WORLD RESOURCES INSTITUTE

GUIDEBOOK

Financial sector guidebook on nature-based solutions investment

Aligning investment with impacts and showcasing examples

WRI.ORG

TABLE OF **CONTENTS**

AUTHORS

Helen Ding

Courtney McLaren

LAYOUT

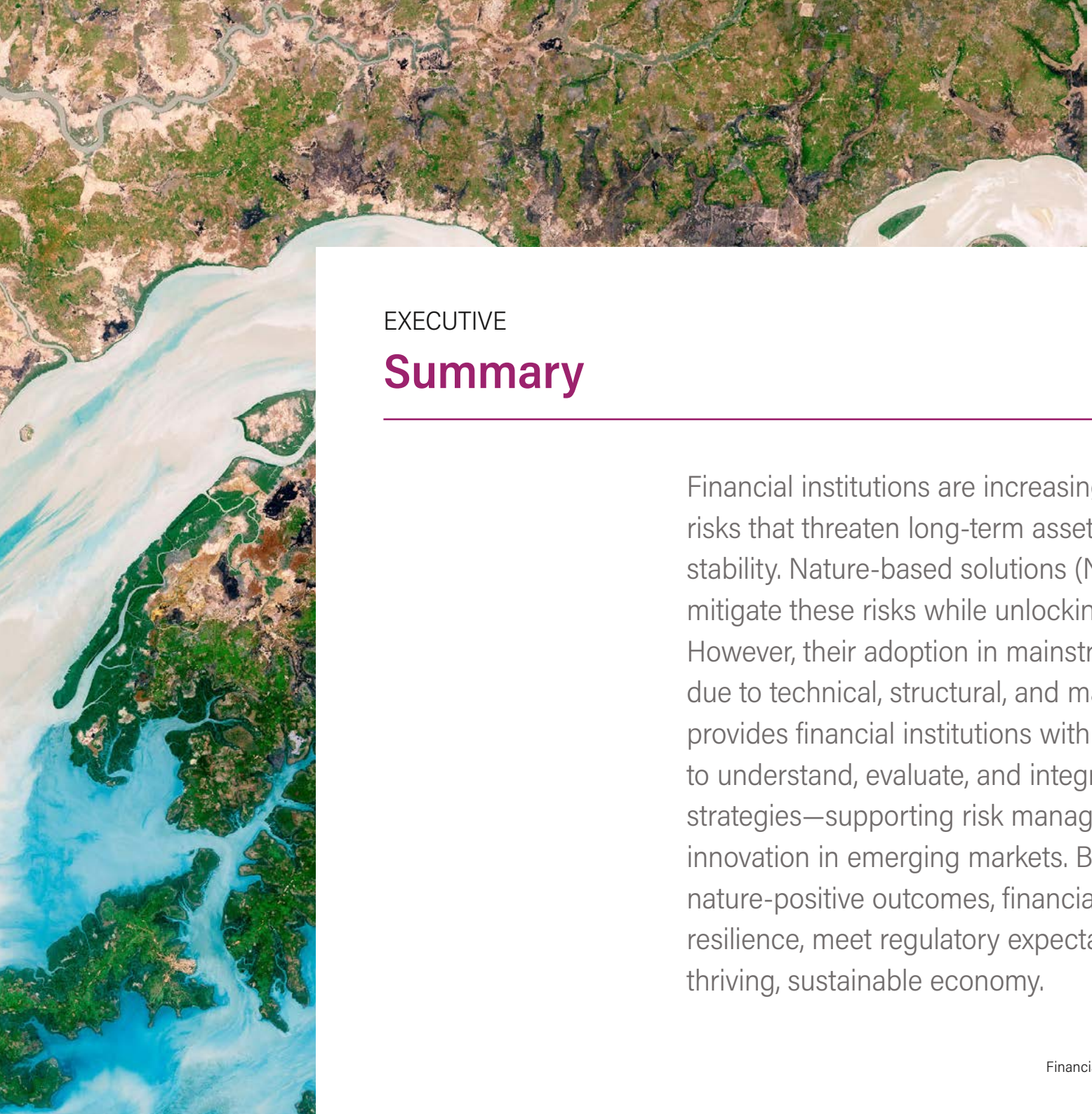
Shannon Collins

shannon.collins@wri.org

VERSION 1 | JUNE 2025

Suggested Citation: Ding, H., and C. McLaren. 2025. "Financial sector guidebook on nature-based solutions investment: Aligning investment with impacts and showcasing examples." Guidebook. Washington, DC: World Resources Institute. Available oneline at: https://doi.org/10.46830/wrigb.24.00043.

Guidebooks are designed to help users apply a clearly defined standard, practice, or process.



EXECUTIVE

Summary

Financial institutions are increasingly exposed to nature-related risks that threaten long-term asset performance and economic stability. Nature-based solutions (NBS) offer a strategic pathway to mitigate these risks while unlocking new investment opportunities. However, their adoption in mainstream finance remains limited due to technical, structural, and market barriers. This guidebook provides financial institutions with a step-by-step framework to understand, evaluate, and integrate NBS into investment strategies—supporting risk management, sustainable growth, and innovation in emerging markets. By aligning capital flows with nature-positive outcomes, financial actors can enhance portfolio resilience, meet regulatory expectations, and contribute to a thriving, sustainable economy.

HIGHLIGHTS

- Financial institutions face increasing nature-related materiality risks, with over 50 percent of global economic sectors highly dependent on nature.
- These risks—both physical and transitional—can lead to systemic financial impacts, eroding asset performance and undermining long-term progress toward the Sustainable Development Goals.
- Nature-based solutions (NBS) offer a holistic approach to mitigate these risks and avoid an irreversible collapse of ecosystems that underpin the global economy while unlocking opportunities for value creation. Yet most NBS financing is still borne by the public sector.
- Despite their promise, NBS remain underused in mainstream finance. Key barriers include a lack of standard definitions and metrics for NBS in finance, limited internal capacity, high transaction costs for small-scale projects, and liquidity concerns—challenges often tied to the public-good nature of these solutions.
- Adoption is further hindered by evidence gaps in financial returns, benefit distribution among economic sectors, and measurable environmental and social impacts.
- This guidebook identifies key challenges in scaling NBS finance and provides a clear roadmap for financial institutions to follow. It highlights how financial institutions can tap into NBS-related opportunities across three domains: risk mitigation and portfolio resilience; sustainable financial growth; and emerging market opportunities and financial innovations.

The context

The global economy is deeply interconnected with the health of natural ecosystems, with approximately 50 percent of global gross domestic product highly dependent on nature, according to the World Economic Forum (WEF 2020). However, ongoing ecosystem degradation presents significant financial risks, particularly for nature-dependent sectors such as agriculture, real estate, utilities, manufacturing, and tourism (GFI 2024a). These risks, compounded by climate change impacts, are expected to become increasingly material, leading to higher capital expenditures related to post-disaster recovery and resource scarcity, as well as greater uncertainty in the stability of the real economy. In turn, this can negatively affect companies' financial performances, risk profiles, profitability, and long-term returns, ultimately influencing investors' perceptions of revenue growth potential and confidence in market valuations.[1]

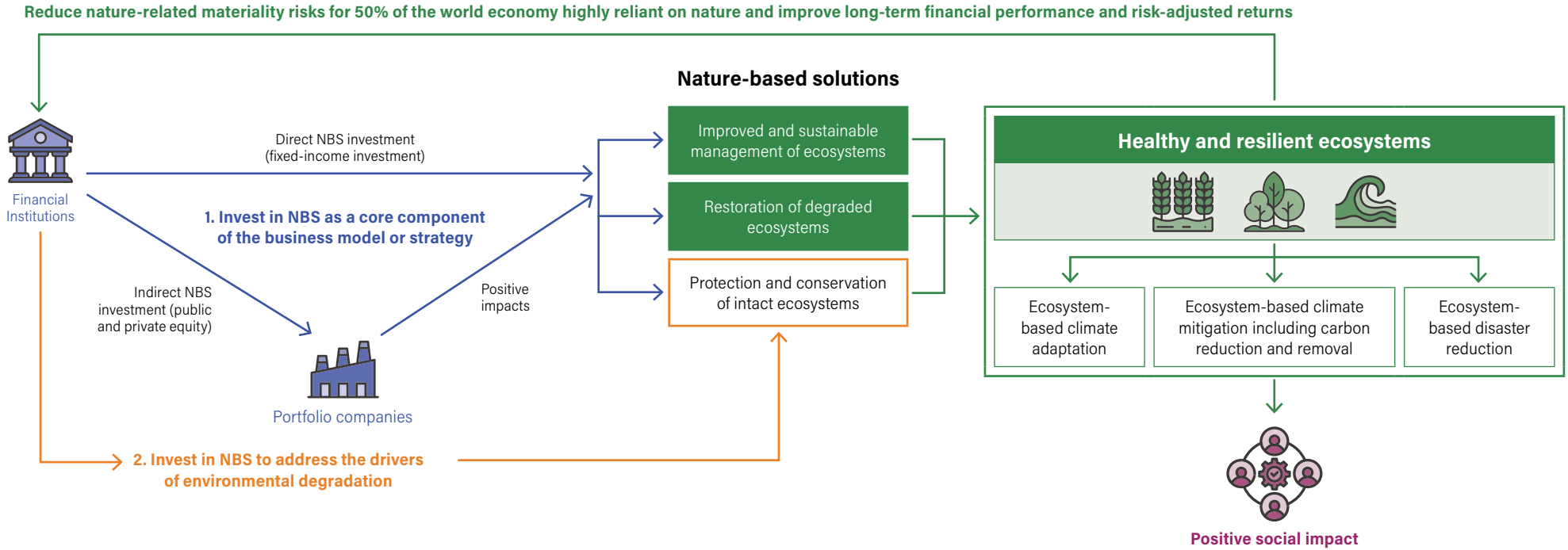
The traditional business model is increasingly viewed as financially unsustainable in the face of rapidly intensifying natural disasters. In recent years, the growing frequency of natural disasters—such as the wildfires in southern California and extreme floods in Europe and Kenya in 2024—alongside expanding scientific evidence on the materiality of these risks and evolving regulatory policies, has led to increasing recognition of nature-related financial risks in the private sector.

Moreover, key regulatory developments—including the European Union (EU) Regulation on Deforestation-Free Products (EUDR), the EU Corporate Sustainability Reporting Directive (CSRD), EU Sustainability-Related Disclosures in the Financial Services Sector (SFDR), and EU Sustainability Taxonomy—have increased the risk and cost of noncompliance. At the same time, shifting consumer preferences toward sustainable products are reshaping market dynamics, further reinforcing the need for financial institutions to integrate sustainability considerations into their investment strategies.

In response, nature-based solutions—actions that protect, restore, and manage ecosystems to address social, economic, and environmental challenges while enhancing well-being, resilience, and biodiversity (UNEA 2022)—offer a holistic approach for financial institutions to mitigate these risks, improve financial stability and future returns, and comply with the evolving regulatory landscape. Figure ES-1 highlights the opportunities NBS offer financial institutions to reduce risks, strengthen nature's resilience for long-term financial performance, and generate positive impacts for both people and nature.

By integrating NBS into their investment strategies, financial institutions can take a more proactive role in driving positive environmental and social outcomes. They can act as direct drivers by allocating capital to NBS projects that protect, enhance, or restore ecosystems or by prioritizing investments in companies committed to making nature-positive impacts. Additionally, they can serve as system enablers by addressing the underlying drivers of ecosystem degradation through targeted investments or by divesting from environmentally harmful activities. These investments will contribute to healthier, more resilient ecosystems, helping to mitigate natural disasters, support climate change adaptation and mitigation, and generate lasting benefits for local communities and society as a whole.

Figure ES-1 | **NBS as an opportunity for financial institutions to mitigate risks and reshape the future finance landscape**



Note: NBS: nature-based solutions.
Source: WRI authors.

However, NBS investments require specialized technical knowledge and expertise that are often lacking in the traditional finance sector. Many financial institutions face internal capacity constraints, including limited technical knowledge of and expertise in NBS, which are required to effectively assess NBS opportunities. At the same time, the unique characteristics of NBS assets, combined with the nascent state of the NBS market, create several challenges. For example, there is a lack of availability of high-integrity (and therefore lower-risk) projects for scaling investments. Additionally, the structuring of small-scale projects often incurs high transaction costs, while the long investment horizons (exceeding 10–30 years) and uncertain risk-return profiles associated with the emerging NBS market can lead to liquidity concerns. These challenges are often incompatible with traditional investments—such as bonds, cash, real estate, and equity—where investors expect short-term capital appreciation, dividends, and interest earnings, deterring the incorporation of NBS into investment strategies.

About this guidebook

Against this backdrop, this guidebook provides a clear framework for financial institutions to understand, invest in, and leverage NBS effectively. Leveraging, in this context, refers to the broader role financial institutions can play, not just by investing directly in NBS, but by influencing the companies within their portfolios. By shifting investment strategies toward nature-positive outcomes, financial institutions can incentivize the

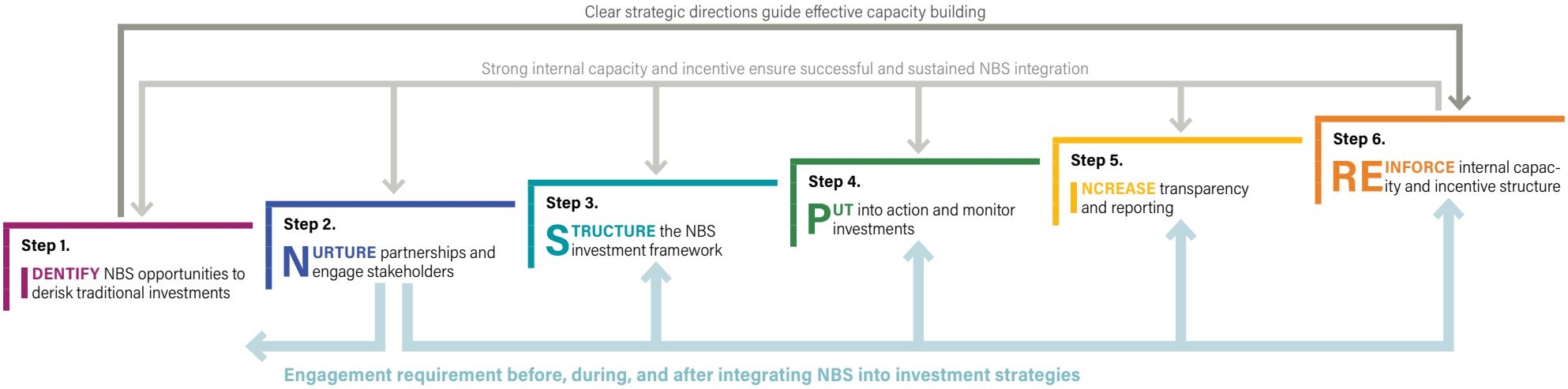
companies they invest in to drive further investments into nature, amplifying the impact of NBS across their entire portfolios. Informed by consultations with the finance industry and a comprehensive literature review, the guidebook addresses key knowledge gaps and offers practical guidance tailored to mainstream financial institutions with limited experience in nature-related investments, enabling them to integrate NBS into their investment strategies, develop solutions to overcome barriers, and drive and accelerate financial innovations to bridge critical nature-finance gaps. The guidebook is primarily designed for institutional investors or asset owners (such as banks, insurance companies, and pension funds) as well as asset managers (including investment firms, private equity firms, mutual funds, and hedge funds).

We offer step-by-step guidance for financial institutions on how to integrate NBS considerations into their investment strategies—from identifying relevant NBS investment opportunities aligned with an existing portfolio to structuring finance and conducting impact assessments and reporting (see Figure ES-2). While these steps are presented sequentially for clarity, they are not strictly linear but rather reinforce one another. For instance, internal capacity-building is shaped by a clear strategic direction for NBS investment, yet it also plays a fundamental role in strengthening all other steps over time.

This guidebook equips financial institutions with clear definitions of investable NBS opportunities; an overview of existing methodologies, tools, data platforms, and regulatory and reporting frameworks; and innovative financial instruments to support the advancement of their NBS investment strategies and practices. It outlines key areas where NBS have the potential to catalyze sustainable economic growth and generate long-term financial returns for financial institutions. Institutions can leverage NBS-related investment opportunities across three domains:

- Risk mitigation and resilience in existing portfolios
- Sustainable growth of financial returns
- Emerging market potential and finance innovation

Figure ES-2 | **Stepwise guidance to "INSPIRE" alignment of investments with NBS opportunities**



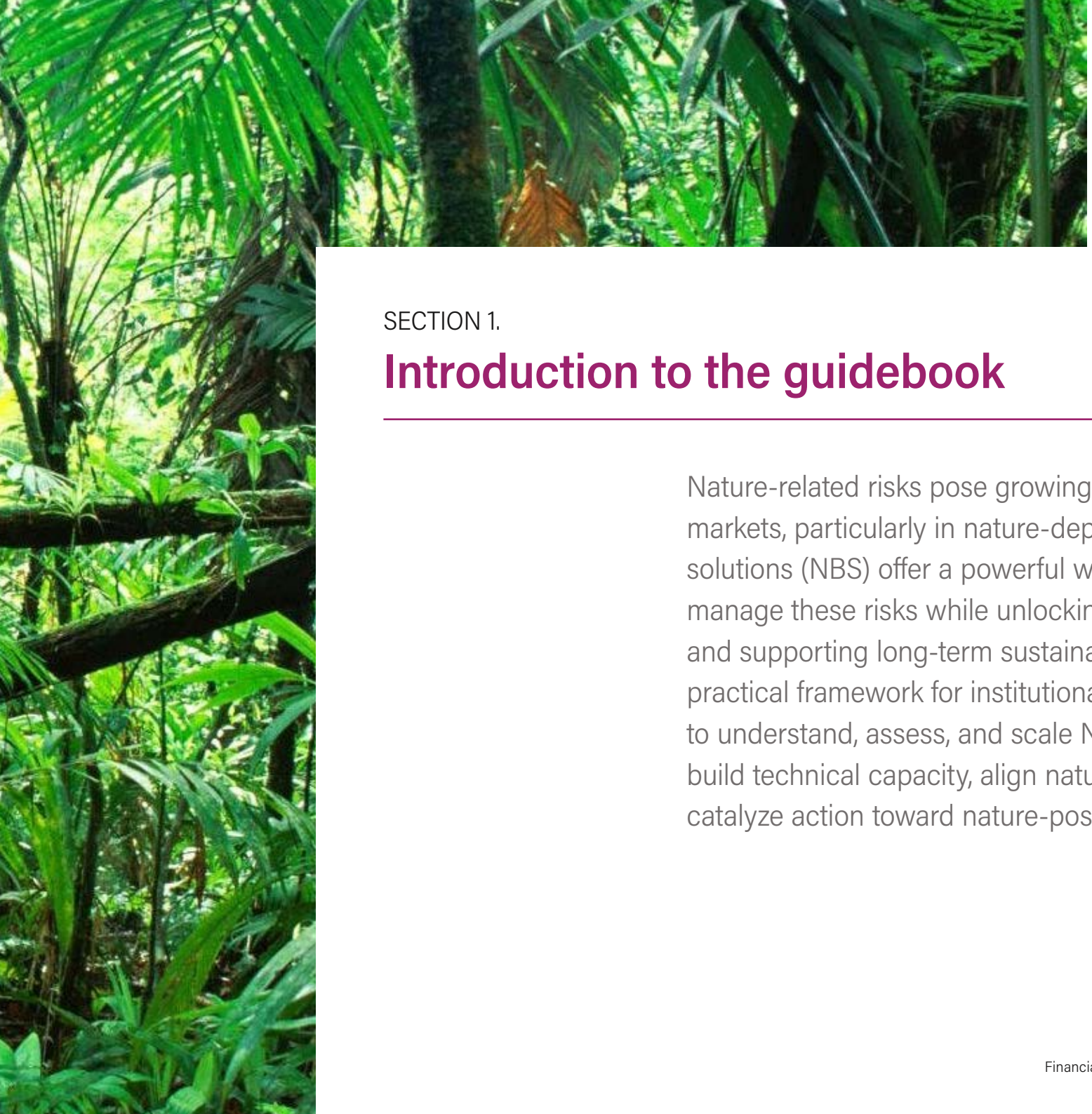
Note: NBS: nature-based solutions.

