectare elsewhere. Yet nature markets need interchangeable units to scale, so they declare places equivalent by methodology.

3. **Nature loss is irreversible.** Extinction is permanent, and beyond tipping points, ecosystem recovery is slow and uncertain. This means avoiding harm should come before restoration. Yet financial innovation focuses on restoration and offsetting, while US$7.3 trillion still flows to nature-negative activities (UNEP, 2026).

Overlooking these three characteristics is not an implementation problem that better data will solve. It follows from an order of reasoning that starts with the instrument and asks what nature must become to fit it. We flip the narrative: we start from the three characteristics of nature and ask which guidelines follow from each (see figure below). These guidelines can serve as a test for any instrument or mechanism aimed at protecting nature.

Figure E.S. 1. Guidelines for nature finance

Source: Adapted from Chapter 4. Authors' own.

Together, these guidelines point to two shifts:

From markets to places. Because nature is local and multifaceted, the unit that makes sense is a place and everything it produces, not a tradable unit abstracted from it.

From a public–private dichotomy to collaboration around a place. Many of the guidelines concern the management of the commons, governance and coordination, which no actor can supply alone.

Four questions make these shifts practical. What is the landscape, and where are its boundaries? What features and functions of nature are present here? What are the main drivers of harm? Who is involved, and in what way? Only then does the financing question arise, and the

answer is usually several finance and governance arrangements at once.

Success should be measured not by how much capital has been mobilised, but by whether the drivers of nature loss are weakening.

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ABBREVIATIONS AND GLOSSARY

List of abbreviations

AEWA	Agreement on the Conservation of African-Eurasian Migratory Waterbirds
BBB	BoerBurgerBeweging
BNG	Biodiversity Net Gain
CAP	Common Agricultural Policy
CBD	Convention on Biological Diversity
CO_2	Carbon dioxide
COP (COP17)	Conference of the Parties
DNB	Dutch Central Bank (De Nederlandsche Bank)
EBA	European Banking Authority
ECB	European Central Bank
ESG	Environmental, social and governance
EU	European Union
EUR	Euro
FATF	Financial Action Task Force
ICMA	International Capital Market Association
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPLCs	Indigenous Peoples and Local Communities
IUCN	International Union for Conservation of Nature
NGFS	Network for Greening the Financial System
OECD	Organisation for Economic Cooperation and Development
PBL	PBL Netherlands Environmental Assessment Agency (Planbureau voor de Leefomgeving)
PES	Payment for ecosystem services
SFL	Sustainable Finance Lab
UNEP	United Nations Environment Programme

UNEP FI	UNEP Finance Initiative
US$	United States dollar
WWF	World Wide Fund for Nature

Glossary

Nature	We follow the IUCN definition of nature as encompassing both the non-living components, and the living components of the natural world (IUCN, 2025). Definitions differ. Many frameworks, such as IPBES, put the emphasis on living nature and use 'nature' and 'biodiversity' almost as synonyms. We use 'nature' for the system that is financed, damaged and restored, in all its complexity. That system includes soil, water and land, which is why Figure 2 lists groundwater and land alongside species. Where we cite policy frameworks or studies that use 'biodiversity' (the CBD, national biodiversity finance plans, public biodiversity spending), we keep their terminology, and in those passages the two terms overlap.
Biodiversity	Following the Dasgupta Review, we use 'biodiversity' for the diversity of life on Earth. It is a characteristic of ecosystems, not an asset in itself (Dasgupta, 2021). The term has no single agreed meaning. The legal definition in Article 2 of the CBD covers diversity within species, between species and of ecosystems. We use 'biodiversity' when we refer specifically to the living part of nature or its variety at genetic, species and ecosystem level.
Ecosystem	We use 'ecosystem' for a specific system in a specific place. We follow the CBD, which defines an ecosystem as "a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit" (Convention on Biological Diversity, 1992).
Ecosystem Services	Following the Dasgupta Review, we use 'ecosystem services' for the flows of goods and services that nature provides to people, such as clean water and pollination. We also call these 'benefits' (Dasgupta, 2021). The term is anthropocentric. It describes nature

	by what it does for people and captures only its instrumental value, not its relational or intrinsic value (IPBES, 2022). We therefore use 'ecosystem services' only where the analysis requires it, as when we classify what nature provides into types of economic goods (Chapter 1, Figure 2), or where we cite sources and instruments that use it, such as payments for ecosystem services. Elsewhere we speak of nature. We call the underlying stocks, such as land or aquifers, 'features' of nature.
Nature finance	We use 'nature finance' as an umbrella term for the debate and practice around financing and nature. It covers all public and private financial flows that protect, restore or harm nature, and the policies and instruments that steer them. It therefore includes both what Carter et al. (2026) call 'financing green', finance for conservation and restoration, and 'greening finance', aligning the financial system so that it stops financing harm. When we mean the narrower set of instruments that must repay investors, we write 'nature finance instruments'.
Nature finance instruments	We use 'nature finance instruments' for financial instruments that aim to protect or restore nature and must repay investors with a return. This covers two groups of instruments (Carter et al., 2026): (1) instruments that raise money up front, such as loans, bonds, equity and impact funds; (2) instruments that generate revenue from nature outcomes, such as credits and offsets. It also covers the private share of blended finance. It excludes public payment, philanthropy and most payments for ecosystem services, which are largely subsidy-like public payments. See the technical explanations of the instruments we discuss throughout this paper in the Appendix.
Nature markets	We use 'nature markets' for markets in which units of nature, such as credits, offsets and Biodiversity Net Gain units, are traded and priced by supply and demand.

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INTRODUCTION

The Slender-billed Curlew was a peculiar bird. With its long, pointed beak it hunted insects and small crabs in the wetlands of Eastern Europe. In the European winter it migrated thousands of kilometres to the Mediterranean and Northern Africa. Small numbers even wintered in the Netherlands, in the Zuiderzee, before the area lost its maritime connection when the *Afsluitdijk* ('closure dyke' in English) was built (Jukema & Piersma, 2004). Once common, its last sighting was more than 30 years ago. It was declared extinct in 2025 (AEWA, 2025; Buchanan et al., 2025).

The fate of a particular European wetland bird may not keep us awake at night; species have always gone extinct. Yet the current rate is tens to hundreds of times the average of the past ten million years, and it is accelerating (IPBES, 2019). Ecosystems are losing resilience. This often happens with little visible change, until they pass a tipping point and shift into a different state that is hard to predict in advance (Boerlijst et al., 2013; Scheffer et al., 2001). The loss of ecosystems is also an economic problem, because nature is the foundation for much economic activity. For example, 75% of corporate loans by euro area banks go to companies that are highly dependent on at least one ecosystem service (Boldrini et al., 2023).

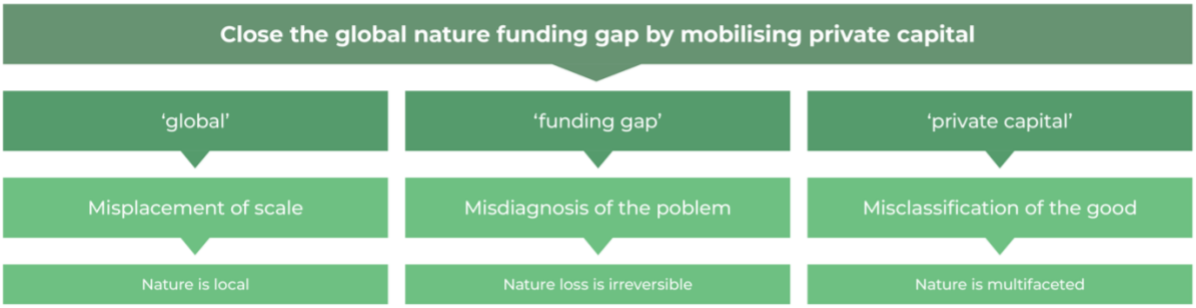
The dominant response is to close the global nature funding gap. Deutz et al. (2020) estimate that gap at around US$700 billion a year. Because public budgets are seen as constrained, the response is that private capital must be mobilised to fill this gap (European Commission, 2025; World Bank Group, 2020).