Source: WRI authors, based on initial consultations with financial experts specializing in nature finance.

Each domain offers distinct investment strategies tailored to different risk tolerances and financial goals. By strategically integrating NBS into their investment portfolios, institutions can unlock opportunities that align with specific risk appetites—whether focused on capital preservation, long-term growth, or high-reward innovation—while advancing sustainability objectives.

This guidebook also underscores the need to increase data transparency, improve reporting practices, build technical capacity and partnerships, and reform incentive structures within financial systems to drive impact-oriented investments while ensuring credibility and avoiding "impact washing." However, achieving this transformation requires change from within. Financial professionals must adopt a systemic approach, deepen understanding of the technical challenges unique to NBS projects, and demonstrate a strong commitment to reforming traditional financial systems to prioritize long-term sustainability over short-term gains.

Integrating NBS into their investment strategies will enable financial institutions to proactively manage the financial risks linked to nature degradation and climate change, seize emerging market opportunities aligned with sustainability objectives, and enhance portfolio resilience—all contributing to improved long-term financial performance and generating positive impacts for people and nature. By actively engaging with key stakeholders, financial institutions could take a leading role in mobilizing much-needed private capital into nature, unlocking new pathways for sustainable finance and driving the transition toward a nature-positive economy.



SECTION 1.

Introduction to the guidebook

Nature-related risks pose growing financial threats to global markets, particularly in nature-dependent sectors. Nature-based solutions (NBS) offer a powerful way for financial institutions to manage these risks while unlocking new investment opportunities and supporting long-term sustainability. This guidebook provides a practical framework for institutional investors and asset managers to understand, assess, and scale NBS investments. It aims to build technical capacity, align nature with investment goals, and catalyze action toward nature-positive, carbon-neutral outcomes.

The global economy is intricately linked to the health of natural ecosystems. According to the World Economic Forum, approximately 50 percent of global gross domestic product (GDP) is highly dependent on nature (WEF 2020). The ongoing destruction of ecosystems presents significant financial risks, particularly for sectors that depend heavily on natural capital, including agriculture, real estate, utilities, manufacturing, and tourism (GFI 2024a). This poses significant material risks for both macroeconomic and financial systems (NGFS 2024).

For example, between 2000 and 2018, the Caribbean region experienced 189 nature-related disasters, causing over US$26 billion in total damages—equivalent to approximately 2 percent of regional GDP annually (CDB 2019). In the United Kingdom (UK), a recent study suggests that environmental decline could lead to an estimated 12 percent GDP loss by 2030—surpassing the 11 percent contraction caused by COVID-19 in 2020 (GFI 2024a). Ultimately, these macroeconomic risks can extend to and significantly impact financial institutions.

Moreover, nature-dependent sectors make up a substantial share of many banks' portfolios, increasing their exposure to nature-related risks. These risks can impair assets and collateral, reduce corporate profitability, and lower insurability, ultimately affecting traditional financial risk categories (NGFS 2024). A recent analysis suggests that the seven largest UK banks could face valuation adjustments of 4–5 percent in domestic holdings (excluding finance) over the next decade due to physical nature-related risks (GFI 2024a).

The global private sector's growing focus on nature-related financial risks is driven by the rising frequency of nature-related disasters; expanding scientific evidence of their materiality impact; shifting consumer preferences toward sustainable products; and regulatory shifts such as the European Union (EU) Regulation on Deforestation-Free Products (EUDR), EU Corporate Sustainability Reporting Directive (CSRD), EU Sustainability-Related Disclosures in the Financial Services Sector (SFDR), and EU Sustainability Taxonomy.

For instance, the failure of breadbasket crops and significant global food and water shortages caused by extreme weather events could lead to an estimated $5 trillion loss to the global economy over five years, with the potential cost soaring to $17.6 trillion in the most extreme scenario (Ranger et al. 2023). These compounded nature and climate risks will become increasingly financially material in the coming years, adversely affecting companies' financial performances, profitability, and future returns. Ultimately, this could diminish investor confidence, negatively affecting market valuations and the future earnings potentials of the affected companies.

In response, nature-based solutions (NBS)—actions that protect, restore, and manage ecosystems to address social, economic, and environmental challenges while enhancing well-being, resilience, and biodiversity (UNEA 2022)—provide a holistic approach to addressing these aggregate nature-related financial risks. NBS projects focusing on ecosystem restoration, protection,

and sustainable management offer viable strategies to mitigate nature-related financial risks, generate financial value, and deliver benefits for both nature and people at the local and societal levels.

Implementing NBS projects such as ecosystem restoration, green infrastructure, and sustainable agriculture can enhance the resilience of economic sectors heavily impacted by and dependent on natural resources. Strengthening this resilience against future risks delivers public benefits by supporting essential ecosystem functions that underpin long-term financial stability and sustainability. It also has the potential to drive increased private value creation and improve ecosystem health. Research highlights that urban green infrastructure, particularly large-scale urban parks, which are often financed by public funds through urban planning, not only increases property and asset values but also delivers substantial health benefits (Hoover et al. 2020; Ding et al. 2021). Additionally, NBS projects have the potential to unlock new revenue streams for private sectors and expand their share of benefits captured by tapping into emerging investment opportunities including nature-tech start-ups and the trading of biodiversity and carbon credits.

In recent years, nature has gained prominence among investors, supported by frameworks like the Taskforce on Nature-related Financial Disclosures (TNFD), the launch of the International Sustainability Standards Board, and the creation of the Science Based Targets Network (Pollination Group 2023a). This momentum has been further strengthened by global policy developments like the Paris Agreement and the Kunming-Montreal Global Biodiversity Framework. In parallel, research on NBS has grown substantially in Europe since 2015, partly supported by the research grants from Horizon 2020 (2014–2020) (Dunlop et al. 2024), empowering researchers and stakeholders to explore and implement innovative nature-based strategies. Proactively adopting these frameworks, alongside supporting net-zero and nature transitions, can help reduce the compliance costs associated with evolving regulations.

Despite this progress, financial institutions still lack comprehensive guidance on how to integrate nature- and biodiversity-related factors into their transition plans and decision-making processes (GFANZ 2024). Furthermore, while financing NBS can generate multiple environmental, social, and economic benefits, quantifying and disentangling these impacts can be challenging, complicating accurate measurement and increasing the risk of double counting.

In this context, we developed the *Financial Sector Guidebook on Nature-Based Solutions Investment* (hereafter referred to as the *Guidebook*) to serve as a framework for financial institutions seeking to understand, invest in, and leverage NBS opportunities effectively. Informed by consultations with the finance industry and a comprehensive literature review (see Appendix A), the *Guidebook* is designed for private institutional investors and asset managers looking to advance their NBS investment strategies. It helps address key knowledge gaps and offers practical guidance to inspire action and scale up private capital toward nature-positive and carbon-neutral projects. Further, it aims to catalyze impactful NBS investments while aligning environmental and social impact metrics with company fundamentals, supporting institutions in embedding nature into their investment decision-making processes.

More specifically, the objectives of the *Guidebook* include the following:

- **Highlight priority areas:** It identifies key areas where NBS can act as a strategic lever for financial institutions to drive sustainable growth in the real economy and protect future financial returns.
- **Provide step-by-step guidance:** It offers a framework to help institutional investors and asset managers strengthen their NBS technical capacities. This enhanced knowledge will enable them to independently assess how NBS opportunities align with their institutional investment goals and identify both direct and indirect investment opportunities. Indirect opportunities can be realized by reducing material risks within existing portfolios through strategic influence on portfolio companies—such as setting expectations, developing new financial services and products, engaging informally, and assisting clients in integrating NBS strategies into their business models.
- **Inspire investment action:** Through real-world examples, the *Guidebook* aims to motivate asset managers and institutional investors to recognize the imperative to invest in NBS and the opportunities they provide.

While NBS play a crucial role in sustainable finance, they may not be equally applicable to all existing portfolios across sectors and geographies. Therefore, the *Guidebook* will emphasize the connections between NBS and broader asset classes, helping to clarify for financial institutions how NBS-related investments can impact their financial, environmental, and social objectives.

SECTION 2.

Why NBS investment? Why now?

This section highlights the fundamental rationale and urgency for financial institutions to integrate NBS into investment portfolios as a holistic approach to drive long-term growth and value creation.

The rising nature-related risk exposure in investment portfolios and the real economy

Nature-related risks are increasingly affecting investment portfolios and the broader economy, posing both direct and systemic financial threats. Fourteen of the 18 ecosystem services—defined as goods and services provided by ecosystems to humans, such as provisioning (e.g., food, freshwater, raw materials), regulating (e.g., air quality, pollination, climate, water runoff), cultural (e.g., recreation, tourism), and supporting (e.g., nutrient cycling, photosynthesis) services—have declined since the 1970s (IPBES 2019). This ongoing degradation poses significant financial risks for businesses and investors reliant on natural capital. A collapse in key services like wild pollination, marine fisheries, and timber provision could result in annual economic losses of 2.3 percent of global GDP (or $2.7 trillion) by 2030 (WB 2021).

For financial institutions, nature-related risks manifest as the following (TNFD 2022):

- **Physical risks** arise from environmental degradation and climate-related events, such as extreme weather, biodiversity loss, and declining ecosystem services, which affect economic activities. Physical risks will become more material in the coming years due to physical income, asset, and profitability losses, increasing the exposure of financial portfolios—and their underlying financial performance and future returns—to nature risks.
- **Transition risks** stem from a misalignment with regulatory shifts, evolving market dynamics, and changing consumer and investor expectations regarding sustainability. They may be triggered by changes in regulations and policies (e.g., EUDR, CSRD, EU Sustainability Taxonomy), legal precedent, technological advancement, or shifts in investor and consumer preferences (e.g., demand for organic products).

If left unaddressed, these risks can evolve into **systemic risks**, leading to ecosystem collapses, economic disruptions, and cascading sector-wide failures. For instance, the overexploitation of natural resources (e.g., water, timber, minerals, fish stocks) beyond planetary boundaries, or excessive waste and pollutants surpassing an ecosystem's capacity to recover, can cause severe disruptions (UNEP 2024). These impacts pose significant risks to long-term financial stability and the broader economic system.

As ecosystems deteriorate and regulatory frameworks tighten, businesses dependent on natural capital will face increasing challenges, including the following:

- **Resource scarcity and rising costs:** The depletion of essential resources—such as clean water, fertile soil, and raw materials—will drive up operational costs for industries that depend on them.
- **Regulatory and compliance pressures:** Stricter environmental policies may require costly operational changes, introduce new compliance requirements, or impose penalties on noncompliant businesses.
- **Market and reputational risks:** Shifts in consumer preferences toward sustainability place businesses with high environmental footprints at risk of declining market demand, investor scrutiny, and reputational damage.
- **Supply chain vulnerabilities:** The degradation of ecosystem services—such as pollination, water filtration, and flood regulation—can disrupt supply chains, increasing production costs and operational risks.
- **Stranded asset risks:** Business models reliant on unsustainable natural resource extraction may see asset values decline as markets and regulations transition toward sustainability-focused investments.

This dynamic can lead to financial losses not only for individual businesses but also across the broader economy. Financial institutions with diversified portfolios will be broadly affected as companies across multiple sectors face financial downturns due to nature-related risks. Proactively managing and mitigating these risks is therefore essential for long-term financial stability.

A real-world illustration of this risk is California's persistent droughts, which have severely reduced water availability, slashing crop yields and resulting in billions of dollars in lost agricultural revenues. The 2021 drought alone cost the state's agriculture sector an estimated $1.1 billion and nearly 8,750 full- and part-time jobs. When considering the ripple effects on other economic

sectors, the total economic impact rose to $1.7 billion and 14,634 full- and part-time jobs lost (Medellín-Azuara et al. 2022).

Similarly, in the tourism sector, degradation of natural assets (e.g., coral reefs, mangroves, tropical forests) can diminish the appeal of destinations, reducing tourist footfall and revenues. Lower tourist arrivals reduce incomes for hotels, restaurants, and local economies dependent on ecotourism. The decline of coral reefs due to ocean acidification and warming has severely impacted tourism revenue in regions like the Caribbean (Waite et al. 2014). It is estimated that the Mesoamerican Reef in the Caribbean provided goods and services worth around $6.2 billion in 2017 from fisheries, tourism, and shoreline protection (UNEP et al. 2018).

As these risks intensify, financial institutions must integrate nature-related risk assessments into their investment strategies and scale up NBS to systemically mitigate risks. By doing so, they safeguard portfolios that depend on healthy ecosystems and play a critical role in reinforcing the ecological foundations upon which all economic activity relies. Through their influence over capital allocation across entire portfolios, financial institutions hold a unique lever to drive resilience and sustainability at scale—beyond what individual companies can achieve alone.

Nature-based solutions as opportunities to mitigate nature risks

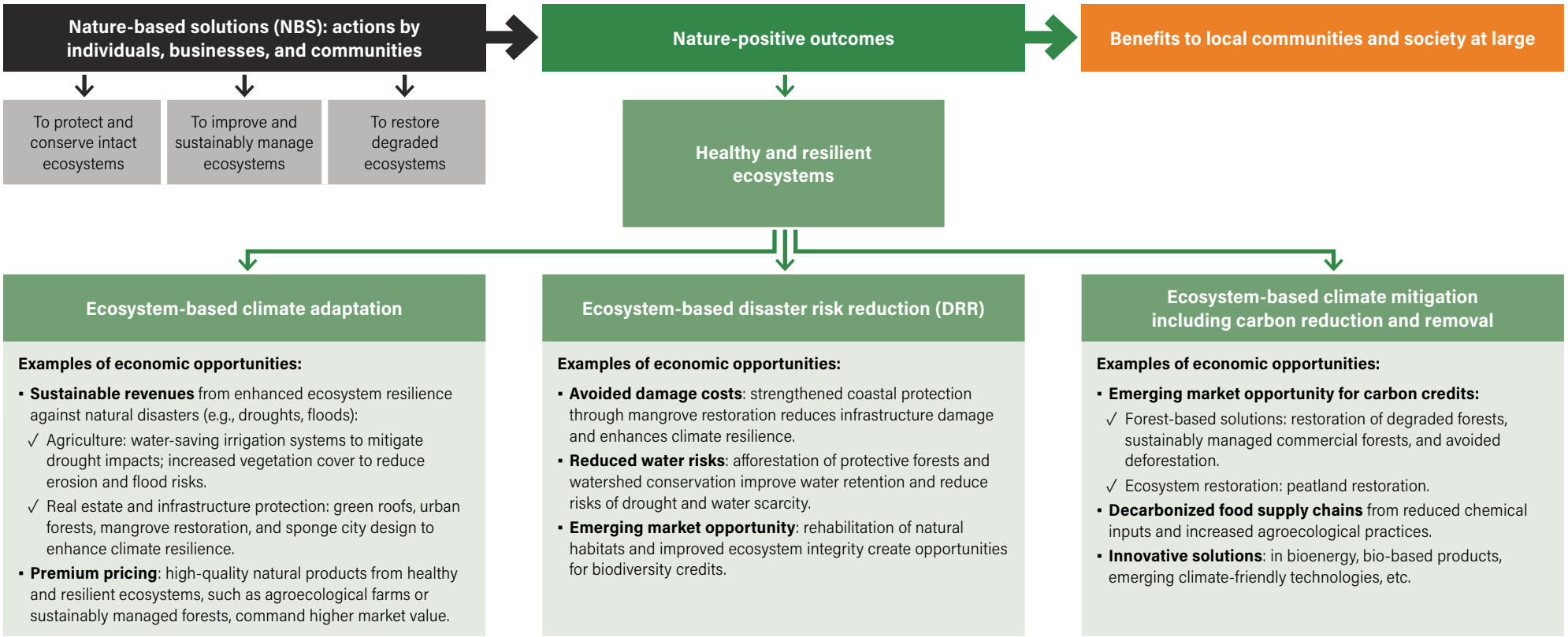
Nature-based solutions refer to localized actions to protect, conserve, restore, sustainably use, and manage natural or modified terrestrial, freshwater, coastal, and marine ecosystems. They address social, economic, and environmental challenges effectively and adaptively while supporting human well-being, providing ecosystem services, and resulting in resilience and biodiversity benefits (UNEA 2022). The United Nations Environment Assembly also recognizes that NBS

- require social and environmental safeguards;
- can be implemented in accordance with local, national, and regional circumstances;
- can help stimulate sustainable innovation and scientific research;
- contribute to climate actions, but do not replace the need for rapid, deep, and sustained reductions in greenhouse gas (GHG) emissions;
- can improve actions for adaptation and resilience to and mitigation of climate change and its impacts; and
- improve the potential of sustainable and environmentally sound bio-based products, innovations, and technologies that result from NBS to contribute to sustainable consumption and production and be beneficial to nature (UNEA 2022).

While the technical definition of NBS may not seem immediately relevant to financial institutions, these solutions can generate environmental outcomes that translate into tangible economic opportunities. Integrating NBS into investment strategies—through sectoral and geographic diversification and proactive assessment of nature-related opportunities—can help enhance portfolio resilience against escalating natural disasters, which is essential for long-term financial returns. This approach also strengthens regulatory compliance and unlocks new avenues for sustainable growth.

Figure 1 illustrates examples of economic opportunities linked to NBS in the real economy. It is important to note that these outcomes are not mutually exclusive but rather interconnected and mutually reinforcing. For example, planting protection forests in the upstream areas of a watershed not only helps reduce disaster risks like flooding and soil erosion but also contributes to climate mitigation by increasing biomass for carbon sequestration. Similarly, in coastal regions, mangrove restoration plays a key role in climate adaptation by enhancing coastal resilience. At the same time, it reduces disaster risks from storm surges, protects infrastructure

Figure 1 | **Examples of economic opportunities linked to NBS in the real economy**



Note: NBS: nature-based solutions.

Source: WRI authors based on UNEA 2022.

like seawalls, and increases carbon sequestration in the mangrove biomass (Ding et al. 2021). This interdependence makes it challenging to isolate and quantify the individual benefits of NBS investments. However, when implemented effectively, NBS can enhance ecosystem resilience and health, providing increased ecosystem services that directly or indirectly benefit both the local communities and society at large.

Additionally, by integrating NBS strategies from the outset, financial institutions can also strengthen their influence over investee companies' net-zero and nature transition plans (see Box 1 for definitions). This, in turn, enhances alignment with their own nature and climate goals.

The overlooked role of financial institutions in driving nature-positive impacts

Financial institutions play a pivotal yet often overlooked role in shaping nature's future. As illustrated in Figure 2, by allocating capital through traditional financing instruments in portfolio companies such as equity, loans, real estate, or bonds, mainstream financial institutions can directly influence economic activities. Their investment choices can either accelerate ecosystem and biodiversity degradation or drive restoration and protection, depending on how capital is deployed. These choices have far-reaching implications for long-term economic prosperity, risk exposure, and financial stability.

Investing in companies with positive impacts on nature can help steer the economic system toward a more sustainable trajectory by lowering both physical and transition risks (Figure 2, Path 1). For instance, in the agriculture sector, poor soil health, water scarcity, and reduced pollination caused by biodiversity loss can lower crop yields and livestock productivity, ultimately reducing revenues. By investing in companies that promote regenerative agricultural practices at the landscape level, financial institutions can help improve soil health, enhance water retention, and support biodiversity—contributing to more stable yields and long-term profitability for agribusinesses and commodity-based investments. While some of these benefits may accrue directly to individual firms, broader and more lasting impacts—such as resilient supply chains and ecosystem restoration—can be realized only if a critical mass of companies and financial institutions within a region adopts similar practices. Without this collective action, the system may not transform sufficiently to secure these wider benefits.

Conversely, continued investments in nature-harming companies reliant on unsustainable agricultural intensification and expansion—key drivers of land degradation and deforestation—amplify these risks (Figure 2, Path 2). The interplay between physical and transition risks significantly impacts financial performance and returns due to increased operational costs or direct damage costs.

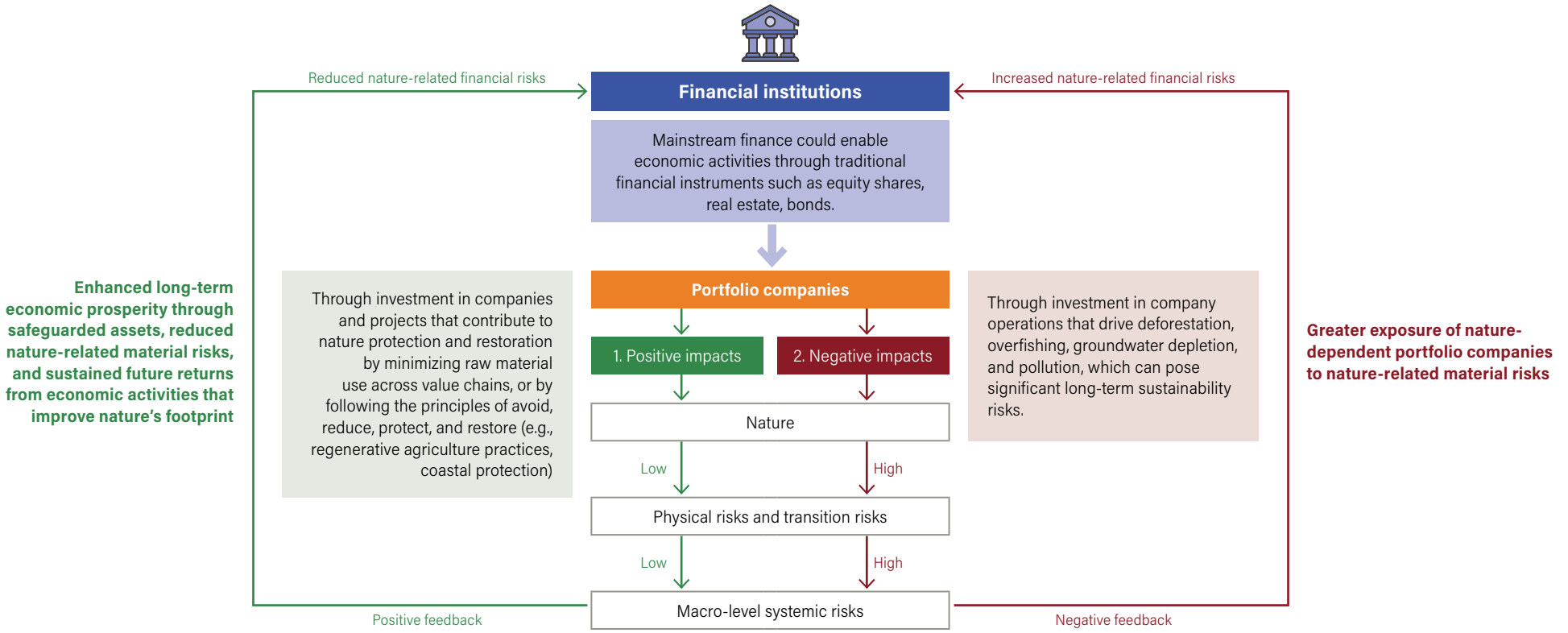
Box 1 | What are net-zero and nature transition plans?

Net-zero transition plans: Using the definition given by the Glasgow Financial Alliance for Net Zero, "a net-zero transition plan is a set of goals, actions, and accountability mechanisms to align an organization's business activities with a pathway to net-zero GHG emissions that delivers real-economy emissions reduction in line with achieving global net zero."[a] While the definition is implicit, it should be noted that nature's role in achieving net-zero extends beyond carbon removals. The way we manage natural ecosystems directly contributes to emissions, making interventions such as the deployment of NBS crucial for reducing emissions and enhancing climate resilience in sectors such as agriculture. Clearly, reaching net-zero is impossible without nature, yet nature's ability to sequester GHG emissions is rapidly diminishing due to rising temperatures.[b]

Nature transition plans: A nature transition plan refers to an aspect of an organization's overall business strategy that lays out the organization's goals, targets, actions, accountability mechanisms and intended resources to respond and contribute to the transition implied by the Global Biodiversity Framework where biodiversity loss is halted and reversed by 2030 to put nature on a path to recovery by 2050. Actions in such plans should prioritize real economy changes and may include: avoiding and reducing negative impacts; protecting, conserving, regenerating and restoring nature; transforming underlying systems to address the drivers of nature loss; and collaborating and engaging with Indigenous Peoples, Local Communities and stakeholders.[c] It tackles biodiversity loss and nature degradation, which are closely linked to climate stability, while supporting efforts to improve the resilience and productivity of ecosystems.

Notes: a. GFANZ 2022; b. Greenfield 2024; c. TNFD 2024.

Figure 2 | **How financial institutions impact nature through their investments**



Source: WRI authors based on key nature-related risks defined by the Taskforce on Nature-related Financial Disclosures (TNFD 2023c) and the Network for Greening the Financial System (NGFS 2024).

However, many financial mechanisms, such as subsidies, investments, and lending practices, are deeply embedded in a system that prioritizes short-term financial returns over long-term environmental sustainability (Soer et al. 2024). This system rewards industries that exploit natural resources without accounting for their true environmental costs, leading to overexploitation, pollution, and ecosystem collapse. By failing to internalize environmental externalities, the financial system reinforces a destructive cycle, jeopardizing the very natural assets that underpin long-term economic stability and prosperity.

Addressing this challenge requires a fundamental shift in the traditional finance landscape and in investment strategies, redirecting capital toward long-term, sustainable, landscape-scale initiatives (FfBF 2024a; Clark et al. 2018). While progress has been made in securing finance, implementing initiatives, and building knowledge, current efforts remain vastly inadequate to bridge the $200 billion annual biodiversity finance gap (K-MGBF n.d.) and align with the Sustainable Development Goals (SDGs) and nature-climate goals (IATF 2024; UNEP 2023).

To help close this gap and drive positive change, financial institutions can leverage three types of investments—adapted from the *MDB Common Principles for Tracking Nature-Positive Finance* (ADB et al. 2023)—that closely align with NBS:

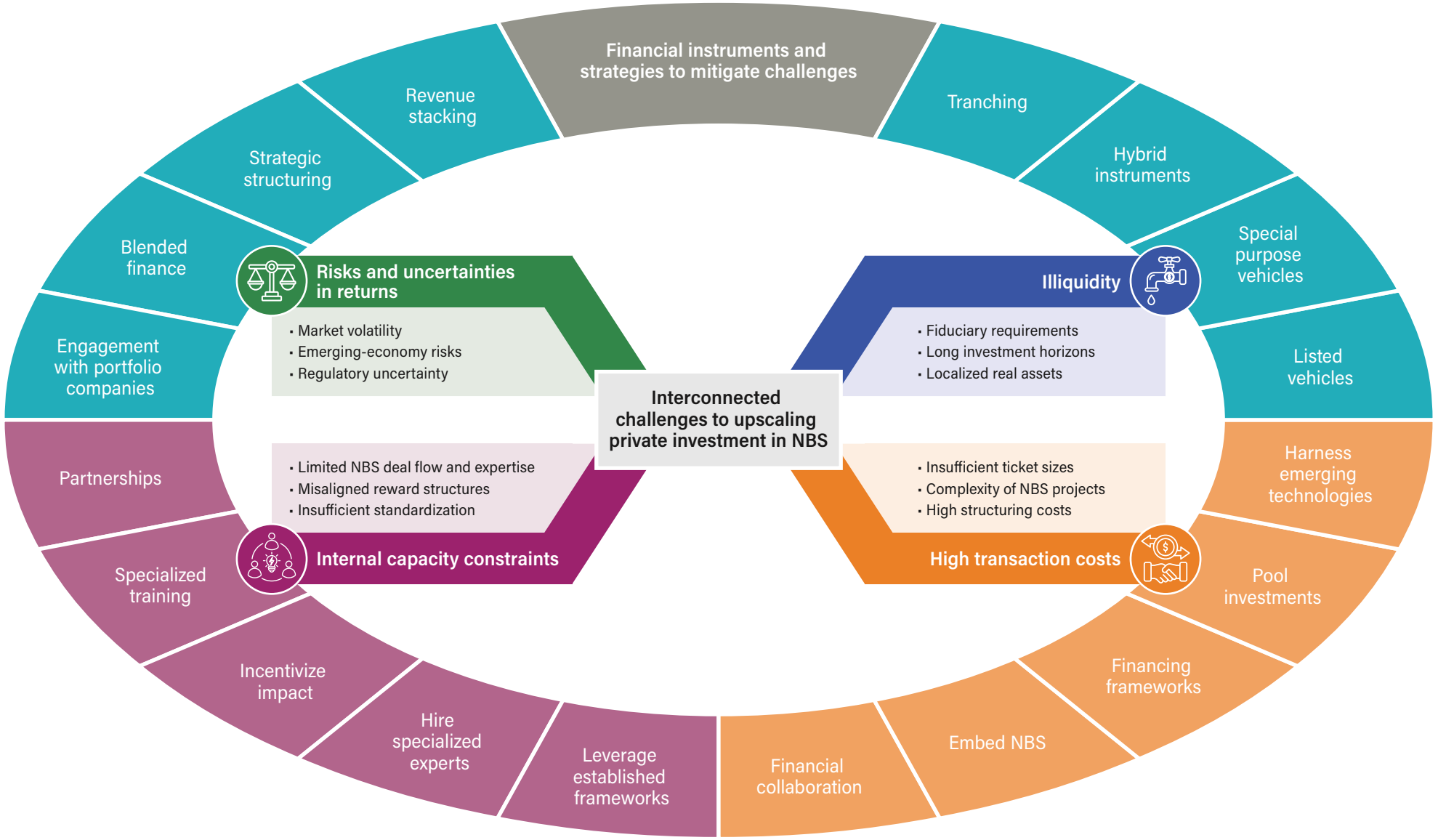
1. **Investments that reduce pressure on nature:** Financial institutions can prioritize investments that minimize harm to ecosystems by financing business models, projects, or sectors that alleviate pressure on natural resources. By actively engaging with companies in their portfolios and directing capital toward nature-positive initiatives, they can discourage harmful economic activities and promote business models that mitigate nature-related risks.
2. **Direct investments in nature to drive positive impacts:** These investments actively restore, protect, or enhance ecosystems, delivering measurable environmental benefits. Examples include funding habitat restoration, regenerative agriculture, or reforestation or supporting corporate nature and net-zero transition plans. While some benefits—such as improved resource efficiency or reduced operational risks—may be directly captured by the investing company, many others are public goods or positive externalities, such as enhanced climate resilience, lower disaster-related costs, and improved ecosystem services. Realizing the full value of these systemic benefits, and achieving meaningful, landscape-level transformation, requires coordinated efforts across multiple companies and financial institutions.
3. **Investments to strengthen finance architecture to prioritize nature:** Unlike (1) and (2), these investments focus on developing data infrastructure, innovative financial instruments, and mechanisms that drive nature-positive investments—such as green bonds, biodiversity-focused funds, sustainable finance, and supply chain finance—while enhancing engagement among key stakeholders and improving impact metrics. They create the enabling conditions, through policies, business models, sectoral instruments, and market incentives, to scale nature-positive finance.

Understanding the challenges in upscaling nature-related finance

Despite a growing market and an expanding number of stakeholders, scaling private investment in NBS remains a significant challenge. The concept of NBS is still relatively new, and the NBS investment market is in its early stages, lacking a strong track record and well-established market infrastructure (Knight et al. 2022; van Raalte and Ranger 2023; Brears 2022; WBCSD 2023; EIB 2023; UNEP 2021, 2023). At the same time, NBS span diverse, highly localized ecosystems, with benefits that emerge through complex, interdependent, and dynamic processes, making their measurement and valuation particularly challenging (Favero and Hinkel 2024; van Raalte and Ranger 2023; Seddon et al. 2020; Knight et al. 2022; EIB 2023) and limiting the bankability of NBS projects (Chausson et al. 2025). Several interlinked challenges have hindered the expansion and mainstream adoption of NBS investments, as shown in Figure 3.

These challenges fall into four overarching and interconnected categories: risk and uncertainties in returns, illiquidity, high transaction costs, and internal capacity constraints. Financial institutions can address these challenges through a variety of strategies. For instance, the strategies highlighted in the turquoise section of the solutions ring in Figure 3 help tackle both liquidity and risk/return challenges. Each challenge is briefly summarized below, with a more detailed discussion of coping strategies provided in Appendix B.

Figure 3 | **Key challenges hindering private investment in NBS and strategies for mitigation**



Note: NBS: nature-based solutions.

Sources: WRI authors informed by EIB 2023; WB 2020; Finance Earth 2021; Brears 2022; UNEP 2021, 2023; WBCSD 2023; Knight et al. 2022; TNC 2019; Favero and Hinkel 2024; NCSA 2024; WWF 2024; Convergence 2024; and Löfqvist et al. 2023, among others.

Challenge #1: Risks and uncertainties in returns

Mainstream private investment in NBS has been stifled by perceptions of NBS as having relatively higher risks and a limited track record of sufficient returns (Favero and Hinkel 2024). Investors often see NBS as generating insufficient returns relative to management costs and compared with other investment opportunities (Brears 2022). This is reinforced by the limited number of NBS transactions taking place (WBCSD 2023) and the lack of transparent, publicly available data on NBS project performance, which constrain investors' abilities to assess risks and returns (Knight et al. 2022).

Many NBS projects operate in higher-risk sectors or developing economies and face greater risks in relation to commodity price fluctuations, land tenure issues, currency vulnerabilities, political instability, and reputational damages (Knight et al. 2022; Löfqvist et al. 2023). These challenges complicate the financing and execution of NBS projects compared with those in developed markets (EIB 2023). Underdeveloped nature markets are also prone to higher volatility (WBCSD 2023), as seen in the 2022 carbon credit price drop from $16 to $5 due to decreased demand (Ahmed and Bravo Gonzalez 2023). Additionally, uncertain environmental and social returns—such as fluctuating carbon sequestration in reforestation (Wang et al. 2022), wetland flood control (Liu et al. 2021), or urban cooling benefits (Rakoto et al. 2021)—complicate performance forecasting.

Regulatory uncertainty and shifting policies further increase investment risks and compliance costs (UNEP 2023; Löfqvist et al. 2023). However, strong policy and regulatory frameworks can play a crucial role in de-risking investments and providing the clarity needed to attract private capital (Chausson et al. 2025).

Coping strategies are detailed in Appendix B: They include investment structuring and financial products such as hybrid instruments, tranching, revenue stacking, special purpose vehicles (SPVs), strategic investment structuring, and blended finance. Additionally, active engagement with portfolio companies can help de-risk investments, improve project performance, and enhance financial returns.

Challenge #2: Illiquidity

Liquidity—the ease of trading an asset and converting it to cash without significant price changes—is crucial for private investors (WEF 2023; Ding et al. 2017). Institutional investors face pressure from short-term financial market demands[2] and liquidity needs, driven by misalignment between investment horizons and compensation structures (Guagliano 2020). However, NBS investments tend to be illiquid due to NBS' localized nature, long time frames, regulatory uncertainty, and limited market infrastructure, especially in emerging economies (TNC 2019; Löfqvist et al. 2023).

NBS projects often take years to generate returns (Ding et al. 2017; Chausson et al. 2025), introducing uncertainty and increasing the risk of unmet outcomes. While some projects like agroforestry offer quicker returns, large-scale regeneration can take 10 to 30 years (WBCSD 2023; EIB 2023). This long time frame conflicts with mainstream investors' typical 5–10-year return expectations (EIB 2023), making alignment with structures like private equity funds or short-term public debt difficult (WBCSD 2023). Real assets such as land and infrastructure are particularly affected by this illiquidity (GFI 2024b).

Illiquidity also presents a challenge for institutional investors, especially in sectors like insurance and reinsurance, where regulatory frameworks such as Solvency II restrict engagement with illiquid assets (EIB 2023). The long time horizon associated with NBS-related investments does not align with investors' liquidity preferences. While some long-term investors may find NBS appealing, securitizing long-term projects could offer liquidity and broaden access to NBS investments (Ding et al. 2017), for example, through pooling NBS assets into tradeable securities like green bonds (Löfqvist et al. 2023). The application of such financial structuring to NBS investments requires further exploration and analysis.

Coping strategies are detailed in Appendix B: They include investment structuring and financial products such as listed vehicles, hybrid instruments, tranching, revenue stacking, SPVs, and strategic investment structuring.

Challenge #3: Transaction costs

While sustainability targets like GHG emission reductions and achieving the SDGs have a global scope, most NBS projects are small-scale, localized efforts. As a result, most investable NBS projects fall short of asset managers' and private investors' scale requirements (UNEP 2021; Löfqvist et al. 2023; Ding et al. 2017). Small-deal ticket sizes of under $10 million currently dominate investments in nature, which is below the threshold favored by institutional investors (PwC 2023; Mayor et al. 2021; EIB 2023; WBCSD 2023; Finance Earth 2021) and far below the average global private equity transaction of $157 million (Finance Earth 2021). Small deals incur higher transaction costs relative to potential returns and often require additional intermediaries to facilitate aggregation and deal structuring (Knight et al. 2022).

The nascent NBS market, with its localized focus, small ticket sizes, and prevalence in emerging economies, limits deal flow, which increases transaction costs by making each deal more complex and resource intensive. High structuring costs and the need for new, complex partnerships among implementers, investors, and other stakeholders such as communities and governments contribute to increased transaction costs (Knight et al. 2022; EIB 2023). This issue is compounded by the lack of standardization in definitions, verification, deal structures, instruments, and performance metrics in NBS investments, which literature suggests may contribute to higher transaction costs by complicating evaluation and risk-sharing mechanisms (Brears 2022; Knight et al. 2022). Knight et al. (2022) linked the absence of standardized deal structures, legal processes, and clear definitions to increased costs in NBS, noting that bespoke arrangements for each project can drive up legal fees and due diligence expenses. While the causal link between standardization and market growth remains an area for further exploration, emerging evidence suggests that reducing complexity through standardization could help reduce these costs and potentially facilitate scaling.

Coping strategies are detailed in Appendix B: They include financial collaboration, harnessing emerging impact measurement and management (IMM) technologies, using established financing frameworks, pooling investments, and embedding NBS within larger investments.

Challenge #4: Internal capacity constraints

Financial institutions face significant internal capacity constraints that limit their ability to integrate these opportunities into their portfolios and scale investments. These challenges stem from the nascent market, the structure of the financial sector, and the complex characteristics of NBS. A mismatch in expertise exists—NBS practitioners (e.g., pipeline developers) lack financial knowledge, while financial institutions often lack expertise in how to drive sustainability outcomes (Löfqvist et al. 2023). As a result, financial institutions can struggle to identify and assess suitable NBS projects, constraining their ability to build expertise and confidence in NBS investing (TNC 2019; Knight et al. 2022). The limited availability of investment-ready project pipelines meeting investor criteria further restricts market depth (TNC 2019). Many financial institutions cite this lack of experience and expertise as a major barrier to scaling private investment in NBS (WBCSD 2023).