This framing steers policy on national and international levels. In 2022, the Parties to the Convention on Biological Diversity (CBD) adopted the Kunming-Montreal Global Biodiversity Framework (KMGBF). Target 19 of the Framework commits parties to "leveraging private finance, promoting blended finance [...] and encouraging the private sector to invest in biodiversity, including through impact funds and other instruments", and to "stimulating innovative schemes such as

payment for ecosystem services, green bonds, biodiversity offsets and credits" (Convention on Biological Diversity, 2022).[2] Countries are drafting national biodiversity finance plans that estimate a gap and select nature finance instruments to close it (Convention on Biological Diversity, 2025), and the European Commission is preparing a market for nature credits (European Commission, 2025). The 17th Conference of the Parties to the Convention on Biological Diversity (CBD COP17) happening in October 2026 in Yerevan, Armenia, reviews progress on the Framework for the first time, with resource mobilisation as a central agenda point.

This paper examines the funding gap narrative, which combines a scale (global), a diagnosis (a funding gap) and a solution (private capital) into one storyline. Our assessment is that each part overlooks an important characteristic of nature (Figure 1).

Figure 1. What the funding gap narrative overlooks



Source: Authors' own

First, 'private capital' misclassifies the good (Chapter 1). Nature is multifaceted. Different types of economic goods come from the same place. For example, a forest provides private goods (timber), common-pool resources (groundwater regulation), public goods (clean air) and club/toll goods (ecotourism). Each type of good calls for a different way of finance and governance. Private markets work for private goods. Most of what nature protection and restoration provides, however, is non-excludable. Nature markets try to make nature excludable by turning it into tradable credits. Their recurring failures, from weak demand to unverifiable additionality, follow from that attempt, not from an immature market that better data will fix.

Second, 'global' misplaces the scale (Chapter 2). Nature is local. Each ecosystem is a distinct combination of species, history and conditions, and much of what lives in it has not yet been described. A hectare of habitat in one place is therefore not simply a substitute for a hectare elsewhere. Fungibility is a matter of degree: it

[2] Apart from payments for ecosystem services, which are mostly public payments, these are what we call nature finance instruments: financial instruments that aim to protect or restore nature and must repay investors with a return (see Appendix).

roughly holds for common, regenerating habitat, but not for a unique wetland or an endemic species. Most nature markets need interchangeable units to scale, so they flatten these differences. Underneath this lies an asymmetry: capital is mobile, and most living things are not (Wiart, 2026). Nature markets bridge that gap by declaring a loss in one place equivalent to a gain in another.

Third, 'funding gap' misdiagnoses the problem (Chapter 3). Much nature loss is irreversible. Ecosystem recovery, where possible, takes long and is uncertain beyond tipping points. Because of this, avoiding harm comes before new finance for restoration. In 2023, US$7.3 trillion flowed to nature-negative activities, US$4.9 trillion of it private and US$2.4 trillion in public subsidies, against US$220 billion to nature-based solutions (UNEP, 2026). The problem is not a shortage of capital, but capital flowing in the wrong direction.

This paper makes two contributions. Chapters 1 to 3 are diagnostic: each takes one characteristic of nature and shows why current approaches to nature finance fail to account for it. Chapters 4 and 5 are constructive. Chapter 4 derives guidelines for public and private actors from these characteristics of nature. Chapter 5 shows that, together, these guidelines point to two shifts: from markets to places, and from a public–private dichotomy to collaboration around a place. This reverses much of the current debate.

1. NATURE IS MULTIFACETED

When people think about nature, they often think about biodiversity. But the term 'biodiversity' is highly ambiguous and used in many ways. It was coined by Walter Rosen, who said he took the 'logical' out of 'biological' to leave room for emotion. The scientists who built the concept shared no definition, nor agreed that one was needed (Takacs, 1996). The legal definition that followed did not make things clearer: Article 2 of the CBD defines biological diversity as the variability among living organisms from all sources, including diversity within species, between species, and of ecosystems (Convention on Biological Diversity, 1992, Art. 2). The ambiguity of the term is appropriate: no single definition could embody the whole meaning of biodiversity. But a word that means everything can be made to mean anything, and that is where the problems begin.

In practice, the meaning of biodiversity is increasingly filled in by the requirements of financial instruments rather than by ecology. A nature credit, for instance, is a tradable certificate representing verified, measurable and lasting positive outcomes for nature (Fiore & Grabbe, 2025). For it to work, that aspect of nature itself must be verifiable, measurable, lasting and tradable. That may fit some aspects of nature, but, as the following chapters argue, not all of it.

A forest supplies timber that can be sold as a private good. But it also supplies public goods, such as clean air, that no one can be excluded from. This chapter explains what goods arise from nature. A single ecosystem consists of several types of goods at once, and the type of good determines who can pay for it and how it can be governed.

Why there is no one-size-fits-all financing solution

Nature is what it is made to be by the ones who fill in the meaning. The question then is what needs to be financed. What kind of economic good would it be? The economics literature has a long history of sorting activities along different

dimensions. Samuelson (1954) distinguished private goods, which can be divided among individuals, from public goods, which all "enjoy in common": one person's consumption does not subtract from anyone else's (p. 387). For public goods, no market price can determine how much should be provided, because each person has an interest in pretending to value the good less than they do. Their provision is therefore a matter of public expenditure. This is based on the concept of 'rivalry', where one person's consumption does, or does not, diminish another person's consumption. Buchanan (1965) added club goods, where the good is 'excludable' (i.e. access can be restricted) but the good itself is shared. Ostrom and Ostrom (1977) named the fourth case, the common-pool resource, from which exclusion is difficult, but where each person's use does subtract from what is left for the rest.

Together these give two axes: whether people can be excluded from using a good (excludability), and whether one person's use subtracts from another's (rivalry). Crossing them produces four types: private goods, club or toll goods, common-pool resources, and public goods. Nature, in all its complexity, runs across all four.

Figure 2 maps the benefits of nature into these four types of goods. The rows show whether people can be excluded from using a benefit (excludability); the columns show whether one person's use reduces what is available to others (rivalry). We can think of the goods that a forest provides as a primary example. Timber is a private good (top left): it can be sold only to those who pay, and timber used by one buyer is not available to another. Ecotourism is a toll or club good (top right): access can be restricted to paying visitors, but one visitor does not use up the forest for the next. Groundwater is a common-pool resource (bottom left): it is difficult to stop people from extracting it, but what one user extracts is no longer available to others. Clean air is a public good (bottom right): no one can be excluded from it, and one person's use does not reduce it for others. Figure 2 gives further examples of each type.

Figure 2. Map of features and functions of nature across economic good classification

	Rival	Non-rival
Excludable	**Private goods** Timber, honey, spices, medicinal plants	**Toll / club goods** Gated ecotourism access, patentable information from nature, bio-mimicry insights

	Common-pool resources	Public goods
Non-excludable	Groundwater, land, habitat, open fish stocks	Clean air, pollination, water purification, pest control, climate regulation

Sources: Adapted from Ostrom and Ostrom (1977), Fisher et al. (2009), and Gatzweiler (2006).

The upper half of Figure 2 shows the goods people can be excluded from. These can be sold or charged for. The lower half shows the goods no one can easily be excluded from. These are hard to charge for. Only part of what nature provides sits in the upper half of the figure, and it depends on the lower half: timber needs soil and water, and crops need pollination.

The boundaries between the types of goods are not fixed. Fisher et al. (2009) note that features shift between categories as conditions change: a good can go from non-rival to rival, and even excludable, as it becomes scarcer. Pollination is an example. Wild pollinators are getting scarcer as monoculture is creating excessive demand (Aizen & Harder, 2009). Consequently, in Californian almond orchards, growers hire honeybee colonies, and pollination has become a private market (Goodrich, 2019).

In the almond orchards, pollination became excludable because wild pollinators became scarce. Exclusion can also be created deliberately. Creating tradable rights to the groundwater under a forest, for example, would move it from the bottom left to the top left of Figure 2. Currently, this is read as an opening: if non-excludability is a technical obstacle, then better metrics, data and property rights should be able to move features of nature from the bottom half (non-excludable) into the upper half (excludable), where markets work. The downside is that manufactured exclusion does two things. First, it requires an owner, which redistributes claims over land and water that others usually already use and manage. Indigenous Peoples and Local Communities (IPLCs) hold tenure or land rights over more than a quarter of the world's land surface, intersecting around 40% of terrestrial protected areas and ecologically intact landscapes, frequently without formal legal title (Garnett et al., 2018). Second, a boundary has to be drawn. Harm that is prevented inside the priced site moves to land just outside it, also known as 'leakage'. A project can deliver every unit it promised while total forest loss is unchanged (West et al., 2023).

What existing markets leave out

Markets already exist for the goods in the top-left box, the private goods, and for these they work: timber, fish and crops can be owned, priced and traded. The problem is not these markets themselves, but what they leave out.

First, damage is not priced. Producing a private good often harms the goods in the bottom half of Figure 2. A mine can pollute the groundwater around it, and timber extraction can require roads through intact, protected forest. Because the mine and the sawmill do not depend on that water or forest to keep operating, nothing in the market makes them pay for the loss. These are negative externalities: costs that fall on others.

Second, benefits are not priced. Farming needs clean water, healthy soil and pollination, but markets use these as free inputs, so nothing in the price signals a need to maintain them. Nature also provides benefits outside any production process, such as flood protection, health and recreation, which no price captures. These are positive externalities: value received without paying for it.

Together, they form a double externality: the damage is not charged, and the benefits are not rewarded.

Manufacturing markets for non-market goods

When value can be extracted from common-pool resources, there is a constant danger of overuse: the tragedy of the commons (Hardin, 1968). This happens when no rules govern extraction, or when markets rely on a benefit of nature that is neither acknowledged nor accounted for.[3] Ostrom (1990) showed that communities can and often do govern such resources collectively, without either privatisation or state control.

One response to the gaps in accounting for the benefits of nature is to bring the missing goods into the market by moving parts of the bottom half into the upper half of Figure 2. If a benefit can be measured, owned and sold, it can in principle be priced like any excludable good. This is what is usually meant by ‘market creation’. For some goods, market creation works: access to a nature reserve or a coral reef can be restricted to visitors who pay an entry fee, turning it into a toll good. For other goods it does not: a wetland that protects surrounding land from flooding protects everyone downstream, and no one can be excluded from that protection, whether they pay or not.

The result is not only the redistribution of claims and the leakage already described in the first section, but the wider set of failures in Figure 3. Five failures recur. Demand is weak, because a large part of nature is non-excludable, so those who benefit have no reason to pay. Additionality is hard to prove, because it requires knowing what would have happened without the project. Measurement narrows nature to what can be counted, because a standard metric captures one attribute and leaves out the rest. Property rights are often unclear, because much of nature

[3] Natural capital accounting tries to make such benefits visible by recording natural assets and the ecosystem services they provide in a way that links to national accounts (Ruijs et al., 2018; United Nations et al., 2024).

lies on land under customary or contested tenure. Lastly, durability is limited, because investors need an exit within a few years, while recovery, as Chapter 3 shows, takes an uncertain and often long time.

Figure 3. Recurring failures of nature finance instruments

Critique	Why it does not fit a private market	Evidence
Demand-side constraints	Nature finance instruments need someone who pays: a buyer, an outcome payer or project income. A large part of nature is non-excludable, so beneficiaries have no reason to pay.	Offset nature markets created by regulation received an estimated US$11.7 billion in 2022, against US$8 million reported to date for voluntary nature credits, whose demand drivers remain unclear (Carter et al., 2026). Impact bonds are usually repaid by an outcome payer from the public or civil sector, not by a private buyer (Carter et al., 2026). Where private demand falls short, blended finance uses public or philanthropic money to stand in, yet one biodiversity-focused private equity firm still required a mean return of 11.9% on blended deals, against 14.7% without support (Carter et al., 2026).
Non-additionality	Nature finance instruments need a claim of impact that can be checked cheaply. Showing what a credit, bond or fund caused means modelling what would have happened without it, which cannot be observed.	Of 34 nature credit schemes, roughly half issue credits for projected effects, and ex-post evaluation is almost never done (Wunder et al., 2025). Repayments on sustainability-linked and use-of-proceeds bonds are not directly tied to verified outcomes (Carter et al., 2026); most of over 100 sustainability-linked bonds examined had targets that were weak, irrelevant or already achieved (Kedward et al., 2022).

Measurement issues	Nature finance instruments need a standardised metric, such as a credit unit or a bond target. Nature is multifaceted, so standardising means selecting one attribute and discarding the rest. Tipping points and feedback loops are unknown, and what is unknown can hardly be measured.	In England's BNG scheme, 44% of planned habitat was a single common grassland type, while wetland and woodland were barely delivered (Duffus et al., 2026). Bonds rely on proxies: area conserved instead of species outcomes in blue bonds (Kedward et al., 2022), and trees planted instead of tree survival in the Tropical Landscapes Finance Facility (Carter et al., 2026).
Property rights	Nature finance instruments need an identifiable party who controls the asset and can secure the revenue. Nature's benefits often arise on land under customary or contested tenure, so no single party holds clear title, and payments frequently bypass whoever bears the cost of the restriction.	IPLCs generate an estimated US$1.16 trillion a year in ecosystem service value from their lands, yet across 129 payment-for-ecosystem-services programmes in 36 countries, payments to them were as low as US$0.33 per household per year and covered less than 25% of opportunity costs in some cases; less than 1% of international development finance for forests, biodiversity and climate between 2011 and 2020 went to securing their land tenure (C.N. McLaren et al., 2025).
Durability constraints	Nature finance instruments need a fixed term and an exit. Financial instruments have predetermined time horizons, while recovery has uncertain and long-time horizons.	England's BNG requires 30 years and Australia's carbon credit scheme 25, while damage is usually permanent (zu Ermgassen et al., 2026). Most bonds are short-term instruments, and equity investors need an exit: US timberland private equity firms typically resell land after several years, leaving long-term outcomes uncertain (Carter et al., 2026).

Source: Authors' own and specific references can be found in the table.

The failures in Figure 3 are usually seen as technical problems with technical fixes: better baselines, stricter standards, longer contracts, regulation to create demand.

In our view, they are symptoms of treating common-pool resources and public goods as if they were private goods. The symptoms do not disappear when the good is relabelled. For public goods, markets are not fit for purpose: a market will not supply a good from which no one can be excluded in the quantity society needs (Samuelson, 1954). For common-pool resources, markets can play a role, but only within rules that are set collectively. Even then, the governance needed to secure ecological outcomes raises costs that conflict with investors' need for competitive returns and scale (Kedward et al., 2022).

The risk is not only that these instruments underperform ecologically. It is also that they absorb the attention and political capital that alternatives need. Fiore and Grabbe (2025) warn that badly designed nature markets can create the illusion of progress while deferring the decisions that matter and can displace public funding rather than add to it. What the common-pool resources and public goods in the bottom half of Figure 2 need is not better market design, but something different from a market: collective governance and public payment.

2. NATURE IS LOCAL

The funding gap narrative works at a global scale: one figure, to be closed by capital that can move anywhere. Most living things cannot move (Wiart, 2026). Each ecosystem is bound to its place, with unique interactions. This chapter shows that nature has no global unit comparable to a tonne of CO_2. Yet nature markets need such a unit to scale, so they construct one by declaring places equivalent.

Why there can be no global unit for nature

Nature markets are often modelled on carbon markets. That model rests on one characteristic: a tonne of CO_2 emitted in the Netherlands has the same effect as a tonne emitted in Brazil, because both enter the same atmosphere. Carbon is fungible, so a single unit can be traded across the world.

Nature has no such global unit. Each ecosystem is a distinct combination of species interactions, evolutionary histories, and soil and hydrological conditions, and this distinctiveness is unevenly distributed. The 35 biodiversity hotspots identified by Mittermeier et al. (2011) hold more than half of the world's vascular plants and 42% of its terrestrial vertebrates as endemics, in remaining natural habitat covering 2.3% of the Earth's land surface. The hotspots are defined by their irreplaceability, but how replaceable a site is depends on what one is trying to conserve (Pressey et al., 1994). Some nature comes close to being interchangeable: common species in a regenerating patch can often be found or restored elsewhere. Some cannot be replaced at all, such as ancient woodland or the last habitat of an endemic species. And much of it cannot be ranked on a single scale, because places differ in kind. Dutch peat meadows hold far fewer species than the Amazon. Yet they are the main breeding ground of the continental black-tailed godwit: about 87% of these birds breed in the Netherlands (Kentie et al., 2016). The meadows' peat soils also store large amounts of carbon, as long as they stay wet. A hectare of Dutch peat meadow is therefore not simply less nature than a hectare of Amazon forest. Each is valuable in its own way, and these ways cannot be

measured on one scale. Markets that trade nature in standardised units flatten this variation.