Only a small portion of ecosystem benefits generate direct market value (de Groot et al. 2012). Ecosystem benefits, such as water and climate regulation, soil and water retention, and soil erosion control, are public goods, characterized by nonexcludability (benefits cannot be restricted to those who pay) and nonrivalry (one user's gain does not diminish availability for others). While these public benefits are crucial for broader societal well-being, they are challenging for financial institutions to incorporate into their portfolios due to the lack of clear revenue streams and established market infrastructure, which underscores that institutions are unlikely to put down capital for projects whose benefits primarily accrue to others. This highlights a key internal challenge in integrating nonmonetized benefits into portfolio decision-making. As a result, financial institutions may require the support of public-private partnerships or other frameworks and cooperation that help share or de-risk the costs of delivering these public benefits while private benefits accrue. Without such support, they may hesitate to invest, limiting engagement with NBS and hindering the development of institutional expertise in the sector.

Valuation challenges further complicate NBS investments, as benefits like biodiversity and water management arise through complex ecological processes (WB 2020). While emerging frameworks exist, gaps in standardized metrics and limited access to high-quality data and tools for quantifying impacts, coupled with a lack of institutional experience, pose significant barriers to due diligence in NBS investments (Rueedi and Whieldon 2022). Unlike more mature carbon markets with uniform metrics, NBS outcomes vary widely across ecosystems, making it harder to establish standardized key perfor-

mance indicators (KPIs) (EIB 2023). Mechanisms like sustainability certifications, KPI tracking, and safeguards often rely on generic and simplified metrics that fail to capture meaningful social and ecological outcomes (Chausson et al. 2025). To address this, the Nature Positive Initiative, among others, is developing nature metrics to support standardization (NPI 2025).

Internal capacity gaps are reinforced by misaligned traditional financial structures. While climate risk is gaining traction in mainstream financial training, programs such as the Chartered Financial Analyst certification typically exclude NBS, limiting relevant expertise development (Knight et al. 2022). Additionally, the pressure to keep fees low leads asset managers to prioritize low-cost, generalized analysis over specialized NBS investments (Knight et al. 2022). Fundamentally, reward structures in mainstream finance favor short-term returns to meet fiduciary obligations, discouraging investment in high-risk, long-term NBS projects (Knight et al. 2022). As a result, financial institutions struggle to build internal expertise, limiting investor confidence and the ability to scale NBS investment.

Coping strategies are detailed in Appendix B: They include forming technical partnerships, hiring specialized experts, implementing impact-linked compensation, creating specialized training programs, and leveraging established frameworks.

SECTION 3.

“INSPIRE” strategic alignment of investments with NBS opportunities

This section provides practical guidance for financial institutions to determine whether, where, and how to integrate NBS opportunities into their investment strategies to mitigate future risks while ensuring alignment with broader environmental and social goals.

Figure 4 outlines detailed steps that financial institutions can follow when considering NBS for their organizations. While these steps are presented sequentially for clarity, they do not follow a strict order but rather reinforce one another.

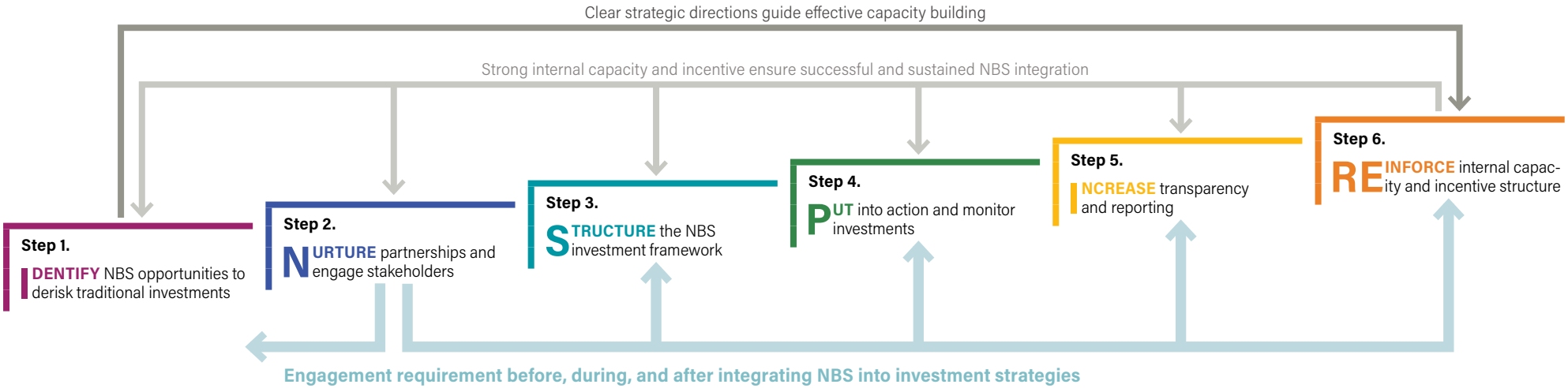
For instance, while establishing clear institutional objectives is essential for guiding strategic financial decisions and building investment portfolios, effective NBS investment also requires specialized expertise such as understanding nature-related impacts and dependencies—an area where many financial institutions lack in-house capabilities. As a result, identifying NBS opportunities and setting strategic investment directions (Figure 4, Step 1) often necessitate external technical support through strategic partnerships and engagement (Step 2). Moreover, a well-defined strategic direction (Step 1) enables financial institutions to develop internal capacities to bridge knowledge gaps (Step 6). In turn, strengthened internal expertise enhances NBS-related decision-making and supports long-term investment success. In fact, many of these steps are part of an important iterative process rather than a rigid sequence.

Step 1. Identify NBS investment opportunities to de-risk traditional investments

S1.1 Prioritize target sectors and asset classes

The conventional business model is becoming increasingly unsustainable and risky due to rising exposure to nature-related risks. Institutional investors must integrate these risks into their future return assessments and implement strategies to mitigate them through diversification or by spreading risks over extended time horizons.

Figure 4 | **Stepwise guidance to "INSPIRE" the alignment of investment with NBS opportunities**



Note: NBS: nature-based solutions.

Source: WRI authors based on initial consultations with financial experts specializing in nature finance.

A critical step in managing these risks is to conduct a comprehensive analysis of nature-climate risk exposure within the existing portfolios. This assessment helps investors understand how their portfolios are both impacted by and dependent on nature, enabling them to identify key actions for building diversified portfolios and actively mitigating and adapting to risks. This involves assessing both physical and transition risks across various sectors. Appendix C outlines the key steps for sector-specific risk-exposure mapping and available tools for conducting risk assessments.

Institutional investors can enhance their portfolios by developing targeted NBS investment strategies that focus on the sectors and regions most exposed to nature-climate risks. By selecting specific asset classes, investors can tailor their NBS-focused portfolios to align with their risk tolerances, investment horizons, and sustainability commitments. Examples of asset classes related to NBS investments include the following:

- **Public and private equity investments:** direct investments in companies actively integrating NBS to mitigate nature-climate risks, such as those involved in regenerative agriculture, green infrastructure, or nature-based technology innovations. These investments offer equity holders the potential for long-term value creation through the growth of environmentally responsible businesses.
- **Real assets**, such as properties designed with green infrastructure, that not only improve environmental resilience but also enhance property value.
- **Fixed-income products**, such as green and blue bonds and sustainability-linked loans, that raise capital for projects with environmental benefits, such as renewable energy, reforestation, and water conservation. These instruments incentivize businesses to adopt more sustainable practices by reducing financing costs when specific environmental goals are achieved.

Financial support to businesses engaged in NBS investments can strengthen business resilience while mitigating the financial risks associated with ecosystem degradation and climate change. Additionally, long-term NBS strategies might allow financial institutions to ride out short-term volatility; address environmental risk sources; and position their portfolios in line with long-term sustainability trends, such as the growing demand for nature-positive products and services. These approaches also support institutional sustainability goals, such as achieving net-zero; enhancing biodiversity; and fulfilling commitments under the SDGs, impact investment policies, and environmental, social, and governance (ESG) frameworks.

S1.2 Set the strategic directions for NBS investments

There are two strategic directions that institutional investors can adopt for their NBS investment portfolios: either investing in NBS as a core component of the business model or strategy to drive direct positive impacts on nature, or investing in NBS as a means to address drivers of environmental degradation.

(1) Investing in NBS as a core component of the business model or strategy: This approach involves financing initiatives that integrate NBS into the risk-mitigation or future-proofing strategies of portfolio companies, especially those highly dependent on natural ecosystems. It also includes providing capital for NBS projects that generate direct positive impacts on nature by protecting, conserving, restoring, and sustainably managing natural or modified ecosystems, including terrestrial, freshwater, coastal, and marine environments. Table 1 provides examples of NBS opportunities for risk mitigation by key sector. Examples by asset class include the following:

- **Fixed-income investments:** Investors can allocate capital to green or conservation bonds issued by governments or utilities to fund large-scale green infrastructure projects. Examples include upstream reforestation for water retention or mangrove restoration for shoreline protection. Such investments are particularly suited for impact investors, philanthropic foundations, or development banks prioritizing environmental and social impacts, even if financial returns are below-market rates.
- **Equities:** Investors can target private debt or equity in companies engaged in sustainable forestry, regenerative agriculture, ecotourism, and biodiversity-friendly product development. For example, regenerative farming practices improve soil health and resilience, strengthen supply chains, and reduce input costs. Investors can prioritize companies promoting regenerative agriculture as a pillar for agribusiness resilience. These nature-dependent businesses operate within larger value chains, creating ripple effects that amplify their sustainability impacts.

(2) Investing in NBS to address the drivers of environmental degradation: This approach involves financing initiatives that minimize resource extraction and consumption rather than directly restoring or conserving ecosystems. Investments may focus on the following:

- **Encouraging corporate environmental responsibility:** Asset managers can allocate capital to companies committed to enhancing their ecological footprints by reducing pressures on nature across their value chains. Investments can also support companies adopting circular economy models, which decrease demand for raw material extraction by increasing resource efficiency and reuse.
- **Providing incentives for sustainable practices:** Banks can provide favorable credit terms, such as higher credit ratings or lower interest rates, to companies with strong transition plans targeting net-zero emissions and nature-positive outcomes. For instance, financing real estate developers integrating green infrastructure such as green roofs can enhance the sustainability rating of their investments while supporting long-term resilience.
- **Ensuring compliance with environmental regulations:** Investors may prioritize companies sourcing raw materials strictly from nondeforested areas or those leveraging advanced technologies, including artificial intelligence (AI) and satellite data, to track supply chains and verify no-deforestation practices. This approach also aligns with stricter regulatory requirements, such as the EUDR, driving corporate adaptation.

By setting the right directions and investing in best-in-class companies, institutional investors and asset managers can optimize capital allocations, balance financial and sustainability goals with risk management, and scale impact without requiring full operational involvement in NBS projects.

S1.3 Conduct due diligence

Conducting thorough due diligence is crucial for NBS investments to ensure projects or portfolio companies are environmentally sustainable and socially responsible. Beyond financial evaluations, key considerations for NBS investment due diligence include the following:

- **Evaluating project developers and partners:** Assess the expertise and track records of local NBS project developers and partners. Ensure they possess the necessary experience and commitment to manage and sustain NBS projects effectively.
- **Conducting a comprehensive impact assessment:** Evaluate the broader environmental and social impacts of the project or portfolio company. This includes assessing the potential effects on carbon sequestration, biodiversity, water resources, and local communities.
- **Adhering to international frameworks:** Align the project and business model with recognized standards such as the Equator Principles,[3] which provide a risk management framework for determining, assessing, and managing environmental and social risks in project finance.
- **Complying with regulatory requirements:** Ensure the project or business operation complies with relevant environmental and social regulations. In regions like the European Union, the Corporate Sustainability Due Diligence Directive mandates that companies identify, prevent, and mitigate harmful human rights and environmental impacts within their operations.

By integrating these considerations into the due diligence process, investors can better factor in future financial risks while ensuring that NBS investments are both environmentally sustainable and socially responsible.

Step 2. Nurture partnerships and engage stakeholders

To successfully incorporate NBS into investment portfolios and scale these investments, financial institutions must proactively engage a diverse range of stakeholders at every stage—*before*, *during*, and *after* the NBS investment period. Before investment, this preparatory phase ensures that investments are well informed, financially viable, and aligned with environmental and social objectives. During the investment period, active engagement

enhances transparency, improves risk assessment, and creates enabling conditions for scaling NBS investments. After investment, strategic partnerships and ongoing engagement ensure the long-term success and scalability of NBS investments.

S2.1 Before investment: focus on knowledge gaps and due diligence (relevant for Steps 1 and 6)

- **Partner early with technical partners:** Investors considering NBS must adopt a holistic, landscape-level approach and develop a deep understanding of nature-related dependencies, risks, and impacts, which often requires interdisciplinary expertise. Partnering with technical partners, such as environmental nongovernmental organizations (both international and local), sustainability consultants, and NBS specialists, provides essential expertise in complex ecosystem modelling, socioeconomic impact analysis, financial analysis, and regulatory policy, areas where financial institutions may lack in-house expertise. Such partnerships offer investors cost-effective access to cutting-edge research, technology, and localized data on biodiversity, carbon sequestration, and ecosystem services. By engaging technical partners from the outset, investors can navigate the complexities of NBS investments, ensuring that projects are scientifically grounded, optimize environmental and social benefits, balance financial returns, and align with global conservation goals.
- **Work with companies committed to nature transitions and collaborate with project developers:** Close engagement with companies committed to nature transitions and partnerships with project developers are critical for establishing effective NBS investment strategies. This interaction enables financial institutions to identify viable projects, shape data collection and reporting processes, and assess project risks and returns more effectively. By actively collaborating with developers, investors can better align investments with long-term environmental and social objectives, enhancing both impact and financial resilience. Initiatives such as PRI Spring and Nature Action 100 provide structured platforms for investors to engage with companies on biodiversity- and nature-related risks. These efforts can help drive corporate action and integrate NBS into long-term business strategies.
- **Engage local communities and stakeholders:** Meaningful engagement with Indigenous Peoples, local communities, and affected stakeholders is essential during the due diligence process. High-quality engagement in priority geographies and landscapes ensures a comprehensive understanding of nature-related issues, fosters trust through transparency and mutual respect, and enhances risk management. Financial institutions should set clear expectations for stakeholder engagement, integrate these into investment criteria, and continuously monitor and report on portfolio companies' engagement activities (TNFD 2023b; Chausson et al. 2025). This approach enhances due diligence, mitigates social risks, and promotes positive social and environmental outcomes, aligning international standards and jurisdictional requirements.

S2.2 During investment: facilitate data- and knowledge-sharing and influence policy (relevant for Steps 1 and 3)

- **Collaborate with peers across the financial sector:** Collaborating with others in the financial sector is essential for developing shared methodologies, standards, tools, and databases to facilitate innovation and data-sharing in NBS investments. Advanced geospatial tools like satellite imagery, remote sensing, and geographic information systems enable precise tracking of NBS outcomes over large areas, aiding environmental monitoring impact assessments. However, financial institutions often lack direct access to these tools. Collaborative integration of geospatial data with financial models can enhance predictions of long-term returns and assessments of nature-related risks, supporting the development of structured NBS investment frameworks and asset classes. Given the potential costs and time investments, promoting shared innovation and standardized metrics is essential to reducing costs and ensuring consistency, thereby scaling NBS investments, and effectively managing the risks associated with climate change and biodiversity loss. Financial institutions can support this by organizing multistakeholder workshops, forums, or working groups to facilitate cross-disciplinary dialogue and collaboration.
- **Engage in dialogues with ministries of finance, central banks, and regulators:** Institutional investors play a vital role in advocating for policy frameworks that support NBS investment and promote supportive regulatory frameworks for NBS. Active engagement with ministries of finance,

central banks, and regulatory bodies can help shape fiscal policies, such as tax incentives, subsidies, and regulatory adjustments, that reduce financial barriers to NBS investment. Additionally, asset managers, who engage with regulators, can better understand evolving policies, enable informed decision-making within their portfolios, and ensure compliance with new regulations. Collectively, these efforts not only contribute to the development of transparent and science-based global standards for NBS, but also drive the integration of nature-related financial disclosure into regulatory frameworks.

S2.3 After investment: strengthen NBS monitoring and impact disclosure, tailoring marketing strategies (relevant for Steps 4 and 5)

- **Encourage transparent disclosure and alignment with global standards:** Institutional investors and asset managers should require portfolio companies to disclose their NBS-related engagement plans and outcomes. This transparency enables financial institutions to assess nature-related risks across value chains and provide targeted support to companies facing challenges. Integrating KPIs into sustainability-linked loans and other financial mechanisms can further enhance company performance by aligning financial incentives with environmental goals. However, concerns around potential greenwashing—where companies secure favorable loan terms without making substantial sustainability progress (Chavkin 2025)—highlight the need for rigorous reporting and accountability. To address this, institutional investors should adopt reporting and disclosure frameworks like the TNFD[4] and the SFDR.[5] Equity investors, whether holding minority or majority stakes, can also exercise active stewardship to ensure that portfolio companies remain aligned with strategic objectives and deliver measurable environmental and social outcomes throughout the investment period (see an example in Box 2).
- **Implement robust measurement, reporting, and verification frameworks:** Effective measurement, reporting, and verification (MRV) systems are crucial for ensuring the transparency, accountability, and credibility of NBS investments. Financial institutions should continuously engage portfolio companies and key stakeholders in establishing robust MRV mechanisms that enable the accurate tracking of environmental and social impacts. This includes leveraging geospatial technologies, third-party certifications, and independent audits to validate reported outcomes. A well-structured MRV system enhances investor confidence, supports risk management, and makes it possible to scale NBS investments by demonstrating verifiable impact.
- **Engage future clients with data-driven insights:** Demonstrating the financial and sustainability benefits of NBS investments through concrete performance data is essential for attracting future investors and clients. Asset managers should develop targeted communication strategies that showcase how NBS align with financial performance objectives, risk mitigation strategies, and evolving regulatory requirements. By providing tailored guidance on the long-term value of NBS investments, financial institutions can build investor confidence, expand market participation, and drive broader adoption of NBS as a core investment strategy.

Box 2 | Leveraging active stewardship for NBS action among portfolio companies

Through active stewardship, investors can impact corporate policies and engagement practices in listed and private equity, mandate the adoption of responsible practices and enhance management systems within private market investments, and develop engagement strategies for debt origination and reissuance in fixed-income investments.[a,b,c] For instance, Green Century Capital Management exemplifies how investors can effectively drive change within portfolio companies through a structured, three-tiered biodiversity strategy. They begin by engaging in dialogue with companies to seek resolutions. If these discussions fall short, Green Century files shareholder resolutions—either independently or in collaboration with others—to secure concrete commitments. It then maintains ongoing engagement with the companies, monitoring progress and providing support to ensure compliance with these commitments.[d] This approach played a role in encouraging Kraft Heinz, a listed corporation with a market capitalization exceeding $40 billion, to adopt its comprehensive, global Deforestation- and Conversion-Free Policy.[d,e]

Sources: a. PRI 2018a; b. PRI 2018b; c. FfBF 2024b; d. PRI 2024; e. KraftHeinz 2023.

Step 3. Structure the NBS investment framework

Once priority sectors and strategic directions for NBS investment are identified (Step 1), financial institutions can engage with stakeholders (Step 2) to establish their own NBS investment frameworks, which set clear criteria to guide the selection of NBS projects for their investment portfolios and identify suitable investable opportunities, instruments, and project pipelines.

S3.1 Set investment criteria for financial performance and environmental and social impacts

- **Financial metrics:** Identify KPIs such as return on investment (ROI), internal rate of return (IRR), and payback period. Consider the cash flow stability, risk-adjusted returns, and cost efficiency of the NBS.
- **Environmental metrics:** Establish measurable environmental outcomes such as carbon sequestration (e.g., volume of carbon dioxide captured through reforestation, wetland restoration, or soil management), water quality improvement (e.g., reduction in pollutants or improved freshwater availability through watershed protection and restoration), and biodiversity enhancement (e.g., increase in species diversity, success rates of ecosystem restoration projects, or improved habitat connectivity). While quantitative metrics provide concrete data, qualitative criteria are also vital, as some environmental impacts are challenging to quantify but remain equally important.