The Mar Menor in Spain, Europe's largest saltwater lagoon, is an example of what place-specificity means. It is a unique ecosystem due to its unusual combination of high salinity, extreme temperature range and low nutrient levels. A distinctive group of species have adapted to this ecosystem, and the lagoon is recognised as a Ramsar Wetland of International Importance. However, nitrate runoff from the surrounding intensive agriculture disturbed these unique conditions. A 2016 algal bloom killed an estimated 85% of the lagoon's marine vegetation, and further oxygen collapses in 2019 and 2021 washed thousands of dead fish and crustaceans ashore (UNEP, 2025). What was lost was a specific configuration that existed in only this place. Restoring coastal wetlands elsewhere in the Mediterranean does not substitute for it, because no other site combines those conditions with those species and with the community of fishers and residents whose livelihoods and identity are bound to that lagoon.[4]

This is not a measurement problem that better methods will fix. It is because of the place-specificity described above. And it is because much of nature is simply unknown. Of the 5,578 animal species recorded in the Clarion-Clipperton Zone, the Pacific region targeted for deep-sea mining, an estimated 88–92% have not been described by science (Rabone et al., 2023). Only 3–8% of the world's estimated 2.2–3.8 million fungal species have been named (Hawksworth & Lücking, 2017), even though fungi are central to how soils and plants function. Even less is known about what these species do and how they interact. Where so much of a system is unknown, the effect of losing one part of it cannot be isolated, however good the data become.

Manufacturing fungibility

Attempts to scale nature markets need to treat places as interchangeable: a unit produced in one place has to count the same as a unit produced somewhere else. Fungibility, as Wauchope et al. (2024) describe, is a social construct rather than an ecological one. Two sites become equivalent because a methodology declares them equivalent, through a series of choices about what to count and against which baseline.

The equivalence is built by a set of standard tools. Wiart (2026) describes the sequence: an impact assessment turns a site into numbers, the loss is calculated as

[4] The Mar Menor is not only a story of an ecosystem that collapsed, but also one that shows what restoration in place can look like. Since 2021, Spain has been implementing a restoration framework for the lagoon with a budget of EUR 675 million. The measures are also directed at the pressures and root causes in the basin, not just at the lagoon: a green belt of artificial wetlands, rehabilitated dunes and vegetated 'green filters' around the shoreline and grants for organic and regenerative agriculture that require less fertilizer. As the responsible Commissioner in the Spanish Ministry for Ecological Transition puts it, the watershed was the fundamental scenario for intervention. The initiative was named a UN World Restoration Flagship in 2025. Full implementation is expected to take decades (UNEP, 2025).

a deficit, and that deficit is settled through exchange rules. There may be rules on matching habitat types or limits on how far away compensation can be bought, but in essence, place becomes one variable in the calculation rather than a limit on it. As Wiart notes, the asymmetry is that capital is mobile and most living things are not.

Regulation has tried to constrain this. For example, England's Biodiversity Net Gain (BNG) metric[5] puts a price on distance by assigning less value to positive biodiversity impact created far away. But it does not rule it out: compensating further from the impact site simply means buying more units. In the first sixteen months of that market, only 38% of developments bought units in their own area, and a third bought from an area with no connection to the damaged site (Duffus et al., 2026).

The pressure to treat places as equivalent comes from the ambition to scale: to build a larger market that mobilises more capital. The EU has made this into a plan: the Commission's Roadmap towards Nature Credits runs from 2025 to 2027, when it will consider next steps for "the development and scaling up of nature credit markets" (European Commission, 2025). The ambition to scale a market and at the same time respect locality often pulls in opposite directions. The bigger the market, the wider the area across which units have to count as comparable. Scaling back finance for activities that harm nature faces no such tension.

[5] Biodiversity Net Gain (BNG) has been mandatory for most new development in England since February 2024. Developers must demonstrate a 10% gain in biodiversity, measured with a statutory metric that scores habitats by type, condition and area. Where a development cannot deliver the gain on its own site, it buys off-site units from a registered supplier, which is what creates the market discussed here.

3. NATURE LOSS IS IRREVERSIBLE

Some nature loss can be repaired with enough time, but some cannot be repaired at all. This chapter shows that how much can be repaired depends on the level at which loss occurs, and on what we accept as recovery. This has a direct consequence for finance: preventing harm must come before repairing it. Yet nature finance currently does the opposite.

Why some losses cannot be undone

Loss occurs at every level of biological organisation: genetic diversity, populations, species and ecosystems. Each level has a point of no return. For species, it is extinction. No amount of capital will bring back the Slender-billed Curlew, the migratory wetland bird from the introduction. For ecosystems, it is collapse: the loss of the features that define them. The International Union for Conservation of Nature (IUCN) treats collapse as the ecosystem equivalent of extinction. The Aral Sea is one of the best-known examples (Keith et al., 2013). It used to be the fourth largest lake in the world but has lost 90% of its size due to the diversion of inflow rivers for irrigation and other human interventions.

Before that point, loss is a matter of degree. Ecosystems can absorb substantial damage with little visible change. Meanwhile, they lose resilience and respond more severely to droughts, floods and disease. Past a critical threshold, they shift into a different state: a tipping point. Warm-water coral reefs are the first major ecosystem assessed to have crossed one (Lenton et al., 2025).

Return is slow and uncertain: it may take decades, and it may not happen at all. The reason is that the new state stabilises itself. In shallow lakes, underwater plants keep the water clear. Once they disappear, the turbid water stops them from growing back. In the Dutch *Veluwemeer*, plants were lost around 1970. They returned only in the 1990s, after phosphorus had fallen far below the level at which they had disappeared. How far pressure must fall, and how long recovery then

takes, differs even between similar ecosystems and is hard to predict. Some systems recover only under rare conditions, such as a run of wet years. Others do not recover at all: when a cloud forest is cut, the trees no longer capture moisture from the clouds, and the land can become too dry for the forest to return (Scheffer et al., 2001).

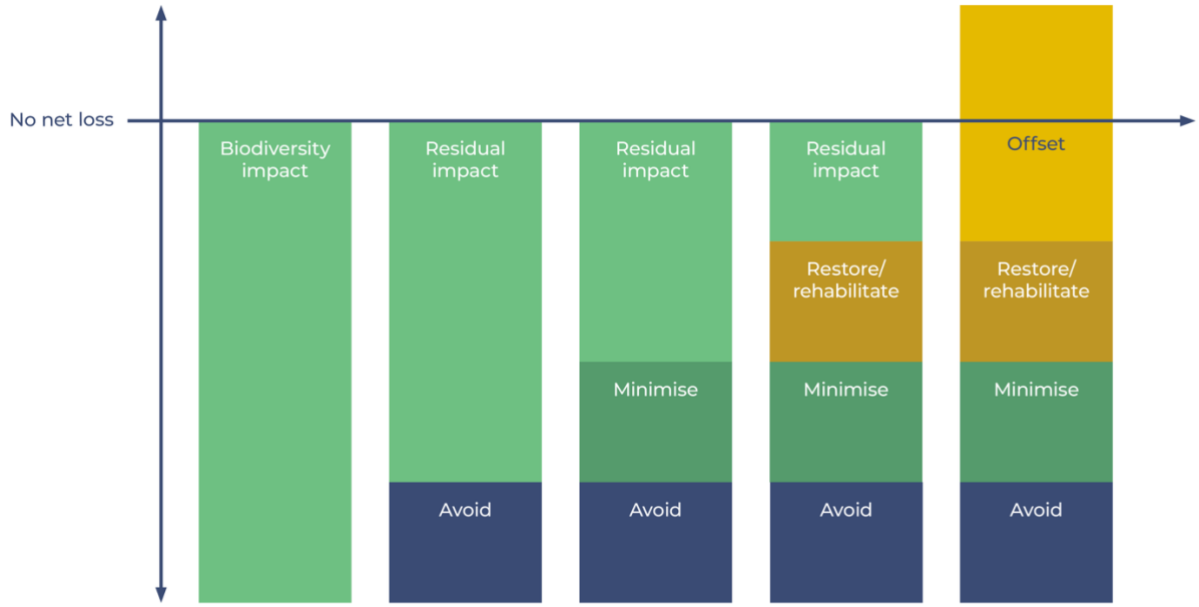
Where recovery is possible, the question is: recovery to what? Under climate change, returning an ecosystem to its historical condition may be impossible, because the biophysical conditions it depended on are changing (Harris et al., 2006). Restoration practice therefore targets a reference ecosystem: the native ecosystem as it would have been without degradation, adjusted to changed or expected conditions (Gann et al., 2019). Recovering ecosystems still fall well short of such references. They show large deficits in organism abundance, species diversity and functions such as carbon and nitrogen cycling. Even where full recovery is eventually reached, the losses accumulated along the way, the "recovery debt", remain (Moreno-Mateos et al., 2017). This irreversibility of nature loss is twofold: we rarely know where tipping points lie until they have been crossed, and recovery, where possible at all, takes decades and can remain incomplete. Kedward and Ryan-Collins, et al. (2023) argue that such thresholds cannot be captured by probabilistic risk models. Postponing action until better data arrive is therefore not a neutral choice. How fast pressure is rising and in which direction is reason enough to act, without first putting a probability on collapse. Together, irreversibility and uncertainty make prevention the safest option: harm should be avoided rather than repaired afterwards.

Avoid harm first: the mitigation hierarchy

One of the most established frameworks in environmental management already puts prevention before repair: the mitigation hierarchy. The mitigation hierarchy sets out a fixed order for limiting the harm that development projects impose on nature: first avoid impacts altogether, for example by situating a project outside ecologically important areas; then minimise the impacts that cannot be avoided; then restore the affected site; and only as a last resort offset the residual loss elsewhere. The aim is no net loss, or ideally a net gain, of nature (OECD, 2025; Figure 4).

Whilst the mitigation hierarchy is developed for individual development projects, it can be applied to the broader policy debate as well. The Transformative Change Assessment of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) also makes this systemic case: biodiversity loss cannot be reversed through incremental, project-by-project change, but requires confronting the structural drivers that produce harm across the economy, including the patterns of production, consumption and finance that make destruction the profitable choice (IPBES, 2024).

Figure 4. The mitigation hierarchy

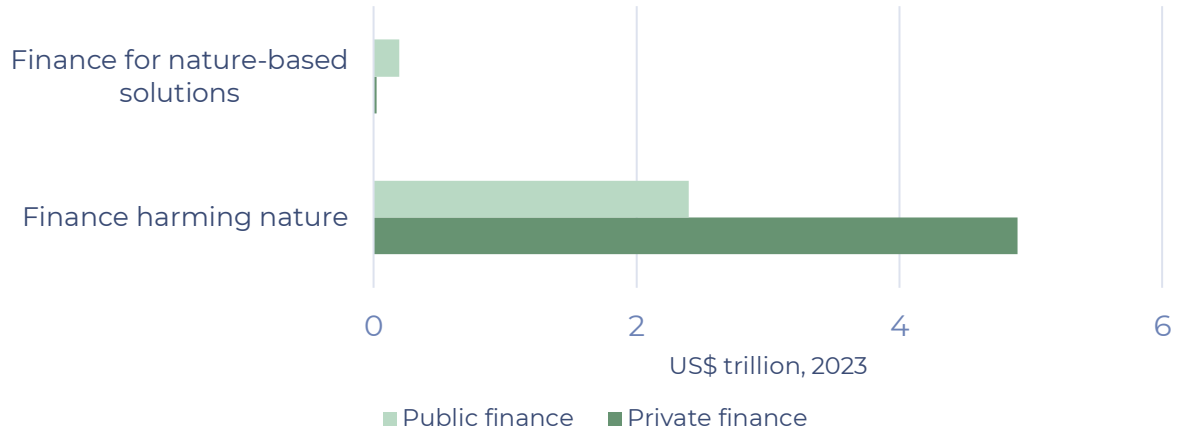


Source: OECD (2025)

Financing the last steps of the mitigation hierarchy

The State of Finance for Nature report of the United Nations Environment Programme (UNEP) puts finance flowing to activities that harm nature at US$7.3 trillion in 2023, against US$220 billion going to nature-based solutions (Figure 5).

Figure 5. Financial flows related to nature



Source: UNEP (2026)

This means around US$30 spent degrading nature for every US$1 spent protecting it (UNEP, 2026). Of the finance harming nature, US$4.9 trillion is private and US$2.4 trillion is government spending on environmentally harmful subsidies. On the nature-based solutions, public finance provides US$197 billion and private finance contributes only US$23 billion (UNEP, 2026).

Currently, financial innovation is concentrated at the last steps of the mitigation hierarchy (Figure 4). The nature finance instruments that dominate the debate all sit at the restoration and offset end, because that is where a tradable unit can be manufactured. The risk is that offsetting is treated as the primary goal instead of the last resort. The top two steps of the mitigation hierarchy, avoidance and reduction, often cannot generate a tradable unit. This is even more true for protection, which comes before avoidance. Avoidance responds to a credible threat by changing a plan; protection requires nothing new to happen at all. It still needs funding, for management, monitoring and enforcement, but there is no change to measure and so nothing to sell. Worse, the availability of financeable compensation can itself weaken the incentive to prevent harm in the first place. This is a dynamic the biodiversity literature calls a “licence to trash” (Hahn et al., 2015) and climate policy has named “mitigation deterrence” (McLaren et al., 2019). For nature finance instruments, harm-reduction measures are under-financed not because they are less effective or necessary, but because they are less financeable. What makes them less financeable is that avoidance is not easily turned into a unit. Where it has been tried, so-called avoided-loss credits need to claim that a harm would have certainly happened without payment. In generating carbon credit from avoided deforestation, for example, the project developer needs to show that a piece of forest would be cut down without intervention. The problem is that these are the weakest units on the market. Because what is sold is a counterfactual rather than an observed change, avoided-loss credits rest on modelled baselines that project proponents themselves propose, and non-additionality in such schemes is a problem (Wunder et al., 2025; zu Ermgassen et al., 2026).

Moreover, redirecting harmful subsidies is not simply a matter of political will, because many of them exist for a clear reason. More than 60% of the EU’s Common Agricultural Policy budget goes to income support for farmers (EU CAP Network, 2024). That support makes up around a quarter of EU agricultural factor income (European Commission, 2021), for a group whose income is on average close to half the average wage in the rest of the economy (European Commission, 2019). Calling all of it a harmful subsidy would therefore have real distributional consequences. This also explains why reform meets strong resistance. In 2024, farmer protests across Europe led the EU to relax the environmental conditions attached to CAP payments, and in the Netherlands, protests against nitrogen policy helped the newly founded BoerBurgerBeweging (BBB) become the largest party in the

Senate in 2023 (Ipsos, 2023). Harmful subsidies are therefore not only misallocated money, but income that specific groups depend on.

Still, most harmful finance is private. Of the US$7.3 trillion, US$4.9 trillion comes from private sources, concentrated in utilities, industrials, energy and basic materials (UNEP, 2026). These flows fund harmful activities with competitive financial risk-adjusted returns. Returns are high because the costs of degradation are not priced. The firm keeps the revenue and others bear the loss. Redirecting private capital therefore requires changing the fact that these activities are profitable. Public spending reinforces this: the US$2.4 trillion in environmentally harmful subsidies lowers costs in the sectors that generate most of the private flows (UNEP, 2026). Harmful activities are profitable in part because governments pay to keep them so.

4. FROM CHARACTERISTICS OF NATURE TO GUIDELINES

Chapters 1 to 3 critically examined the dominant narrative in the nature finance debate: that private capital needs to be mobilised to close a global nature funding gap (Figure 1). Dissecting its assumptions shows that the criticisms of nature finance instruments go beyond technical problems that can be innovated away.

The risk here is not only that financial and technical innovations in nature finance instruments will underperform ecologically, but that they absorb the attention alternatives would need (Fiore & Grabbe, 2025; Stanley et al., 2026). What the narrative overlooks are three characteristics of nature: the value of nature is multifaceted, nature is local and its loss is often irreversible.