  However, it is critical to recognize that NBS investments do not always generate universal co-benefits but may involve trade-offs. For instance, climate and nature outcomes can sometimes be misaligned, such as in reforestation projects where the choice between indigenous, slow-growing tree species—crucial for biodiversity but with low commercial value—and fast-growing, non-native species—better for carbon sequestration and offering higher commercial returns—creates a conflict. While the ideal scenario is to achieve positive results for both climate and nature, careful evaluation is necessary to navigate these trade-offs and balance competing objectives. When co-benefits are unattainable, investments must adhere to the "do no significant harm" principle under the SFDR to ensure they do not undermine broader environmental or social goals (ESMA 2023).

- **Social metrics:** Incorporate both qualitative and quantitative social metrics to evaluate the comprehensive impact of an NBS investment. These may include the number and quality of local jobs created due to the investment, capacity-building initiatives for local communities, and projects that address the needs of marginalized groups while promoting equitable access to benefits and participation opportunities.

  However, social impacts can be complex and difficult to measure. To mitigate potential negative effects, investors must establish minimum standards. For instance, Triodos Bank has embedded minimum standards into its finance and investment processes, applying them to direct investments and credit agreements (Triodos Bank 2022). By exclusively offering Article 9 products under the SFDR, Triodos ensures that all investments meet the "sustainable investments" criteria defined in Article 2(17) of the SFDR.

S3.2 Establish clear criteria for project and portfolio company selection in four aspects

- **Estimate financial returns:** Set minimum financial return benchmarks aligned with the institution's overall investment goals. Incorporate nature-based investments into financial return estimations, develop a scenario analysis, and use common financial metrics to demonstrate their impacts.
- **Manage risk:** Assess an NBS project's capacity to mitigate nature- and climate-related risks (e.g., flood reduction, drought resilience) alongside regulatory risks. Integrating these risk assessments into business operation strategies can enhance risk-adjusted returns.
- **Align with sustainability goals:** Prioritize portfolios that support climate targets (e.g., net-zero commitments), deliver positive environmental and social impacts, and align with broader sustainability initiatives (e.g., the SDGs, the Kunming-Montreal Global Biodiversity Framework, TNFD) and regulations (e.g., SFDR, CSRD, EUDR).
- **Ensure scalability and replicability:** Prioritize NBS investment projects with the potential to scale and be replicated to maximize both environmental and social impacts and financial viability. Scalability refers to the potential of a project to expand its scope or size effectively—e.g., demonstrated financial returns and scale of impact—while replicability involves the ability to reproduce the project's success in different regions or contexts.

S3.3 Identify investable NBS opportunities and risks

Building on the selection criteria outlined immediately above, financial institutions can leverage the NBS investment catalog (in Table 1) to develop NBS-related investment strategies and financing structures. While not exhaustive, this catalog helps identify and map investable NBS opportunities by asset class, potential investor, suitable investees, and expected environmental outcomes, with a focus on TNFD priority sectors that are highly exposed to nature-climate risks. Incorporating NBS into investments in these priority sectors can enhance portfolio diversification, strengthen financial resilience against future risks, and improve risk-adjusted returns while supporting global sustainability objectives and generating positive environmental and social impacts.

Table 1 | **NBS investment catalog**

CATALYZING INVESTABLE NBS OPPORTUNITIES FOR PRIORITY SECTORS						
Type of financing	**Asset classes**	**Investors**	**Suitable investees**	**Investable NBS opportunities**	**Primary focus of NBS investment**	**Relevant TNFD priority sectors**
Equity financing The investment decision is determined by a company's underlying financial performance, profitability, and future returns, and reflected in investors' confidence in the market valuation and future earnings potential of a company.	Private equity (preferred shares) **S/M**	Angel investors, venture capital	Start-ups and SMEs in NBS innovations and technology	Invest in innovative and technological nature projects to adapt to and mitigate physical and transition risks and create nature, environmental, and social benefits	Ecosystem-based climate adaptation and mitigation	All
	Public equity (common stock) **L**	Institutional and retail investors	Large companies, corporations, or funds	Invest in shares of companies that fund NBS projects for nature-climate risk prevention and supply chain resilience	Ecosystem-based climate adaptation, mitigation, and DRR	1) Food and beverage, (4) extractives and mineral processing, (5) health care (esp. pharm), (7) consumer goods

Table 1 | **NBS investment catalog (cont.)**

CATALYZING INVESTABLE NBS OPPORTUNITIES FOR PRIORITY SECTORS						
Type of financing	**Asset classes**	**Investors**	**Suitable investees**	**Investable NBS opportunities**	**Primary focus of NBS investment**	**Relevant TNFD priority sectors**
Debt financing The investment decision (except responsible investment) is affected by earnings and credit risks related to debt repayment capacity and/or devaluation of existing collateral. The repayment capacity is affected by projected earnings and costs.	International project loans **M**	Banks (incl. development banks)	Public REDD+ projects	Invest in large-scale green infrastructure (public investment)	Ecosystem-based climate mitigation	(4) Extractives and mineral processing
	Private loans **S/M**	Banks and insurance companies	Companies and individuals	Provide loans, credits, and insurance products to implement projects that adapt to and mitigate physical and transition risks	Ecosystem-based climate adaptation and DRR	(1) Food and beverage, (7) consumer goods
	Fixed income (bonds, asset-backed securities) **L**	Banks	Govts investing in public infrastructure, renewable energy projects	Issue bonds and securities for public green infrastructure or projects (e.g., watershed restoration) with positive impacts on nature	Ecosystem-based climate adaptation, mitigation, and DRR	(2) Renewable resources and alternative energy, (3) infrastructure, (8) transportation, (9) utility and energy generators
	Responsible investment (microfinance, env and socially responsible investment) **S**	Banks (incl. development banks)	Smallholders, local communities	Provide loans and credits to support the implementation of projects that are proven to have nature, environmental, and social benefits	Ecosystem-based climate adaptation and mitigation	(1) Food and beverage, (7) consumer goods
	Real estate **S/L**	Banks, insurance, and private pension investors	Developers and individuals	Provide loans, credits, and insurance products to support the integration of NBS features (e.g., green roofs) in existing buildings and new construction	Ecosystem-based climate adaptation and DRR	(3) Infrastructure
	Infrastructure **L**	Banks (incl. development banks), insurance, and private pension investors	Developers and governments	Invest in large-scale green infrastructure (public investment)	Ecosystem-based climate adaptation, mitigation, and DRR	(2) Renewable resources and alternative energy, (8) transportation, (9) utility and energy generators
	Commodities (ag products, carbon credits, water) **S**	Institutional and retail investors	Commodity producers or suppliers	Invest in commodities associated with nature conservation and restoration activities (e.g., EUDR supply chains, carbon credit projects, water provision)	Ecosystem-based climate mitigation and adaptation	1) Food and beverage, (4) extractives and mineral processing (esp. forestry), (7) consumer goods

Notes: S: small ticket size (<$1 million); M: medium ticket size ($1–$100 million); L: large ticket size >$100 million); NBS: nature-based solutions; TNFD: Taskforce on Nature-related Financial Disclosures; SME: small and medium-sized enterprise; DRR: disaster risk reduction; pharm: pharmaceuticals; REDD+: Reducing Emissions from Deforestation and Forest Degradation plus sustainable management of forests and carbon stock enhancement and conservation; Govts: governments; env: environmental; incl.: including; ag: agricultural; EUDR: European Union Regulation on Deforestation-Free Products; esp.: especially.

Source: WRI authors.

Building and implementing successful NBS investment strategies requires overcoming the challenges inherent in NBS investments (as outlined above in "Understanding the challenges in upscaling nature-related finance"). Appendix B provides a comprehensive list of existing or emerging financing instruments that can help address investment barriers. Investors must identify the financial instruments best suited for their intended investments. Tailored financial instruments or innovative solutions, such as blended and structured finance, are essential for effectively deploying capital, meeting the complex financing needs of NBS projects, and managing risks in emerging economies (Step 4). When managed well, these investments can create significant opportunities for risk mitigation, future financial growth, and the development of new markets, which are explored in greater detail in section 4: "Harnessing NBS to create financial opportunities." Examples illustrating these applications are detailed in section 5: "Real-world examples."

Step 4. Put into action and monitor investments

S4.1 Deploy capital to NBS projects

To minimize risks, institutional investors can pilot NBS strategies by deploying a limited amount of capital in early-stage initiatives or supporting sector-specific partnerships. Given the unique challenges of NBS investments—such as uncertain returns, long payback periods, illiquidity, and potential cost overruns—various financial instruments can be leveraged or enhanced to manage risk, attract different types of investors, and provide flexibility in funding. Appendix B presents a comprehensive list of these instruments. Structured financial tools, such as SPVs, green bonds, and blended finance, can be particularly interesting for structuring NBS investments, as they attract larger pools of capital, enhance flexibility, and improve risk management for scaling successful projects. Following are two examples:

- **Sustainability-linked loans for sustainable agriculture and resilient food production:** Institutional investors can offer favorable interest rates to companies like Unilever or farmers implementing agroforestry and generative agriculture, with KPIs measuring impacts. These financial instruments can make sustainable agriculture more accessible to farmers, reduce monoculture dependency, and scale climate-smart farm transitions. The resulting benefits include carbon sequestration; improved soil health; higher crop yields; and resilience against droughts, floods, and pests (FOLU 2023). Additionally, these investments unlock new revenue streams via carbon credit sales and premium-quality crop production.
- **Catalytic capital for blended finance or green bonds supporting urban green infrastructure:** Institutional investors can invest in green bonds to finance urban green infrastructure projects such as green roofs and walls, rain gardens, urban forests and street trees, or constructed wetlands. These projects help mitigate natural disaster risks, reduce urban heat islands, manage stormwater, improve air quality, and enhance the aesthetic and economic value of urban spaces. For instance, municipal green bonds have enabled cities like Toronto, Canada; Cape Town, South Africa; and San Francisco, United States, to raise funds for green and low-carbon infrastructure through debt markets, paying investors periodic interest until maturity, when the principal is repaid (WEF 2023). Further innovations, such as enabling corporate off-takers to resell these assets, could be to enhance liquidity and attract institutional capital.

By investing in NBS through partnerships and structured finance, institutional investors can gain practical insights into project characteristics, data challenges, capacity gaps, and potential returns. For example, partnering with initiatives like the Restoration Seed Capital Facility can help mitigate early-stage investment risks through co-financing, helping to develop NBS-focused investment funds and robust project pipelines. While these investments may represent a small share of portfolios, they offer a cost-effective, hands-on way to test financial structures' NBS at scale.

Given the prevalence of NBS opportunities in emerging economies, institutional investors should actively engage with development finance institutions and impact investors to mitigate structural, financial, and operational risks in these regions. Partnerships with intermediate NBS project developers (such as NatureVest, Ecotierra, TreeVive, or Barka Fund) can help aggregate and structure NBS projects, improving deal flow and investment efficiency. By working with these developers, investors can streamline the investment process and access larger, more diverse project portfolios, maximizing both financial and environmental returns. Additionally, the Coalition for Private Investment in Conservation's blueprints offer model financial transaction structures that can help guide investors in replicating successful NBS investments in areas such as coastal resilience, green infrastructure, and sustainable agriculture (CPIC n.d.).

S4.2 Measure and manage the impacts of NBS investments

NBS projects often generate significant localized impacts on nature and people, making effective impact management essential for financial institutions. Impact measurement and management involves analyzing both the positive and negative effects of investment strategies on environmental and social outcomes while implementing processes to mitigate adverse impacts and enhance beneficial ones (GIIN 2024a). However, due to the complex interactions within natural systems, measuring and attributing impacts remains a challenge.

As the investment landscape evolves, IMM will be increasingly critical for capitalizing on emerging market opportunities and managing physical, reputational, and regulatory risks. In this context, it is essential to distinguish impact measurements from ESG ratings (see Box 3).

While the methodology and data for IMM remain nascent, a robust system can enhance investor value by optimizing portfolio performance through effective management for long-term financial growth; mitigating reputational and regulatory risks, ensuring compliance with evolving sustainability standards; strengthening credibility and competitive positioning by substantiating impact claims with rigorous measurement; and expanding access to emerging economies where NBS investments present growing opportunities. Therefore, investing in internal capacity, data, and technology to improve IMM is a strategic priority for financial institutions seeking to future-proof their businesses in a rapidly evolving, sustainability-driven market that increasingly integrates NBS.

Approaching the impacts of NBS investments through the lens of double materiality

Double materiality enables financial institutions to assess both financial materiality—how nature-related risks and opportunities impact the financial performance of investments—and impact materiality—how investments

Box 3 | **ESG ratings versus impact measurements**

Over the past two decades, ESG ratings have become widely used by corporations and financial institutions to guide mainstream investment decisions, particularly in public markets.[a] However, ESG investing is often mistaken for responsible or impact investing, despite fundamental differences:

- ESG ratings rely on publicly reported data to assess how organizations manage sustainability-related risks and opportunities. They typically rely on backward-looking measures that capture the outcomes of regular business operations.
- Impact measurement, in contrast, takes a forward-looking approach by assessing the tangible, measurable environmental and social benefits of an investment. Unlike EGS ratings, it focuses on real additionality[b]—impacts that would not have occurred without the allocated capital.
- For financial institutions, adopting robust impact measurement frameworks is essential to avoiding "impact washing"—the practice of making misleading claims about sustainability performance—and to ensure that investments generate genuine, measurable contributions to sustainability goals.

Notes: a. Foroughi 2022; b. In NBS investments, additionality refers to the measurable environmental, social, or economic benefits that would not have occurred without the investment. It ensures that projects deliver real, meaningful outcomes rather than just supporting existing activities. There are two key types of additionalities. The first is environmental additionality, which represents the extra positive impact on ecosystems, biodiversity, or climate from the investment, such as increased carbon sequestration. The second is financial additionality, which measures whether the investment supports a project that would not happen otherwise due to funding gaps. Demonstrating additionality is crucial for credibility, helping investors avoid greenwashing and ensuring tangible outcomes.

in NBS affect environmental and social systems. As a fundamental component of corporate sustainability reporting and disclosure requirements, double materiality assessments help financial institutions gain a comprehensive understanding of material risks. These risks range from individual risks such as physical damages affecting future returns, legal liabilities, and reputational harm, to broader systemic risks that affect the entire financial system (CSF 2022).

By actively engaging with portfolio companies, financial institutions can push for greater transparency in disclosing the nature- and people-related impacts of NBS investments, as discussed in Step 2. This approach enables them to better assess impact risks, navigate evolving regulations more effectively, and mitigate impact washing (Box 4). The growing trend of stricter environmental regulations requires financial institutions to proactively adapt their strategies. Regulatory compliance not only reduces risks—such as penalties and reputational damage—but also creates opportunities for growth in the NBS sector. By aligning investment strategies with regulatory frameworks such as the SFDR and EUDR, institutions can strengthen their market positions and capitalize on emerging sustainability-driven opportunities (ADB et al. 2023). For a comprehensive list of corporate and financial disclosure and reporting regulations and frameworks, see Table 4 in Step 5.

Developing tailored IMM strategies for direct and indirect NBS investments

After identifying material NBS investment–related activities and impacts, financial institutions must develop tailored IMM strategies to effectively manage these impacts and mitigate risks. The approach to IMM will vary depending on whether investors are directly investing in NBS or indirectly financing NBS.

1. **Direct NBS investment** involves allocating capital directly to NBS projects, providing investors with greater visibility into project operations. This enables active engagement with project developers and local communities to codevelop the impact strategy, methodologies, metrics, and data used for effective IMM over the long term. However, despite having more control over impact delivery, direct investors often face limitations due to the relatively small scale of investable NBS projects.
2. **Indirect NBS investment**, on the other hand, operates at the portfolio level, where investors integrate impact-linked KPIs into financing agreements. These investors rely more heavily on borrower disclosures and third-party assessments to track contributions to climate and biodiversity goals. While they may have less direct control over project-level impacts, they can exert broader influence by engaging portfolio companies, leveraging financial incentives, and using risk management tools to align capital with sustainability outcomes.

For a detailed comparison of IMM actions and strategies for direct and indirect NBS investments, see Table 2.

Box 4 | Managing reputational risks and impact washing in NBS investments

Financial institutions face increasing reputational risks as watchdog organizations and transparency platforms expose problematic financial flows linked to harmful environmental or social impacts. For example, BankTrack's Dodgy Deals database identifies investments in projects harmful to human rights and ecosystems,[a] while the Forests & Finance coalition tracks financial ties between investors and companies with negative impacts on tropical forests and local communities.[b] These platforms serve as vital tools for holding institutions accountable and influencing responsible investment practices.

As impact washing (misleading sustainability claims) becomes more prevalent, AI and machine learning (particularly natural language processing) offer new opportunities to analyze large volumes of sustainability data, identifying inconsistencies and false claims.[c] These technologies enable more effective due diligence, helping financial institutions manage risks and ensuring that NBS investments deliver real, measurable impacts.

Notes: a. Banktrack 2024; b. F&FC 2024; c. Huang et al. 2023; Boedijanto and Delina 2024; Moodaley and Telukdarie 2023.

Table 2 | **Actions for measuring and managing impact in NBS investments**

STEP	DIRECT NBS INVESTMENT	INDIRECT NBS INVESTMENT
1. Establish clear impact metrics	▪ Select granular, project-level metrics. ▪ Align metrics with recognized frameworks. ▪ Customize for local ecological and social context. ▪ Engage local experts to ensure metrics are contextually relevant and capture real, additional impacts.	▪ Use portfolio-level, outcome-based metrics that align with investment strategy. ▪ Align metrics with impact-linked KPIs (sometimes referred to as sustainability performance targets, or SPTs). Ensure KPIs credibly contribute to portfolio targets and impact. ▪ Leverage external benchmarks and third-party frameworks for consistent measurement across investments. ▪ KPIs must be directly relevant, material to the specific NBS objectives and sector, adapted to the local context, and focused on measuring outcomes, such as absolute biodiversity gains or progress against the key drivers of biodiversity loss or toward conservation goals.
2. Develop baselines for impact assessment	▪ Engage with project developers to develop the baseline, using remote sensing, ground truthing data, and community surveys, to establish initial conditions and develop localized NBS impact indicators and metrics for tracking additionality while ensuring alignment with TNFD, GRI, and SBTN. ▪ Use the Ecosystem Services Valuation Database to monetize ecosystem benefits.	▪ Collaborate with borrowers to define prefinancing baseline performance and set impact expectations. ▪ Integrate impact-linked financial incentives. ▪ Ensure borrowers track relevant KPIs linked to portfolio investment goals. ▪ Ensure that KPIs are based on clear, objective data, and have a documented baseline that can be tracked over time for accurate progress assessment. ▪ Use the Impact Management Norms' five dimensions of impact to approach measuring the impacts of investments on nature and people.
3. Review and align impact reporting practices	▪ Evaluate whether investees use recognized frameworks for impact reporting. ▪ Identify gaps or discrepancies in reported data and support investees in improving transparency. ▪ Consider third-party verification for credibility.	▪ Assess borrower impact disclosures against institutional IMM standards and regulatory requirements. ▪ Ensure verifiability of KPIs through external audits (third-party verification) to guarantee transparency and accountability. ▪ Data and outcomes associated with KPIs must be externally verifiable to ensure transparency and accountability.
4. Establish IMM reporting requirements	▪ Set clear IMM requirements for investees, ensuring alignment with project-level impact goals. ▪ Engage in ongoing dialogues with investees to refine strategies and improve data collection.	▪ Define IMM reporting obligations in financial agreements (e.g., annual KPI audits for SLLs). ▪ Communicate expectations for reporting and third-party verification for impact-linked products to ensure credibility. ▪ Standardize impact disclosures across the portfolio for easier aggregation and analysis.
5. Manage and use impact data for decision-making	▪ Use impact data to adjust portfolio strategies and improve future NBS investments. ▪ Apply insights to manage risks. ▪ Report verified impact to investors, regulators, and stakeholders. ▪ Engage with investees (active stewardship) to enhance outcomes.	▪ Aggregate impact data to assess portfolio-wide performance trends. ▪ Use data analytics to detect underperforming impact-linked instruments and adjust broader investment strategies accordingly. ▪ Apply financial incentives and/or penalties to drive corrective actions.