Stanley et al. (2026) call for a reimagining of nature finance. In our view, such a reimagining must begin with the characteristics of nature. In this chapter we therefore flip the narrative. Instead of starting from the funding gap and asking what nature must become to fill it, we start from the three characteristics of nature and ask which guidelines follow from each. Because nature is multifaceted, the solution should match the type of good. Because nature is local, the place should be the unit of finance, not a tradable unit abstracted from it. And because nature loss is irreversible, protecting nature and avoiding harm come before restoration. Figure 6. Guidelines for nature financesets out what this can look like.

Each column of Figure 6 starts with a characteristic of nature, states the principle that follows from it, and then gives concrete guidelines. The next sections discuss these guidelines column by column, including what they mean for public and private actors.

(Figure 6. on the next page)

Figure 6. Guidelines for nature finance

Source: Authors' own

Nature is multifaceted: match the solution to the type of good

Common-pool resources need collective governance

Many people benefit from common-pool resources, so everyone has a reason to let someone else pay for them. Ostrom (1990) showed that users can solve this themselves, without privatisation or central control, by building institutions around the group that uses the resource. Those who benefit contribute, and because they contribute, they also decide what is provided and to what standard. Ostrom (1990, p. 90) identified eight design principles shared by commons that last: clearly defined boundaries; rules that fit local conditions; users taking part in making the rules; monitoring; graduated sanctions; low-cost conflict resolution; recognition of the users' right to organise; and, for larger systems, nested layers of governance. The last principle points to polycentric governance, in which local, regional and national bodies each govern at their own scale, rather than relying on government alone (Ostrom, 2010). The specific form is for the users to choose: cooperatives, water boards and user associations can all work. Government's role is to recognise and support these bodies, through secure land tenure, legal certainty and charitable tax treatment for conservation trusts (Gatzweiler, 2006).

Public goods need public payment

Where no one can be excluded, people will not pay voluntarily for what they receive, so a public authority has to pay on the public's behalf. This does not require a market. As Hahn et al. (2015) point out, using a price signal does not require trade: a tax or a payment changes behaviour through price, but its level is set by an authority. The signal then reflects a public decision about how much harm or use is acceptable, not the preferences of private buyers. Public payment can serve three purposes. It can correct harmful behaviour, as a tax on pesticides does; reduce pressure on a resource, as a charge on water abstraction does; or pay for a service,

as public payment for ecosystem services (PES) schemes do. For the first two, the price does not have to reflect the value of nature: it is a correction, set at whatever level changes behaviour. Only the third requires a judgement about what a service is worth. Public payment also avoids the cost of defining, measuring and policing a tradable unit, which is why public action is often cheaper than marketisation (Schoenmaker & Stegeman, 2026). Kedward, zu Ermgassen, et al. (2023) therefore argue for a critical ongoing role for direct public funding. Where public money is spent, it appears to work: across 30 countries, higher public biodiversity spending was associated with slower biodiversity loss (Seidl et al., 2021).

The standard objection is that public budgets are exhausted. Yet taxes that correct for the harm markets leave unpriced, so-called Pigouvian taxes such as the pesticide tax and water abstraction charge discussed above, raise revenue while reducing damage. Blended finance is often proposed as a solution to limited public budgets. It lowers recorded public spending by moving it off the government balance sheet, but it can be more expensive over time than direct public funding, because governments can usually borrow more cheaply than private investors and blended deals carry high legal and advisory fees (Kedward, zu Ermgassen, et al., 2023). Moreover, public spending on nature is also not simply a cost: restoration projects can have high macroeconomic multipliers; much of what is labelled transaction cost, such as monitoring and compliance, is local employment; and in many countries public investment banks can finance such projects outside the government balance sheet (Kedward et al., 2022).

Private finance fits the excludable part, at a bounded return

It has its place where ecological and financial returns coincide, for example in agroforestry that raises both yields and biodiversity (Kedward et al., 2022). Private actors can finance the transition to sustainable production patterns. This means funding the change in how a farm, forest or processing operation works, or new businesses built around sustainable production: the planting material, equipment or land preparation needed before a new way of working becomes profitable. This is ordinary lending and investment work.

In the current environment, extractive activities still generate higher economic returns, at least in the short-term and before accounting for the negative externalities which society bears. This is the double externality described in Chapter 1: damage to nature is not charged, and its benefits are not rewarded. Public actors can change both. Regulation and minimum standards set a floor that applies to every competitor, so frontrunners are not undercut. Taxes and fees make damage costly, and public subsidies reward the benefits.

For private actors that want to finance nature-positive solutions that are ecologically meaningful, this will mean accepting bounded financial returns.

Schoenmaker and Stegeman (2026) argue that a private return on nature is acceptable only where it is bounded: limited to activities that do not extract more than the system can sustain and that are consistent with its restoration. Blended finance uses public or philanthropic money to reduce the risk or increase the return for private investors (Carter et al., 2026). This is useful when a project has its own revenue but needs support in the early phase. In the Forest Resilience Bond, for example, philanthropic loans at 1% interest made it possible to attract commercial loans at 4%, which were repaid from payments by utilities and local governments for reduced fire risk (Carter et al., 2026). When a project has no revenue of its own, the investor's return is paid from the public contribution. Private investors that receive public de-risking should therefore accept a lower return.

Govern together what nature produces together

The natural system can deliver benefits across all four types of good in Figure 4 at once. The Heredia Declaration on payments for ecosystem services calls for the full bundle to be considered together, to avoid perverse incentives (Farley & Costanza, 2010). Doing so also makes visible the benefits that pass through no production process or market at all. This does not mean that only one party can pay. Benefits can also be paid for separately: a farmer can accept payment from a water board for water quality and remain the owner and manager of the land. Different actors, public or private, can each contribute to the benefit that fits their mandate: a water board to water quality, a municipality to social cohesion, a company to a benefit it depends on. What should stay whole is the governance of the ecosystem. Those who pay can contribute and obtain benefits, but they do not gain control: decisions about how the ecosystem is maintained remain with local actors in the landscape.

Public bodies are well placed to keep the bundle intact, because they do not have to split an ecosystem into tradable units. The German city of Munich is an example. Faced with declining water quality in the 1980s, the city chose to protect the catchment rather than treat the water. Since 1992 its public utility, Stadtwerke München, has paid farmers in the Mangfall valley to convert to organic production, financed through water tariffs. Because the programme built on existing organic farming standards, it addressed several environmental issues at once (Grolleau & McCann, 2012). The beneficiaries, Munich's water customers, are also the ones paying, and the body spending the money is the one deciding. The case is simpler than most, because a single utility both pays and decides. More often, a municipality, a water board and a province each have their own mandate and targets for the same area, and keeping the bundle intact requires them to combine those targets in one plan.

Nature is local: take the place as the unit

Treat places as interchangeable only on ecological grounds

Two sites are not equivalent because a methodology says so (Wauchope et al., 2024). The Mar Menor lost a configuration that existed only there; restoring wetland elsewhere in the Mediterranean does not replace it. This does not make compensation always wrong, but it should have to be justified. A scheme should show ecological grounds for treating two places as equivalent rather than assume it and discount for distance.

Whether equivalence is justified is for public authorities to decide: they set the exchange rules for compensation, as England's Biodiversity Net Gain shows (Chapter 2). Regulators can require equivalence to be demonstrated before a scheme is approved, rather than allow distance to be bought off with more units.

Steer capital to where the ecological impact is, not where it is cheapest

Where places count as equivalent, finance goes to wherever a unit is cheapest or safest to produce, not to where nature is under most pressure. England's Biodiversity Net Gain market shows this: most developments bought their units outside their own area, and the habitat created was dominated by the grassland type that scores highest per hectare (Duffus et al., 2026). Investors face the same pull: commercial risk steers investment towards stable, predictable markets, potentially away from those that matter most for nature (Carter et al., 2026).

For public actors, this means making eligibility depend on where land is under threat, not applying uniform rules. For investors and lenders, it means assessing exposure by sector and location: where a company operates says much about its pressure on nature, even when detailed biodiversity data are missing.

Leave agency with local communities and organisations

IPLCs should have decision-making power, instead of only being considered as stakeholders. IPLCs hold tenure or land rights over more than a quarter of the world's land surface, frequently without formal legal title (Garnett et al., 2018). Where land is held without formal title, the public role is to safeguard the rights of IPLCs and make sure their agency is not overruled when nature-based solutions formalise property rights and governance structures.

Agency also stays in the place when finance works through local organisations, such as cooperatives and producers selling through short supply chains. This keeps more of the value, and of the decisions, in the place.

Above the level of a single scheme, this points to a landscape approach: one that recognises place-based values, including those of IPLCs, by bringing together the actors in a region around shared goals and common monitoring. The useful shift is to see a landscape not as a single investment proposition, but as a portfolio of separate investments across sectors, coordinated through one landscape plan (Shames & Scherr, 2020). Banks that finance much of a sector in a region can help link those cases: they can tell borrowers what would make them financeable and connect parties that need to move at the same time.

The Mar Menor illustrates why the unit of intervention is the landscape rather than the site. A systemic solution needs to address root drivers and pressures on biodiversity. The lagoon could not be protected by only acting on the lagoon: the pressure originated in the agricultural basin draining into it, so the response had to reach the watershed and the actors within it. Spain's Law 19/2022, a rights-of-nature law adopted through a citizens' legislative initiative, grants legal personality to the lagoon and its basin together, and gives any person or organisation legal standing to defend it in court (Krämer, 2023). On that basis, municipalities and non-governmental organisations have joined criminal proceedings against agricultural companies, seeking compensation for the damage (UNEP, 2025). Zoning, permits, liability, tenure and legal standing are tools that markets do not have and that work only within a defined area.

Nature loss is irreversible: protect and avoid harm first

Redirect harmful flows before building new instruments for restoration

The US$2.4 trillion in environmentally harmful subsidies is directly within public control. In the EU, harmful subsidies in agriculture, fisheries and transport are large enough that redirecting part of them would close the European nature financing gap without increasing total expenditure (Fiore & Grabbe, 2025). Because subsidies keep harmful activities profitable, reforming them also changes the returns private investors respond to. Subsidy reform reaches private flows without the need to construct a market. However, much harmful subsidy is income support that farmers depend on (see Chapter 3). The public task is to change what they pay for while keeping much of it with the same recipients: from support tied to land area and production towards payment for the public goods farmers can supply, such as clean water, habitat and an intact landscape. Where restoring nature means less farming rather than different farming, part of the money can also support farmers who choose to move into other activities.

For private actors, redirecting harmful flows are the largest lever they hold. Redirecting these harmful flows does not require new nature finance instruments, but the financing of innovation on business models, technology and new

economic practices. For financial institutions that finance harmful economic activities it means applying the mitigation hierarchy to a portfolio of loans, bonds and equity (UNEP FI, 2024). Pressure can be located by sector and location. Loans can be declined, priced differently or made conditional on reducing environmental impact. Lenders and shareholders alike can exclude the most harmful activities and engage with borrowers. But engagement should have a clear timeline and an escalation path to exclusion: most companies targeted by investor engagement are still at an early stage of addressing their impacts on nature (Nature Action 100, 2024). Clients in high-impact sectors can be required to have transition plans. All of this can start without waiting for better data (Knijp, 2025). Investors should be judged on whether the pressure they finance falls, not on what they invest in restoration. The Finance for Biodiversity Foundation's target-setting framework offers a tool for this: portfolio targets, which set thresholds on indicators of pressure on nature across a portfolio, backed by engagement with investee companies (Finance for Biodiversity Foundation, 2024). Financial institutions can also serve as information brokers and identify sustainability frontrunners that can serve as role models for other borrowers in their portfolio.

Financial supervisors can reinforce harm reduction within their existing mandates (NGFS, 2026). Since January 2026, EU banks must now prepare prudential plans for environmental, social and governance (ESG) risks that include the degradation of ecosystems and biodiversity (European Banking Authority, 2025), and the European Central Bank (ECB) treats nature-related risk as a supervisory priority for 2026–2028 (European Central Bank, 2025). But prudential rules see the risk to the bank, not the bank's impact on nature, and models built on historical data miss tipping points (Chenet et al., 2021). A precautionary approach would add macroprudential tools, such as capital add-ons or concentration limits for exposures to the main drivers of harm (Kedward, Ryan-Collins, et al., 2023). Supervisors can also require financial institutions to demonstrate that the value chains they finance are free of nature crimes, such as illegal logging and mining. This could be done by broadening anti-money laundering rules or through a stand-alone requirement. Environmental crime generates an estimated US$110–281 billion in criminal proceeds a year (FATF, 2021).

Prioritise avoidance and use offsets only as a last resort

A focus on offsets can create unintended consequences: once compensation is available and priced, damage becomes a cost to be budgeted rather than a decision to be avoided. The incentive to prevent harm in the first place weakens. Maron et al. (2024) warn that this is reaching policy level: Australia's Nature Positive Plan proposed letting developers pay into a central fund when no suitable offset can be found, which risks weakening avoidance in order to streamline approvals. Fixing it means making avoidance a first, mandatory step and a binding constraint. Some losses cannot credibly be compensated at all, so limits need to be set. For

nature that is hard to replace, and for species and ecosystems already under threat, avoidance should be the only permitted option, with no price tag.

Markets for compensation and offset credits also need a regulator. So far, they have largely regulated themselves. The problem with this is that all actors (sellers, volume-paid certifiers and buyers) have an incentive to provide a large volume of cheap offset credits which leads to weak monitoring (Kedward, zu Ermgassen, et al., 2023). Environmental regulators should be resourced to verify and enforce, and financial supervisors should treat greenwashing as mis-selling. Both need a formal seat in the bodies that write the standards (Kedward, zu Ermgassen, et al., 2023).

Align funding horizons with the long-term needs of the ecosystem

Where compensation is permitted, the site providing the compensation has to be maintained for as long as the impact on the original site remains. That impact is often permanent. Land cleared for a road or a housing development does not come back. The obligation on the compensating site, by contrast, often expires: after 30 years under England's Biodiversity Net Gain, 25 years in Australia's carbon credit scheme and 40 years in voluntary carbon markets (zu Ermgassen et al., 2026).

5. TWO SHIFTS IN THINKING

The guidelines from Chapter 4 share a common pattern. They revolve around places and rely on actors working together around those places. This points to two shifts in thinking: from markets to places, and from a public–private dichotomy to collaboration around a place. These two shifts are turned into four questions to answer before choosing any instrument.

From markets to places

The first shift concerns what is financed. It requires starting from the goal: the protection or restoration of an entire natural place, not just the part that fits a financial instrument. Ostrom (2009) offers a way to describe such a place: as a social-ecological system, in which an ecosystem and the people and rules around it shape each other, so that a change in one part works through the others. Understanding a place therefore starts with its ecology: which species and habitats are present, how they depend on each other, where the pressure on them is and what drives harm. It then means understanding the social system: who lives with and from the place, who has influence over it, and how its ecological and jurisdictional boundaries relate.

Nature markets can be an important part of protecting and restoring a place. But the shift to places changes how the nature finance problem is framed. Treating nature finance as a matter of producing a unit of nature fit for a market assumes the difficulty lies in measuring the unit. Treating it as a matter of maintaining a place means recognising that the difficulty lies in keeping intact a system whose parts depend on each other (Morgan & Buckwell, 2022).

Starting from the place, not the market, opens room for interventions that come before nature markets: redirecting harmful flows and investing in nature-positive business models.

It also highlights the role of local and national public authorities in setting transparent and ambitious standards and using tools such as zoning, permits and subsidy reform.

From a public–private dichotomy to collaboration around a place

The second shift concerns who acts. Many of the guidelines concern the management of the commons, governance structures and the need for coordination. This gives the public sector an important role, for legislators, ministries and institutions such as environmental regulators and land-use authorities. But much of this work cannot be supplied by any single actor, public or private. This changes how the nature finance problem is framed. Treating it as a matter of getting capital from a provider to a recipient assumes the difficulty lies in the terms of that transaction. Treating it as a collective action problem assumes the difficulty lies in getting several parties who each benefit to contribute at all .

The response is to organise the actors around those who are affected by, and have influence on, the place. This will usually involve public and private actors together, rather than a constructed dichotomy of public versus private capital. In essence, this is polycentric governance applied to the financing of nature. Ostrom (2010) shows that complex resource systems are often governed better by several overlapping centres of decision-making than by either markets or a single state. Toxopeus and Merfeld (2023) find the same pattern in 54 urban nature projects: the business models that sustain them have no focal firm, but are co-created by public, private and civil actors around a bundle of values.