Notes: NBS: nature-based solutions; KPI: key performance indicator; TNFD: Taskforce on Nature-related Financial Disclosures; GRI: Global Reporting Initiative; SBTN: Science Based Targets Network; IMM: impact measurement and management; SLLs: sustainability-linked loans.

Sources: WRI authors, informed by PBAF 2024; IFC 2023, 2024; UNDP 2023; APLMA et al. 2023; NPI 2025; Impact Frontiers n.d.a, n.d.b; Chausson et al. 2025.

Managing and incorporating impact risks into NBS investment decision-making

While identifying and mitigating impact risks through effective IMM strategies is crucial, future-proofing investment portfolios requires integrating impact risk considerations into NBS investment decision-making. Although impact risk assessment remains an emerging field within impact management, and widely accepted methodologies are still being developed, investors can begin applying qualitative assessment frameworks. For instance, Social Value International (Impact Frontiers n.d.b) has developed an approach that integrates nine types of impact risk into a cumulative impact risk score for each investment. The likelihood and consequences of these risks vary depending on an enterprise's context and strategy. By assessing both factors, investors can determine which risks are most relevant and incorporate them into their impact rating, leading to more informed investment decisions in NBS.

S4.3 Refine and scale NBS investments through a learning-by-doing approach

To successfully scale NBS investments, financial institutions must adopt a learning-by-doing cycle, leveraging insights from pilot projects to refine investment strategies. Key learnings include the following:

- **Evaluate performance regularly:** Continuously track NBS investment performance to determine whether projects are meeting expectations. For small pilot cases, it is crucial to evaluate performance regularly and scale the successful projects to maximize institutional impact and returns. Strategies should be adjusted as needed to align with financial, environmental, and social goals.
- **Identify challenges and adjust:** For underperforming initiatives, institutions must pinpoint key challenges and implement strategies to adjust course. This iterative approach enhances project effectiveness, aligns investments with institutional priorities, and ensures long-term sustainability.

Step 5. Increase transparency and reporting for market proposition

S5.1 Align with major impact reporting frameworks

Table 3 provides a summary of internationally recognized reporting frameworks. Materiality impact reporting and disclosure regulations are under increasing scrutiny. Leading global initiatives—including the International Sustainability Standards Board, the Global Reporting Initiative (GRI), and TNFD—are working together to develop nature-related reporting frameworks that provide structured methodologies and standardized metrics.

Over time, frameworks are becoming increasingly interoperable. In 2024, TNFD and GRI published joint guidance for impact metrics related to carbon reductions, biodiversity gains, and flood resilience in NBS investments (TNFD and GRI 2024). Additionally, the International Finance Corporation (IFC), in collaboration with BNP Paribas, the Finance for Biodiversity Foundation, Natixis Corporate & Investment Banking, TNFD, and the Wildlife Conservation Society, published a new supplement to the IFC's *Biodiversity Finance Reference Guide* (IFC 2024). This supplement enhances impact reporting by providing indicative metrics for each eligible biodiversity finance activity identified in the original guide, making it easier for investors and asset managers to effectively track and report on their biodiversity investments. These improvements help investors and asset managers align nature-related disclosures more effectively across multiple frameworks and reduce relevant materiality risk.

Table 3 | **Overview of impact-related initiatives and frameworks for disclosure and reporting**

	SUSTAINABILITY ACCOUNTING STANDARDS BOARD	GLOBAL REPORTING INITIATIVE	EUROPEAN SUSTAINABILITY REPORTING STANDARDS	TASKFORCE ON NATURE-RELATED FINANCIAL DISCLOSURES	SUSTAINABLE FINANCE DISCLOSURE REGULATION	IMPACT REPORTING AND INVESTMENT STANDARDS PLUS (IRIS+)
Type	Disclosure standard	Disclosure framework	Regulatory framework (EU)	Disclosure framework	Regulatory framework (EU)	IMM system
Developer	International Financial Reporting Standards	GRI	European Financial Reporting Advisory Group	TNFD	European Commission	Global Impact Investing Network
Materiality	Financial materiality	Double materiality (focus on impact materiality)	Double materiality (financial and impact)	Flexible materiality (includes financial and impact)	Double materiality (financial and impact)	Impact materiality (applicable for double materiality)
Purpose	To help companies disclose financially material sustainability information to investors	To help organizations disclose their ESG impacts	To standardize corporate sustainability reporting across the EU, primarily for EU-regulated entities	To provide guidance for reporting and acting on nature-related risks and opportunities	To enhance transparency in sustainable finance by mandating standardized disclosures on sustainability risks and adverse impacts for EU entities and those with products marketed to EU clients	To standardize IMM for impact-focused investors
Metrics	77 industry-based standards focusing on financial impacts of nature issues (e.g., energy use, water mgmt., climate change)	Universal standards, sector standards, topic standards, including updated biodiversity standard and community impact	Broad sustainability metrics aligned with EU regulations, covering ESG aspects	Core metrics are by impact driver for nature change	Standardized qualitative and quantitative disclosures on sustainability risks, principal adverse impacts, and sustainable asset ratios	Impact metrics across categorizations, including industry, SDGs, and dimensions, and specific metrics for ecosystem services, biodiversity, sustainable use, community impact
Relevant investment goals and impact targets	Financial returns only (corporate reporting)	Financial returns with impact and impact driven (corporate reporting)	Financial returns with impact (corporate reporting)	Financial returns with impact (investor focused)	Financial returns with impact (investor focused)	Financial returns with impact and impact driven (investor focused)

Note: GRI: Global Reporting Initiative; TNFD: Taskforce on Nature-related Financial Disclosures; EU: European Union; IMM: impact measurement and management; ESG: environmental, social, and governance; mgmt.: management; SDGs: Sustainable Development Goals.

Sources: UNEP-WCMC 2024; GIIN 2024b; TNFD and GRI 2024; European Commission n.d.

Financial institutions should determine what they will report and align with the frameworks and standards that best meet their objectives. They are not limited to a single framework—in practice, many institutions use multiple interoperable frameworks to capture impacts comprehensively and meet regulatory requirements. When selecting reporting frameworks, institutions should consider the following aspects:

- **Alignment with investment strategy and objectives:** Financial institutions should strive to exceed the minimum requirements of these frameworks and standards, enabling them to capture the full scope of their positive impacts. This proactive approach enhances transparency, builds stakeholder trust, and strengthens risk management while guiding capital allocation toward nature-positive outcomes.
- **Relevance to sector and asset class:** Ensure the selected frameworks address sector-specific risks and asset class characteristics. This is particularly important for asset managers tracking detailed project-level impacts. Frameworks like the European Sustainability Reporting Standards, GRI, and Sustainability Accounting Standards Board are designed for corporations and can help financial institutions understand investees' impacts, though it may be less applicable for financial institutions' own reporting.
- **Geographic considerations:** Select frameworks that align with regional regulatory requirements. For example, financial institutions operating in the EU or marketing to EU clients must comply with the SFDR.

S5.2 Communicate impact results effectively

Financial institutions must clearly communicate investment impact results to clients, regulators, and internal teams, ensuring alignment with impact goals and regulatory requirements. Transparent communication builds trust with stakeholders, demonstrates accountability, and highlights the environmental and financial impacts of NBS investments. By proactively engaging with stakeholders, institutions can reinforce their market positions and drive long-term commitments to sustainability goals.

Step 6. Reinforce internal capacity and incentive structure

As outlined in previous steps, NBS investments require specialized technical knowledge and expertise that are often lacking in the traditional finance sector. While leveraging external expertise through strategic engagement (Step 2) provides a cost-effective short-term solution, financial institutions must also invest in internal capacity-building—whether through recruitment or staff training—to improve engagement with external experts and ensure long-term success. This effort should be guided by clear NBS investment strategies (Step 1) to maximize efficiency and impacts. Additionally, incentive structures should be strengthened to reward impact-oriented investments, facilitating sustained success.

S6.1 Invest in internal staff training

Ideally, internal training should be conducted by external experts. Financial institutions can collaborate with universities to design and implement targeted training programs that address specific knowledge gaps when integrating NBS into investment strategies, as outlined in the *Guidebook*. For instance, asset managers may need training to navigate diverse client mandates related to NBS objectives and effectively incorporate NBS projects into broader investment strategies. Institutional investors, such as pension funds, would benefit from training on how to set impact targets aligned with their fiduciary obligations.

Focused training programs should also cover IMM frameworks and data analysis to ensure financial professionals can apply these methodologies effectively. For asset managers, this means integrating IMM at the portfolio level and leveraging advanced metrics to demonstrate value to clients. For institutional investors, training should emphasize selecting fund managers with proven impact expertise and monitoring their adherence to impact objectives.

S6.2 Align incentives to strengthen impact-based investments

Due to a misalignment between the long-term benefits of projects and fiduciary requirements that prioritize short-term returns, asset managers have limited incentives to invest in impact measurement and management (Thirion et al. 2022). While evolving regulations can help bridge this gap at the institutional level in the medium to long term, challenges remain in translating regulation changes to the investment or portfolio level.

To address this, financial institutions can integrate incentive mechanisms into their strategies to enhance alignment between their financial and impact objectives.

- **Strengthening institutional understanding of impact risk:** A foundational step in driving impact-focused investments is improving institutional awareness of impact risk—the likelihood that an enterprise's impact performance will diverge from expectations (see Step 4). Enhancing institutional expertise in impact risk can motivate behavioral shifts toward impact-driven investment strategies.
- **Establishing an internal NBS taskforce:** Financial institutions can establish a dedicated taskforce to develop and implement long-term incentive plans that prioritize stable returns over short-term gains. This is especially critical for institutional investors, such as pension funds and insurance providers, whose long-term horizons can accommodate NBS investments. Asset managers can leverage such taskforces to identify high-impact opportunities and communicate to their clients their alignment with both financial and impact mandates. Additionally, result- or impact-based financing instruments can align incentives for both debt and equity investors with specific impact outcomes.
- **Implement impact-linked compensation:** To enable accountability within financial institutions, impact-linked compensation (ILC) should be incorporated into staff performance evaluations, merit increases, and promotions. For asset managers, ILC can motivate investment teams to incorporate impact as a performance metric for their portfolios, ensuring alignment with client goals. Institutional investors can extend ILC to external fund managers, mandating adherence to specific impact benchmarks. This incentive model can be applied across multiple levels, from executive bonuses to individual asset manager incentives and fund performance evaluations. Despite its potential, ILC remains underused in the sector (Blue Mark 2024). However, the Asia Climate-Smart Landscape Fund, managed by ADM Capital and discussed in section 5: "Real-world examples," offers an example of how ILC can be effectively integrated into a broader impact-focused strategy.

SECTION 4.

Harnessing NBS to create financial opportunities

This section outlines key areas where NBS have the potential to catalyze sustainable economic growth and generate long-term financial returns for financial institutions. Institutions can leverage NBS-related investment opportunities across three domains: risk mitigation and resilience in existing portfolios; sustainable growth of financial returns; and emerging market potential and finance innovation. Each domain offers unique strategies catering to different risk tolerances and financial goals.

By strategically integrating NBS into their investment portfolios, institutions can tap into a variety of opportunities that align with specific risk appetites; financial goals, such as capital preservation, long-term growth, or high-reward innovation; and sustainability objectives. These opportunities enable financial institutions to develop tailored investment strategies that support their unique objectives, whether focused on risk mitigation or creating diverse, impactful investment products.

Risk mitigation and resilience in existing portfolios

Focus

As environmental risks grow, financial institutions and asset managers can leverage NBS within their existing portfolios to enhance resilience and protect long-term asset stability within defensive investment strategies (i.e., lower-risk, lower-return profiles). With over 50 percent of the market value of firms listed on 19 leading stock exchanges exposed to nature-related financial risks (Evison et al. 2023), managing these threats is crucial.

NBS can mitigate climate change and biodiversity risks while reducing operational costs. For risk-averse investors like insurers and pension funds, these strategies enhance portfolio resilience over time. For example, eco-engineered stormwater management systems—such as bioswales and permeable pavements[6] integrated into urban developments—help lower maintenance costs, insurance premiums, and flood risks, preserving property values. These can help mitigate physical and transition risks while improving overall financial performance. However, individual investments in NBS, such as permeable pavements or wetlands restoration, can provide localized benefits, but their effectiveness may be limited unless adopted at a larger scale. The positive impact often extends beyond the individual investor, and without sufficient collective action from other firms or sectors, the full risk reduction or productivity boost will not materialize. This underscores the "public good" nature of many NBS solutions, where the environmental and financial benefits depend on broader adoption. Without sufficient collective action, investors may still face risks from inaction in neighboring areas (e.g., from floods), underscoring the need for coordinated investment and potential government support to ensure broader impact.

For asset managers, evaluating nature- and climate-related risks to assets can identify opportunities to mitigate threats to portfolios. For those with a risk management mandate, especially in vulnerable sectors, NBS investments can help reduce emerging physical and transition risks while enhancing long-term resilience and stability for clients. A comprehensive approach includes determining which nature-related risks can be addressed through private investment and which require public sector involvement, ensuring efficient capital allocation and alignment with broader systemic efforts. Complementary private investments can amplify the impact of public sector interventions, creating mutually reinforcing strategies for risk reduction and management.

Active stewardship plays a central role in how asset managers engage with portfolio companies on nature-related risks and encourage NBS adoption as part of their strategies to strengthen financial performance. Asset managers can prioritize companies well-positioned for NBS, offering better financing terms to drive uptake, manage immediate risks, and enhance both asset protection and long-term financial performance.

Manage nature-related risks in investment portfolios

Institutional investors and asset managers are highly exposed to physical risks linked to biodiversity loss within their portfolios. A study of 11,812 listed companies (2004–18) found $7.2 trillion in enterprise value was at risk due to unmanaged biodiversity impacts, despite one-third of these companies having biodiversity policies (de Carvalho et al. 2023). Further, just 250 companies account for 73 percent of the biodiversity impacts in the MSCI World Index, with 20 food and beverage companies alone contributing 20 percent of this impact (FfBF 2023). This concentration of risk gives investors significant leverage to influence corporate practices through active stewardship, shareholder engagement, and capital allocation. The scale of action can be crucial here. While investors can mitigate risks through active engagement and capital allocation, the environmental benefits and long-term profitability linked to NBS investments often become more significant when adoption is widespread across industries, particularly for those solutions that protect shared ecosystem services.

Asset managers can manage these risks by directing capital toward sustainable transitions, either by divesting from high-risk companies or by actively engaging with underperforming companies to improve practices in sectors with high dependencies and impacts on nature, such as food and beverage (see Table 4). Climate Asset Management, a joint venture between HSBC and Pollination, engages with portfolio companies on climate and nature issues and uses voting rights to promote stronger environmental practices (HSBC 2024). Similarly, AXA Investment Managers excludes deforestation-linked companies, applies active stewardship to drive better

practices, and invests in sustainable forestry and natural capital, using specific exclusion criteria based on certifications, controversies, and biodiversity impact (Kousky 2022; AXA IM 2025). These strategies are particularly relevant in forestry and packaging, where reforestation and reduced-impact logging mitigate supply chain risks related to pests, soil erosion, and lack of pollinators (see Table 4).

Transition risks, including regulatory changes and market shifts toward sustainability, are critical for investors. Growing pressure from regulations like the EU's SFDR requires asset managers to disclose how investments align with sustainability objectives. Integrating NBS helps them mitigate these risks and ensure compliance with emerging sustainability frameworks, while positioning portfolios for the market shift toward nature-positive strategies. Additionally, other thematic regulations affect investor clients, making NBS a strategic tool for asset managers to enhance both portfolio stability and long-term resilience.

Enhancing financial performance through cost efficiency and risk reduction

Investors can drive value creation and risk reduction by allocating capital to companies that leverage natural processes for ecosystem services—such as improved water management, enhanced soil health, and increased biodiversity. By engaging with portfolio companies and targeted capital deployment, investors can influence corporate strategy and incentivize the adoption of practices to address risks, such as the drivers of biodiversity loss (PRI 2018, 2024a, 2024b). In sectors like infrastructure, utilities, food and beverage, forestry, and health care,

integrating NBS can enhance operational efficiencies, reduce costs, and mitigate nature-related risks (Kooijman et al. 2021; Al-Mashaqbeh et al. 2024; Griscom et al. 2020; CI and IFC 2023; Debele et al. 2023), ultimately safeguarding their portfolios to protect financial returns.

Investors in real estate and infrastructure funds, including real estate investment trusts and private equity with sustainability-aligned mandates, can unlock long-term value by investing in developers implementing NBS. Projects like vegetative facades, permeable surfaces, and rain gardens promote asset protection and improve maintenance cost-efficiency by reducing stormwater runoff, decreasing heating and cooling needs, extending waterproofing lifespans, and lowering exterior damage, though the maintenance and installation costs may not always be offset (Teotónio et al. 2021; Kasprzyk et al. 2022). For example, Wuhan, China's strong city project, incorporating green infrastructure, has reduced waterlogging risks and saved RMB 10 million ($1.5 million) annually in pipeline maintenance costs (Han et al. 2023; Ding et al. 2021). These benefits help protect financial returns for investors that are backing developers incorporating NBS into infrastructure design.

Capital allocation to companies incorporating NBS can also enhance asset longevity and hedge against inflation, especially in economies with fluctuating interest rates. While sustainable building features incur a median green surcharge of 4 percent for office buildings and 2 percent for other commercial buildings (Hu 2022), energy-efficient buildings command higher commercial rental premiums: 11.6 percent in London, 9.9 percent across major Asian markets, and 7.1 percent in major American and Canadian markets (JLL 2023).

Table 4 provides a structured overview of examples of NBS investment opportunities across key sectors, illustrating how investors and asset managers can apply these strategies to mitigate nature-related financial risks and enhance portfolio resilience. While many NBS generate direct productivity or cost-efficiency benefits at the asset or firm level (e.g., improved soil quality, water retention, on-site pollination, or erosion control cost savings), others—particularly those that safeguard shared ecosystem services (e.g., biodiversity, flood control)—realize their full risk mitigation potential only when widely adopted. By engaging with companies to assess nature-related dependencies and NBS implementation plans, financial institutions can identify both private value opportunities and areas where collective action or regulatory alignment may be needed to unlock broader, systemic benefits. This dual lens allows them to strengthen defensive investment strategies, improve risk-adjusted returns, and align with emerging sustainability-focused regulations.

Sustainable growth of financial returns

Focus

Financial institutions seeking sustainable growth can strategically integrate NBS investment strategies that enhance portfolio value and long-term asset appreciation. This domain aligns with balanced strategies targeting moderate risk-return profiles, as well as asset managers pursuing growth-focused investment strategies. While such NBS investments may take longer to generate returns, which may challenge short-term investors (Ding et al. 2017), their potential for long-term growth and risk-adjusted returns makes them an attractive opportunity for investors prioritizing sustainable value. These investments can enhance portfolio diversification, financial resilience, and long-term returns.

Increase asset value through NBS integration

Financial institutions can drive portfolio growth by investing in companies that leverage NBS to enhance competitiveness and asset value. This shifts from traditional risk management to proactive value creation, backing businesses that integrate NBS to differentiate their market positions and strengthen financial performance.

Table 4 | **Examples of NBS opportunities for risk mitigation by key sectors**

SECTOR OR INDUSTRY	KEY NATURE IMPACTS	KEY DEPENDENCIES	EXAMPLES OF NBS OPPORTUNITIES	EXAMPLE APPLICATION
Food and beverage, agricultural commodifies, seafood, and processed foods[a]	▪ **Air pollution, GHG emissions** ▪ **Land/ocean use, soil pollution** ▪ **Freshwater ecosystem use, water pollution, water use**	▪ **Pollination, nursery habitat, soil quality, water quality/flow** ▪ Bioremediation, waste dilution, filtration ▪ **Climate regulation, disease control, flood and storm protection, land stabilization and erosion control, pest control** ▪ **Groundwater/surface water, genetic materials, fibers, and fodder**	▪ Regenerative agriculture ▪ Forest restoration and conservation in productive landscapes ▪ Agroforestry ▪ Riparian buffer zones ▪ Wetland restoration and conservation ▪ Pollinator habitats	▪ Restore and maintain soil and water quality for production ▪ Enhance soil health and water regulation and quality; maintain biodiversity, pest control, pollinators for crops, carbon sequestration ▪ Increase farming system resiliency, enhance yields ▪ Enhance water quality and filter pollutants ▪ Protect seafood value chains via mangroves, ensure groundwater and surface water quality and quantity ▪ Maintain pollinators for crops
Health care, biotechnology, and pharmaceuticals[a]	▪ **Air pollution** ▪ **Soil pollution, solid waste** ▪ **Water pollution**	▪ Genetic materials ▪ **Water resources**	▪ Sustainable harvesting and cultivation ▪ Wetland restoration and conservation	▪ Maintain ecosystems relevant to supply chains ▪ Ensure water quality and quantity needed by active pharmaceutical ingredient suppliers

Table 4 | **Examples of NBS opportunities for risk mitigation by key sectors (cont.)**

SECTOR OR INDUSTRY	KEY NATURE IMPACTS	KEY DEPENDENCIES	EXAMPLES OF NBS OPPORTUNITIES	EXAMPLE APPLICATION
Utilities and water utilities	▪ **Freshwater ecosystem use, water use** ▪ **Land use**	▪ **Groundwater/surface water**, soil quality ▪ Bioremediation, filtration ▪ **Water quality, water flow** ▪ Climate regulation, flood and storm protection	▪ Infiltration and treatment-based landscape ▪ Horizonal levees ▪ Permeable pavements, bioretention, and biofiltration	▪ Reduce flood risk, decrease soil erosion, protect built assets, increase groundwater infiltration, recharge water tables ▪ Reduce flood risks to coastal wastewater treatment plants by reducing impact of floods, surges, waves ▪ Decrease pollutant discharge, flood risks, and heat islands
Forestry and packaging[a]	▪ Air pollution, **GHG emissions** ▪ **Land use**, **soil pollution** ▪ **Water pollution, water use**	▪ **Pollination, nursery habitat, soil quality, water quality, water flow** ▪ Bioremediation ▪ **Climate regulation, flood and storm protection, land stabilization, erosion, pest and disease control** ▪ **Groundwater/surface water, fibers and fodder**	▪ Afforestation and reforestation ▪ Reduced impact from logging ▪ Agroforestry and silvopastoral systems	▪ Prevent soil erosion, enhance biodiversity, sequester carbon ▪ Maintain pollinators, control pests and diseases ▪ Enhance biodiversity and land productivity, sequester carbon
Electricity (solar, wind, hydropower, transmission, and distribution)	▪ Noise/light disturbance ▪ Land use ▪ **Freshwater ecosystem use**, seabed use	▪ Water flow maintenance, water supply ▪ Soil/sediment retention ▪ **Climate regulation**, storm protection, **flood mitigation**	▪ Forest restoration ▪ Wetlands, coral reef restoration ▪ Agrivoltaics	▪ Decrease sedimentation, reduce maintenance costs, regulate water flows, sequester carbon ▪ Protect offshore assets/facilities from scours, storm surges, sea level rise, and coastal erosion ▪ Improve energy production, reduce maintenance costs, improve stormwater management, increase land productivity
Extractives and mineral processing	▪ **Air pollution, GHG emissions** ▪ Land use, **soil pollution**, **solid waste**, disturbances ▪ Freshwater ecosystem use, **water pollution**, **water use**	▪ Climate regulation, flood and storm protection ▪ Water flow maintenance, water resources	▪ Bioengineering roads ▪ Ecosystem restoration, incl. quarry lakes ▪ Constructed treatment wetlands	▪ Reduce erosion, landslide, and flood risks of conventional roads ▪ Reclamation to improve local water supply and reduce flood risks ▪ Alternative to chemical treatment to improve water quality and reduce flood risks via infiltration and storage, sequester carbon

Notes: a. Denotes impacts and dependencies adapted from Ching et al. 2024 and ENCORE 2024; others adapted from ENCORE 2024. Bolded and underlined: very high materiality rating in at least 50 percent of sector subcategories reporting (bolded and underlined follow ENCORE materiality rating); bolded: high materiality in at least 50 percent; not bolded: medium materiality in at least 50 percent and/or high and/or very high in at least one category; low materiality is not included; GHG: greenhouse gas; incl.: including.

Sources: WRI authors based on information in ENCORE 2024; Ching et al. 2024; Giglio et al. 2023; SIF 2021; CI and IFC 2023; Evison et al. 2023; FSB 2024; IUCN and FOLU 2023.

A key opportunity exists in consumer-oriented industries heavily reliant on natural resources, such as consumer goods, commodities, and the food and beverage sectors. Studies indicate consumers are increasingly willing to pay premiums for environmentally responsible products (Pollination Group 2023b). Between 2017 and mid-2022, ESG-related products drove 56 percent of US retail sales growth, outpaced non-ESG products in two-thirds of categories, and achieved a 28 percent cumulative growth rate (McKinsey and NielsenIQ 2023).

Sustainability-focused marketing has also driven market share growth in sectors like consumer goods and cosmetics, with a study of 36 categories showing notable growth between 2013 and 2018 (Whelan and Kronthal-Sacco 2019). For instance, Unilever's sustainable living brands grew 46 percent faster than the rest of its portfolio in 2017 and delivered 70 percent of turnover growth (Sustainable Brands 2018). While this growing demand does not guarantee higher financial returns, it indicates a strong market opportunity.

For example, the global beauty company Natura & Co. has embedded NBS-aligned principles, such as the sustainable sourcing of biodiversity-rich ingredients from the Amazon and support for supplier communities, to mitigate supply chain risks and enhance brand differentiation. Despite challenges, including higher initial costs and reputational risks—such as 2009 biopiracy allegations that were later dropped—Natura's commitment to improving practices has attracted premium pricing from both consumers and investors. Its stock price tripled between 2015 and 2020, reflecting investor confidence in its sustainability-driven strategy (Simões-Coelho et al. 2023; Boehe et al. 2014).

Institutional investors in private equity or venture capital can embed NBS criteria into investment mandates, incentivizing asset managers to prioritize companies that integrate or commit to integrating NBS into their business models. In listed equities, investors can adopt screening frameworks to identify companies with strong NBS-aligned strategies that enhance risk-return profiles. For example, the AXA WF ACT Biodiversity fund, which follows a listed active equity investment process, invests in listed companies contributing to ecosystem preservation and restoration (AXA IM 2022). It has reported returns of approximately 10 percent (Cox 2024), demonstrating the financial viability of such investment approaches.

While corporate NBS data remain limited, frameworks like TNFD and expanding regulations on nature-related claims are enhancing much needed transparency, providing investors with better tools to assess opportunities and manage risks effectively.

Enhancing asset value through sustainability-linked financing

Investing in sectors where NBS contribute to sustainable, long-term growth and value creation offers financial institutions a strategic opportunity. This approach underscores the potential for asset appreciation and enhanced portfolio stability while aligning with sustainability commitments.

As public scrutiny of greenwashing and misleading environmental claims intensifies, financial institutions must ensure that portfolios align with credible, science-based sustainability practices to mitigate reputational and regulatory risks. Conversely, those that conduct rigorous due diligence and incentivize credible practices can transform this heightened scrutiny into a strategic advantage.

Financial institutions aiming for long-term returns and growth can adopt an outcome-based investment model that links financial performance to environmental and social milestones, including NBS. Sustainability-linked financing instruments, such as sustainability-linked loans (SLLs) and sustainability-linked bonds (SLBs), provide a mechanism to achieve this alignment. SLLs typically consist of three key components: a standard interest rate, specific sustainability targets, and a discounted interest rate contingent upon meeting those targets (Hsu et al. 2024). Similarly, SLBs offer enhanced yields by adjusting the bond's coupon rate based on the issuer's achievement of sustainability milestones (GFI 2024b).

These instruments enhance financial flexibility and creditworthiness, promoting long-term portfolio stability. Research on European companies shows that companies with strong sustainability commitments have lower credit risks (Höck et al. 2020). Additionally, by aligning borrower incentives with sustainability targets, SLLs can reduce default risk and improve financial performance. Studies also indicate that issuing SLLs can strengthen lenders' financial positions by increasing deposit inflows after issuance (Du et al. 2022).

While the application of SLLs to NBS is still in its early stages and poses challenges for scaling relevant investments, asset managers and commercial banks like Lloyds Banking Group and HSBC are increasingly integrating nature into their financing frameworks (LBG 2023; HSBC 2024). For example, Lloyds' Sustainable Financing Framework includes nature and biodiversity criteria for SLLs, ensuring alignment with "do no harm"

principles, independent sustainability verification, and mechanisms for client engagement or exit if unintended negative impacts arise (LBG 2023).

One key challenge in sustainability-linked finance for NBS is developing appropriate KPIs. Unlike carbon-related KPIs, which are relatively standardized, nature-related KPIs must address multiple interconnected environmental factors such as biodiversity, water, and soil health. This complexity makes structuring sustainability-linked finance more challenging. However, companies with established policies and targets provide clearer benchmarks for setting relevant KPIs. A notable example is BNP Paribas's role as sustainability coordinator for UPM's €750 million ($856.5 million) revolving credit facility. The loan's pricing mechanism was linked to both a carbon reduction KPI and a biodiversity impact KPI in Finnish forests (BNP Paribas 2020). This suggests that active stewardship and engagement, using initiatives like PRI Spring and Nature Action 100, can help investors ensure that companies develop appropriately robust KPIs and commitments, creating stronger foundations for nature-linked financing.

Commodity investors in agriculture and energy, sectors with significant environmental impacts, are well-positioned to leverage sustainability-linked finance. These sectors have global supply chains, clear KPIs, growing investor demand, and strong potential for innovation. For example, the World Wide Fund for Nature (WWF) has proposed financing models for palm oil operators that emphasize regenerative agriculture, forest restoration, yields, biodiversity, and climate resilience (WWF 2023). Adopting these practices can strengthen sector resilience, enabling industries to better manage climate-related risks while enhancing long-term risk-adjusted returns.

Emerging market potential and finance innovation

Focus

Financial institutions with higher risk tolerance and a focus on maximizing value creation can target direct investments in NBS opportunities that explore new market potential and pioneer innovative financial products, such as direct investments in restoration projects, carbon trading, and nature-tech innovations.

Emerging economies carry higher risks, such as volatility, political instability, inadequate regulation, and tech uncertainty. However, by targeting these evolving markets and developing innovative financial products, institutions can secure first-mover advantages, diversify exposure, and unlock new revenue streams, positioning themselves to benefit from long-term growth as these markets mature. Asset owners can commit to allocating an absolute amount or a percentage of their assets to nature-positive investments, making NBS a permanent portfolio component to capitalize on high-growth, high-risk opportunities, while balancing nature-negative exposure. For example, BNP Paribas set a €4 billion ($4.33 billion) biodiversity protection financing target for 2025, which it had already exceeded by the end of 2023, having allocated €4.3 billion ($4.65 billion) (BNP Paribas 2024), while Triodos Bank has committed €500 million ($541 million) in investments, loans, and contributions to the NBS sector by 2030 as part of its biodiversity targets (Triodos Bank 2024c).

These opportunities are well-suited for institutional investors with a mandate to explore new markets. Commercial banks can play a key role through active stewardship and structured financing, while asset managers specializing in high-risk, high-reward strategies, such as venture capital and private equity, can capitalize on these high-growth opportunities.

Emerging nature-tech solutions and system transitions

Innovations in nature technology present significant growth opportunities for early-stage investments in start-ups and scale-ups. These innovations—including AI-driven conservation tools; digital monitoring, reporting, and verification; blockchain for sustainable supply chains; and biotech solutions—align with the United Nations Environment Assembly's definition of NBS by promoting adaptive, sustainable ecosystem management with co-benefits. For example, Mirova's Sustainable Ocean Fund invests in aquaculture technology to improve sustainability and reduce impacts on marine ecosystems. Its portfolio includes JALA, an Indonesia-based company that provides data-driven solutions for shrimp farming sustainability, and UK-based SafetyNet Technologies, which designs precision fishing technologies that reduce bycatch and contribute to the recovery of fish populations, improving marine biodiversity (Mirova 2024). While nature-tech presents substantial market opportunities, these ventures carry inherent risks, including technological uncertainty, regulatory hurdles, and scalability challenges, necessitating careful due diligence and structured financing approaches.

By investing in companies that tackle the root causes of nature degradation or business models that support the sustainable management of natural resources, financial institutions can uncover high-growth opportunities. Supporting circular economy models that bolster regenerative agriculture efforts and reduce resource extraction can generate an estimated $4.5 trillion in economic value by 2030 (WEF 2023). Currently, only 9 percent of extracted materials are reused, while 62 percent of global greenhouse gas emissions stem from extraction, processing, and production (WEF 2023).

However, businesses that prioritize efficiency without integrating nature-positive strategies may still deplete ecosystems, increasing material risks and threatening long-term financial stability. Financial institutions can play a critical role by engaging with such companies to improve their nature-related impacts. This strategic approach enables investors to capture value while ensuring that economic gains are not achieved at the expense of long-term ecosystem resilience.

Emerging financial products

Nature-based carbon credits

Nature-based carbon credits present a compelling opportunity for investors as demand for high-integrity credits grows. Well-designed NBS projects—such as those geared toward natural forest regrowth, regeneration, tree plantations (that do not replace or degrade natural ecosystems), and ecosystem restoration—can generate carbon credits to meet growing corporate and regulatory demand while delivering environmental and social co-benefits, including biodiversity enhancement and improved ecosystem resilience. In 2023, approximately $723 million worth of carbon offsets was traded in voluntary carbon markets (VCMs) (FTEM 2024), while compliance carbon markets were valued at approximately $850 billion in 2021 (Credit Suisse 2022).

While overall demand in the VCMs has stagnated, driven by increased public criticism and buyer scrutiny of the credibility of credits, high-quality credits remain in short supply. This creates an opportunity for investors, as buyers increasingly prioritize credits with strong environmental integrity and co-benefits, leading to higher prices (Carbon Direct 2024). Several initiatives are strengthening the credibility of carbon credits, including the Core Carbon Principles by the Integrity Council for the Voluntary Carbon Market, which evaluate carbon crediting methodologies. With several methodologies approved, these standards provide investors greater confidence in credit quality (FTEM 2024; Braverman 2024; ICVCM 2024).

Regulatory advancements are expected to drive further growth, with NBS projects poised to play a pivotal role. The finalization of the Article 6.4 operational framework under the Paris Agreement in 2024 established the Paris Agreement Crediting Mechanism, which is expected to significantly boost demand for standardized, high-integrity carbon credits (Braverman 2024; TNC 2024; Khan 2024).[77] Additionally, Brazil's Bill No. 182/2024 mandates that insurance companies, pension funds, capitalization companies, and reinsurers allocate at least 1 percent of their technical reserves annually to environmental assets under the national carbon credit scheme or environmental investment funds (Mattos Filho 2024).

A strong example of a high-integrity NBS project is Mombak, a Brazilian Amazon reforestation initiative, which is selling carbon credits at over $50 per ton, far above the $3–$15 market average. Focused on restoring

deforested land with native, biodiverse reforestation, Mombak works to store carbon, create new habitats, and drive socioeconomic development. Its claims are backed by advanced methodologies like satellite and drone imagery and bioacoustics, and Mombak adheres to stringent certifications and standards for co-benefits, impacts, environmental and social risks, and institutional grade governance (TCCT et al. 2024).

Asset managers can strengthen market integrity by working with portfolio companies to ensure responsible use of carbon credits. For example, BNP Paribas Asset Management, part of the Net-Zero Asset Manager initiative, does not rely solely on carbon credits to meet its net-zero commitments but uses them as a supplementary measure across approximately €2 billion ($2.16 billion) in assets under management in funds (BNP Paribas 2023b). The firm prioritizes direct emission reductions and offers voluntary carbon credits only to clients with credible climate strategies, ensuring credits are used to offset residual emissions rather than as a primary decarbonization tool (BNP Paribas 2022, 2023a).

Additionally, financial institutions can enhance market infrastructure by investing in blockchain-based transaction platforms and other auxiliary services, helping to scale high-integrity credit markets. By improving transparency, traceability, and liquidity in carbon credit transactions, such innovations can address concerns about market credibility and drive further institutional investment in NBS.

Biodiversity credits

Biodiversity credits are tradable units representing measurable biodiversity gains (Maron et al. 2025), covering activities such as protection (e.g., areas for conservation), regeneration (improving degraded ecosystems), stewardship (maintaining ecological value), or adaptation (enhancing ecosystem resilience to climate change) (Pollination Group 2024).

Investment opportunities in this space are beginning to gain traction, as seen with the UK's Biodiversity Net Gain mandate, which has created a regulated compliance market. This has opened avenues for banks to provide commercial debt to innovative pilot projects, such as Triodos's £3.85 million ($4.92 million) loan for the Avon Needs Trees project (Triodos Bank 2024b). Future opportunities are expected through Colombia's voluntary scheme, as well as in other at-risk biodiverse regions (Climate Focus 2023).

However, biodiversity credits pose unique challenges compared with carbon credits. Unlike carbon, which is globally fungible, biodiversity is place specific and involves complex and unique dynamics, making it harder to measure and compare with one single metric. Consequently, ensuring additionality, avoiding double counting, and developing robust measurement frameworks remain critical hurdles (Miles et al. 2025; Maron et al. 2025; Attwell et al. 2023; Pollination Group and TNM 2023; Pollination Group 2023a). Lessons from the implementation of programs like Victoria, Australia's biodiversity offset initiative highlight key challenges. An evaluation of the program, which analyzed "avoided loss" and "regeneration" offsets through statistical matching and comparisons with future offsets, found a lack of measurable impact from avoided loss offsets, concerns about the additionality of regeneration projects, and data limitations that complicate the ability to assess true biodiversity gains (zu Ermgassen et al. 2023). Furthermore, biodiversity gains in one region cannot offset losses elsewhere, making it difficult to establish a standardized global market.

Insurance products

Parametric insurance, or index-based insurance, provides predetermined payouts based on the magnitude of specific events, rather than actual losses. This nontraditional insurance has gained importance in the disaster insurance market. Its appeal lies in bypassing the claims process, enabling faster payouts to policyholders (Visser et al. 2023). A notable example is the Quintana Roo Reef Protection Policy in Mexico. Created by Swiss Re and The Nature Conservancy, the policy provides rapid funding for coral reef restoration, maintenance, and resilience after hurricanes. Premiums are financed through a trust supported by coastal property owners, the tourism sector, government, and philanthropy, helping to protect the region's $10 billion tourism industry (Visser et al. 2023; Swiss Re n.d.; GFI n.d.).

SECTION 5.

Real-world examples: NBS investments and innovative financial solutions

This section presents real-world examples that highlight successful NBS investments and innovative financing instruments implemented by financial institutions. While these examples focus on positive outcomes, this does not suggest that successes outweigh challenges in scaling NBS finance. Instead, they illustrate how financial innovation can help overcome key barriers.

These examples align with the three categories of NBS opportunities outlined in the section "Harnessing NBS to create financial opportunities" and showcase how financial innovation can overcome key hurdles (as detailed in "Understanding the challenges in upscaling nature-related finance"). While Appendix B provides a comprehensive inventory of commonly employed financial instruments designed to tackle these obstacles, the cases here are illustrative rather than exhaustive.