Working together does not guarantee a better outcome. Toxopeus et al. (2020) studied six urban nature projects run jointly by public bodies, firms and citizens. Some improved fairness and some made it worse. What mattered was how the arrangement was set up: who decides, who pays, and whose claims count. Three conditions stood out: transparent decisions on who bears the costs and who receives the benefits, public control over the nature itself, and consultation that combines scientific expertise with the voices of residents, present and future (Toxopeus et al., 2020).

What to ask before choosing any instrument

The second shift highlights the importance of coordinating different actors around a place. Who that actor is will depend on the local context. Often, the role of convening will fall to public authorities, for example municipalities, water boards and provinces. In the discussion with other stakeholders, they need to assess how nature finance solutions can incorporate the characteristics of nature. Four questions can help facilitate that discussion:

- **What is the landscape, and where are its boundaries?**
  This covers the ecological system, but also which legal boundaries apply.

- **What features and functions of nature are present here?**
  Which benefits are private and excludable, which are common-pool and which are public goods, and which of them are produced jointly? How do the different nature benefits of the specific place interact, and what can be marketed separately without damaging the rest?

- **What are the main drivers of harm?**
  Because loss is irreversible, this comes before any question about restoration finance.

- **Who is involved, and in what way?**
  Distinguish those who use the resource, those who depend on it, those who regulate it, and those downstream who benefit without appearing in any transaction.

Only after asking these questions does the financing question arise, and the answer is usually several finance and governance arrangements at once, rather than one instrument. Some of what a place produces can be sold, some has to be governed collectively, and some has to be paid for publicly. These can sit side by side under a shared set of goals, with the parties agreeing what is being protected, who bears which cost, and how progress is checked. Working this way is slower than designing a single instrument, and it asks parties who currently act separately to accept obligations to each other. But the alternative is not cheaper. It is a set of measures that each work on their own niche, while the ecosystem they apply to continues to degrade.

CONCLUSION

This paper began with the narrative that has dominated the nature finance debate: mobilise private capital to close the global nature funding gap. Each element of this narrative carries an assumption. 'Private capital' assumes that nature can be financed like a private good. 'Global' assumes that nature is interchangeable across geographies. 'Funding gap' assumes that the problem is a shortage of capital. None of these assumptions holds. Nature's value is multifaceted, so most of what it provides cannot be made excludable and priced. Nature is local, so a unit produced in one place does not offset a loss in another. Nature loss is irreversible, so the problem is not a shortage of capital but an excess of it flowing the wrong way. These failures follow from an order of reasoning that starts with the instrument and asks what nature must become to fit it.

Reversing that order starts from the characteristics of nature, derives guidelines from them, and only then asks which arrangement and what kind of finance. Common-pool resources need collective governance rather than capital. Public goods need a public payment rather than a private market. What nature produces together should be governed together. Harmful flows should be redirected before new ones are built.

Nature finance instruments still have a place, where a real private benefit exists without doing harm. For nature markets, demand should also rest on a legal obligation that a regulator can enforce. The risk is treating these instruments as the only answer. They supply a small share of finance for nature while absorbing a large share of the attention. But attention is also scarce, perhaps more so than capital. Effort spent perfecting nature finance instruments is effort not spent on subsidy reform, public payment, land-use rules or the governance most of these rules require.

The shift is twofold: from markets to places, and from a public–private division to collaboration. Success is then measured on the ecological scale: not by how much capital has been mobilised, but by whether the drivers of nature loss are weakening and the drivers for ecosystem resilience are strengthening.

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APPENDIX: NATURE FINANCE INSTRUMENTS

Table A1 explains how each instrument mentioned in this paper works technically.

How the nature finance instruments in this paper work

Instrument	How it works	Source
Use-of-proceeds bonds	An issuer borrows from many investors at once and commits to spend the proceeds on a pre-defined set of green or nature-related activities. Investors receive a periodic interest payment (coupon) and their principal back at maturity, paid from the issuer's usual revenues, not from the project's results.	Carter et al. (2026)
Green bonds	The most common type of use-of-proceeds bond. The proceeds, or an equal amount, go exclusively to eligible green projects, which can include biodiversity conservation and sustainable land use. Under the voluntary Green Bond Principles, the issuer discloses how projects are selected, tracks the proceeds separately and reports annually on how they were allocated and their expected impact. Investors are repaid by the issuer, as with any other bond.	ICMA (2025); Carter et al. (2026)
Blue bonds	A use-of-proceeds bond whose proceeds go to ocean and water-related projects, such as marine protection or sustainable fisheries. The financial mechanics are the same as for a green bond.	ICMA (2025)

Sustainability-linked bonds	The issuer can spend the proceeds on anything. The interest rate is tied to sustainability performance targets the issuer has agreed in advance: the coupon falls if targets are met and rises if they are missed.	Carter et al. (2026)
Impact bonds	Investors provide capital up front to fund a conservation or restoration project. Their return is paid by a third-party outcome payer, usually a public or philanthropic body, and depends on whether pre-agreed outcomes are achieved. Where the project organisation cannot issue a bond itself, a larger institution such as the World Bank acts as issuer.	Carter et al. (2026)
Forest Resilience Bond	Despite its name, a loan-based structure. Two philanthropic loans at 1% helped secure two commercial loans at 4%, which together financed forest restoration in the Yuba River watershed (US). The loans are repaid from payments by water utilities and local governments for the resulting reduction in fire risk and better water quality.	Carter et al. (2026)
Nature credits (biodiversity credits)	A tradable certificate representing a verified, measurable and lasting positive outcome for nature. A project developer carries out conservation or restoration under a credit standard, an independent verifier checks the outcome, and the credits are sold to buyers directly or through brokers. Credits can be traded in two types of market. In voluntary markets, companies or other buyers purchase them to support nature or meet their own commitments, without compensating for damage elsewhere. In regulation-based markets, a law requires buyers, such as developers, to compensate for damage they cause; the credits then function as offsets and must be measured with the same metric as the loss (see Biodiversity offsets and Biodiversity Net Gain).	Fiore & Grabbe (2025); Carter et al. (2026); European Commission (2025)
Biodiversity offsets	A measurable gain in biodiversity at one site that compensates for loss caused by a development at another site. Loss and gain must be measured with the same metric, aiming at no net loss.	OECD (2025); Carter et al. (2026)

Biodiversity Net Gain (England)	A mandatory offset market. Most new developments must show a 10% gain in biodiversity, measured with a statutory metric that scores habitats by type, condition and area. If the gain cannot be delivered on site, the developer buys off-site units from registered suppliers, such as habitat banks, which must maintain the habitat for 30 years.	Carter et al. (2026); Duffus et al. (2026); zu Ermgassen et al. (2026)
Payment for ecosystem services (PES)	A private beneficiary of an ecosystem service, or a government on behalf of the public, pays land managers to manage land in a way that provides that service. Payments are conditional: they continue only as long as the agreed management is carried out.	Wunder (2015)
Blended finance	Public or philanthropic money is combined with private capital in one deal. This lowers the private investor's risk or raises its return to a level competitive with other investments. Forms include: • Concessional loans: loans at below-market rates or with lower repayment priority. In the Forest Resilience Bond, philanthropic loans at 1% made commercial loans at 4% possible. • Junior (first-loss) capital: the deal is split into tranches. Public or philanthropic capital takes the junior tranche, which carries more risk and is repaid last, so that senior investors are repaid first. The Tropical Forest Investment Fund, launched alongside the Tropical Forests Forever Facility, aims to raise US$25 billion of public or philanthropic junior capital to attract up to US$100 billion of senior debt. • Guarantees and insurance: a guarantor covers losses if revenue falls short, for example by committing to buy a set amount of sustainably produced timber; an insurer covers the loss of assets, such as forest lost to fire. These count as blended finance when the guarantor or insurer is a public or philanthropic body.	Carter et al. (2026)

Impact funds	A pooled investment vehicle that collects money from several investors and invests it across a portfolio of companies or projects that seek positive social and environmental outcomes alongside a financial return. Investors range from impact-first investors, who accept below-market returns, to return-first investors, who require market returns. The fund can invest through equity (private equity funds) or debt (pooled debt vehicles); its returns come from the revenues of the companies or projects it invests in.	World Bank Group (2020)

Table A1. Sources in the table

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