The examples underline the critical role of financial expertise in developing practical solutions, demonstrating that scaling nature finance is achievable. However, success requires financial professionals to deeply understand the challenges in upscaling NBS investments and commit to addressing them directly. These examples serve as evidence that, with a strong internal drive, transformative change within the financial sector can unlock the full potential of nature-based solutions.

Risk mitigation and resilience in existing portfolios

Zephyr wind farm

Overview of NBS investment

Integrating mangrove restoration as an NBS component of the Zephyr Wind Farm investment in Pakistan is projected to yield monetary returns up to 20 times the initial investment for investors. The wind farm acts as a natural physical barrier that enhances infrastructure resilience against escalating climate change risks and coastal erosion and reduces asset replacement and maintenance costs, while providing socioeconomic and biodiversity benefits to local communities through ecosystem restoration and protection (Visser et al. 2023; Earth Security 2021b). Key investment characteristics are detailed in Table 5, while key investment challenges and the strategies used to overcome them are outlined in Table 6.

Revenue model

The primary revenue stream of the total investment is generated from the sale of electricity produced by the 50-megawatt wind independent power project (Visser et al. 2023). The restoration of on-site and surrounding degraded mangroves and intertidal mudflats is included as part of the investment's operational expense; they serve as adaptation measures to protect project roads and wind turbine platforms (Visser et al. 2023) in response to increasing climate change–related flood risks in Pakistan (UN Habitat 2023; Eckstein et al. 2021). The costs of restoration are considered low with baseline studies and stakeholder engagement, staff costs for on-site mangrove nurseries, and monitoring and costs for regenerating 14 hectares (ha) of mangroves expected to total $352,000 (Earth Security 2021b). Projected cost savings over the project's lifespan range from $875,000 to $7 million, depending on infrastructure needs (Earth Security 2021b). This includes the following:

- **$875,000 to $1 million** ($35,000–$40,000 per year) in reduced maintenance costs for project infrastructure (Earth Security 2021b)
- Up to **$6 million** in avoided civil infrastructure replacement costs (e.g., roads, submarine cables) if infrastructure replacement is needed (Earth Security 2021b).

Table 5 | **Investment characteristics of Zephyr Wind Farm**

INVESTMENT CHARACTERISTIC	CASE-SPECIFIC DETAIL
NBS type	Mangrove restoration
Location	Pakistan
Sector	Renewable energy infrastructure
Instrument	Debt Equity
Vehicle	Blended finance SPV
Size	$352,000 (NBS); $110 million (total)
Revenue	Savings in maintenance, replacement costs ($875,000–$7 million)
Projected returns	145–1,886% ROI (on NBS component)
Horizon	20-year investment, 25-year asset lifespan
Liquidity	Illiquid
Risks	High managed to low through governance frameworks
Investee	Zephyr Power Limited
Investors	Equity: BII, Khaleeli family, Gul Ahmed Metro Group, Sadek Dossa Debt: BII, Dutch Entrepreneurial Development Bank, United Bank Limited

Note: NBS: nature-based solutions; SPV: special purpose vehicle; BII: British International Investment; ROI: return on investment.

Sources: WRI authors based on information in CI and IFC 2023; Visser et al. 2023; Earth Security 2021b.

Table 6 | **How Zephyr Wind Farm addresses common NBS investment challenges**

TYPICAL CHALLENGE IN NBS INVESTING	HOW ZEPHYR WIND FARM HELPS ADDRESS IT
Illiquidity, high risks with uncertain returns: illiquid long-term asset, generating nonmarketable benefits	▪ **SPV structure:** isolated risks by consolidating debt and equity investors, enabling targeted financing and improved risk management ▪ **Blended finance:** combines concessional capital with private investment to de-risk projects and compensate for nonmarketable socioeconomic and environmental benefits
High transaction costs: small ticket size for NBS component	▪ **Embed NBS:** integrating NBS within a larger infrastructure project lowers operational costs, enhances revenue stability, and reduces transaction costs by eliminating the need for a standalone investment
Internal capacity constraints: primarily a renewable energy investment	▪ **Partnerships:** close coordination and collaboration among the project owner, investors (including development and commercial banks), and implementation partners with technical expertise, including Sindh Forest Department, IUCN Pakistan, Mott MacDonald, Business and Conservation Group, the University of Karachi

Note: NBS: nature-based solutions; SPV: special purpose vehicle; IUCN: International Union for Conservation of Nature.
Sources: WRI authors based on information in CI and IFC 2023; Visser et al. 2023; Earth Security 2021b.

Investment structure

The ~$110 million Zephyr Wind Farm investment is structured through an SPV that combines equity and debt contributions from multilateral development finance institutions—namely, British International Investment (BII) and the Dutch Entrepreneurial Development Bank (FMO)—and a consortium of local partners including United Bank Limited, one of Pakistan's largest commercial banks. During negotiations, BII, FMO, and the shareholder groups made funding conditional on the integration of biodiversity conservation and demonstration of positive impact on the local community (Visser et al. 2023; CI and IFC 2023).

Measuring and managing impact

The Zephyr Wind Farm project developed an Environmental and Social Action Plan in line with IFC standards, in collaboration with lenders and contractors, to manage environmental and social impacts (Visser et al. 2023; Earth Security 2021b). A key component, the Habitat Management and Monitoring Plan, outlines strategies to offset environmental effects (including minimizing construction-related damage and planting 14 hectares of mangroves to offset impacts) and actively involves local communities to prevent disturbances to restored mangroves (CI and IFC 2023; Visser et al. 2023; Earth Security 2021b). Partnering with the Sindh Forest Department further increased community engagement, with restoration commitments growing from 14 ha to over 160 ha by 2023 (Visser et al. 2023; Earth Security 2021b).

Local fishers have reported that mangrove restoration has resulted in a doubling of their daily catches of higher-value shrimp, rising from 5 to 10 kilograms per day (Visser et al. 2023; Earth Security 2021b).

BII's commissioned ex ante study by Earth Security demonstrated the potential for mangrove restoration to generate over $7 million in economic benefits to local communities (2021b). The project aimed to enhance local support and reduce project risks by providing these benefits (Visser et al. 2023; Earth Security 2021b). However, impact measurement and management would be strengthened by conducting an ex post analysis to verify whether the projected ecological, social, and economic impacts align with the actual results and to what extent they accrued to investors. This analysis could also provide a basis for comparing these outcomes with those of other comparable projects that did not incorporate such NBS components to objectively assess whether local support was enhanced and project risks related to community disturbances reduced.

Scalability and replicability

The substantial projected ROI from the NBS component of the Zephyr Wind Farm project demonstrates that integrating NBS into existing infrastructure and renewable energy investments offers a scalable strategy for investors. By incorporating elements such as mangrove restoration, investors can enhance asset resilience and reduce maintenance costs without the need to rely solely on standalone NBS initiatives.

The use of SPVs provides a flexible investment structure that isolates risks while blending equity and debt financing from key stakeholders, including development finance institutions, commercial banks, and local implementation partners, enabling the pooling of expertise necessary for managing complex projects and integrating NBS. This structure not only is applicable in renewable energy but can be replicated in other sectors and regions

where climate and nature risks affect asset infrastructure. Partnerships with technical experts, government bodies, and community groups further mitigate project risks, secure social licenses to operate, and preserve reputational integrity.

As the renewable energy sector expands (Hale and Wasserman 2023) and climate and extreme weather risks intensify in Pakistan and around the world (UN Habitat 2023; Eckstein et al. 2021), integrating NBS can help private investors safeguard returns and protect asset value while delivering co-benefits such as biodiversity gains and enhanced community resilience. By reducing maintenance and replacement costs, as demonstrated in the Zephyr Wind Farm project, investors can pursue substantial long-term financial benefits in their existing long-term-oriented investments, ensure compliance with regulatory requirements, and future-proof their investments against climate impacts.

Sustainable growth of financial returns

Stora Enso's dual tranche green bond

Overview of NBS investment

Stora Enso's dual tranche green bond aims to raise €1 billion ($1.08 billion) for sustainable forest management and circular economy initiatives, targeting a coupon rate of 4–4.25 percent (Environmental Finance n.d.b; Stora Enso 2023b). This investment seeks to deliver stable fixed-income returns while advancing corporate sustainability goals in renewable packaging and biomaterials, enhancing both financial and environmental performance within the circular bioeconomy (Stora Enso 2023a). Key investment characteristics are detailed in Table 7, while key investment challenges and the strategies used to overcome them are outlined in Table 8.

Revenue model

Stora Enso's dual tranche green bond generates fixed-income returns for investors through coupon payments ranging from 4 percent to 4.25 percent, funding the company's initiatives in forest management and innovation in fiber-based packaging (Environmental Finance n.d.b). These investments are expected to yield energy and resource savings that enhance profitability for this €10 billion ($10.8 billion) market-cap company, a leading provider in renewable packaging, biomaterials, and wooden construction, while capitalizing on growth opportunities in biomaterials and the circular bioeconomy (Stora Enso 2024).

Investment structure

The €1 billion ($1.08 billion) corporate bond comprises two €500 million ($541.2 million) tranches, offering coupon rates of 4 percent and 4.25 percent, maturing in three years (2026) and 6.25 years (2029), respectively (Stora Enso 2023b; Environmental Finance n.d.b). This dual tranche format enhances marketability by catering to both short-term and long-term fixed-income investors. The structure provides liquidity premiums that increase with bond maturity, aligning with broader market evidence that long-term investors seek compensation for higher liquidity risks (Tomczak 2024). As the dual tranche green bond is a sustainability-linked bond, if Stora Enso fails to meet specified KPIs or sustainability performance targets (SPTs) or fails to verify adequate

Table 7 | **Investment characteristics of Stora Enso's dual tranche green bond**

INVESTMENT CHARACTERISTIC	CASE-SPECIFIC DETAIL
NBS type	Sustainable forest management integrated with circular economy practices
Location	Sweden and Finland
Sector	Biomaterials and packaging
Instrument	Debt
Vehicle	Dual tranche sustainability-linked bond
Size	€1 billion ($1.08 billion) (dual tranche, €500 million [$541.2 million] each)
Revenue	Interest payments
Projected returns	Interest (4–4.25% coupon)
Horizon	3 and 6.25 years (maturities: June 2026 and September 2029, respectively)
Liquidity	Limited, due to bond structure
Risks	Moderate, mitigated by Stora Enso's approach and use of certified forestland
Investee	Stora Enso (issuer and listed corporate)
Investors	Bond investors (oversubscribed, 4x demand)

Note: NBS: nature-based solutions.

Sources: WRI authors based on information in Stora Enso 2023a, 2023b, 2024; Environmental Finance n.d.b.

reporting and KPI performance, a higher coupon rate or a premium on the redemption price may be triggered (Stora Enso 2023a).

The bond issuance follows Stora Enso's Green and Sustainability-Linked Financing Framework, which is aligned with the International Capital Market Association's Green Bond Principles and Green Loan Principles to define project evaluation, proceeds management, reporting, and external review processes (Stora Enso 2023a). Bond proceeds are allocated to projects in the following categories: sustainable forest management, sustainable production processes, energy efficiency, renewable energy and waste-to-energy, sustainable water management, and waste management and pollution control (Stora Enso 2023a).

Beyond Stora Enso, key partners involved in the bond issuance include Sustainalytics as the external reviewer to ensure alignment with green bond standards, and lead managers BNP Paribas, Crédit Agricole CIB, Danske Bank, and SEB Group, which underwrite the bond and manage its distribution to investors (Stora Enso 2023a, 2023b; Environmental Finance n.d.b).

Table 8 | **How Stora Enso's green bond addresses common NBS investment challenges**

TYPICAL CHALLENGE IN NBS INVESTING	HOW STORA ENSO'S GREEN BOND HELPS ADDRESS IT
Illiquidity, high risks with uncertain returns: moderate liquidity and bond-related risks	▪ **Revenue stacking:** allocates proceeds across six eligible categories to diversify income streams and enhance financial viability ▪ **Hybrid instruments:** leverages SLBs to enhance liquidity and align risk-return profiles by attracting diverse investors through performance-based financial returns ▪ **Dual tranche:** structured to cater to diverse investor preferences regarding liquidity and returns
High transaction costs: administrative and technical complexities of NBS financing	▪ **Pooling investments:** aggregates smaller projects into a larger fund structure ▪ **Standardized financing frameworks:** financing frameworks aligned with established principles (e.g., SLBP, SLLP, Green Bond Principles, Green Loan Principles)
Internal capacity constraints: difficulty in managing and reporting NBS investments	▪ **Partnerships and capacity-building:** collaborates with external experts and positions sustainability at the core of its business to innovate practices and improve assessment of NBS investments ▪ **Aligns KPIs with established frameworks:** develops KPIs and sustainability performance targets in accordance with SLBP, SLLP, Science Based Targets Network, and SDGs

Note: NBS: nature-based solutions; SLBs: sustainability-linked bonds; SLBP: Sustainability-Linked Bond Principles; SLLP: Sustainability-Linked Loan Principles; KPI: key performance indicator; SDGs: Sustainable Development Goals.

Sources: WRI authors based on information in Stora Enso 2023a, 2023b; Environmental Finance n.d.b.

Measuring and managing impact

Stora Enso's Green and Sustainability-Linked Financing Framework, which is also aligned with the Sustainability-Linked Bond Principles and Sustainability-Linked Loan Principles, ensures that capital raised delivers measurable positive outcomes in the three sustainability areas most materially significant to their operations and the broader societal and environmental context: climate change, circularity, and biodiversity (Stora Enso 2023a, 2023b).

A central component of the framework is the establishment of KPIs and SPTs, which track annual progress toward reducing GHG emissions by 50 percent (Scopes 1, 2, and 3) by 2030, achieving 100 percent recyclability by 2030, and planting 3.4 million birch trees in Sweden by 2030 (Stora Enso 2023a, 2023b). However, to ensure more meaningful impact measurement, it is recommended that future biodiversity KPIs also reflect long-term ecological outcomes. Progress should be measured not only by outputs (e.g., trees planted) but also by ecological impacts on ecosystem health, such as by incorporating metrics for biodiversity (as discussed in subsection "Sustainable growth of financial returns").

Progress is systematically monitored at both the group and divisional levels, with Stora Enso using historical performance data and relevant benchmarks, such as industry standards and science-based targets, to assess progress alongside ambition levels and strategies to achieve them (Stora Enso 2023a, 2023b). Quarterly updates on KPIs and SPTs are provided in Stora Enso's interim reports, while consolidated results are reported annually in the *Green and Sustainability-Linked Financing Report*, following external verification of KPI performance against SPTs (Stora Enso 2023a).

Incentives for achieving KPIs are embedded in the bond's structure as an SLB and in the remuneration of Stora Enso's leadership team, with sustainability metrics included in both short- and long-term incentive plans (Stora Enso 2023a, 2023b).

Scalability and replicability

Stora Enso's dual tranche green bond represents a strategic opportunity for institutional investors to integrate NBS into their portfolios through stable fixed income. This innovative financing structure, offering both short- and long-term maturities, provides flexibility to accommodate diverse liquidity preferences and risk profiles while mitigating liquidity and market risks in accordance with established green financing principles. The bond's issuance under Stora Enso's Green and Sustainability-Linked Financing Framework enhances its credibility and transparency in the allocation of proceeds, while regular KPI monitoring reinforces accountability, fostering investor confidence and ensuring compliance with sustainability mandates—elements that can be replicated across various sectors.

Stora Enso's position as one of the world's largest private forest owners presents significant opportunities for the geographic expansion and scalability of NBS investments (Stora Enso 2024). By initially targeting developed markets, the company effectively mitigates the risks associated with emerging economies, allowing institutional investors to assess the viability of NBS models before committing to broader geographic deployment. Upon validation of these models, Stora Enso's extensive global footprint supports the scaling of successful initiatives into new regions (Stora Enso 2024). The strategic focus on high-growth sectors, such as renewable packaging and biomaterials, further enhances this scalability; for example, the anode materials market is projected at €10 billion ($10.8 billion) over the project's lifespan, offering a long-term EBITDA (earnings before interest, taxes, depreciation, and amortization) margin potential of 50 percent, while bio-binders represent a €20 billion ($21.6 billion) market with a 40 percent EBITDA margin (Stora Enso 2024). This approach underscores the financial viability and scalability of NBS investments through a structured framework that allows institutional investors to effectively assess risk, capitalize on growth opportunities, and implement successful models across diverse markets.

Emerging market potential and finance innovation

ADM Capital's Asia climate-smart landscape fund

Overview of NBS investment

ADM Capital's Asia Climate-Smart Landscape Fund (ACLF) targets $200 million to finance land regeneration, forest and mangrove restoration, and sustainable agriculture projects in Indonesia (ADM Capital 2023, n.d). Through a blended fund, ACLF provides senior secured loans to small and medium-sized enterprises (SMEs), aiming for a net IRR of 6–8 percent, while incentivizing significant environmental and social impact, including carbon sequestration, rural gender-equitable job creation, and improved sustainable land-use practices (Bang 2023; ADM Capital 2023). Key investment characteristics are detailed in Table 9, while key investment challenges and the strategies used to overcome them are outlined in Table 10.

Table 9 | **Investment characteristics of ADM Capital's Asia Climate-Smart Landscape Fund**

INVESTMENT CHARACTERISTIC	CASE-SPECIFIC DETAIL
NBS type	Land regeneration, forest and mangrove restoration or protection, sustainable agriculture
Location	Indonesia
Sector	Agriculture
Instrument	Debt
Vehicle	Blended finance fund (secured by 50% guarantee at asset level)
Size	$200 million (target size); investment $5–$20 million (investment ticket size)
Revenue	Cash flow, commitment and/or redemption fees, interest
Projected returns	6–8% net
Horizon	10-year holding period
Liquidity	Limited liquidity due to medium-to-long-term debt structure
Risks	High but mitigated to moderate through blended financing
Investee	Indonesian SMEs (including PT Bening Big Tree Farms)
Investors	Seed commitments from Calvert Impact Capital, Ceniarth, The David and Lucile Packard Foundation, the John D. and Catherine T. MacArthur Foundation, Margaret A. Cargill Philanthropies, RS Group

Note: NBS: nature-based solutions; SMEs: small and medium-sized enterprises.
Sources: WRI authors based on information in ADM Capital 2023, n.d.; Bang 2023; Capital for Climate 2024; Convergence n.d.; Kiernan-Stone 2024; WEF 2025.

Table 10 | **How ADM Capital's fund structure addresses common NBS investment challenges**

TYPICAL CHALLENGE IN NBS INVESTING	HOW ADM CAPITAL'S ACLF HELPS ADDRESS IT
Illiquidity, high risks with uncertain returns: moderate liquidity and bond-related risks	▪ **Blended finance:** combines concessional capital with 50% asset-level guarantee to de-risk projects and compensate for nonmarketable socioeconomic and environmental benefits ▪ **Financial structuring:** uses senior secured loans to mitigate risks and prioritize repayment in uncertain markets
High transaction costs: administrative and technical complexities of NBS financing	▪ **Pooling investments:** aggregates investments to enable larger investment ticket sizes ▪ **Financial collaboration:** technical partnerships streamline investments, reduce costs, and enhance pipeline efficiency
Internal capacity constraints: difficulty in managing and reporting NBS investments	▪ **Impact-linked compensation:** incentivizes the team to align financial outcomes with impact targets, driving performance and accountability ▪ **Partnerships:** leverages partnerships with strong technical and on-the-ground experts including Convergence, Partnerships for Forests, National University of Singapore Centre for Nature-based Climate Solutions

Note: NBS: nature-based solutions; ACLF: Asia Climate-Smart Landscape Fund.
Sources: WRI authors based on information in ADM Capital 2023, n.d.; Bang 2023; Capital for Climate 2024; WEF 2025; Convergence n.d.

Revenue model

The fund aims to generate returns primarily through interest income, project cash flows, and commitment and/or redemption fees from medium-to-long-term debt financing (Capital for Climate 2024). The fund targets a net IRR of 6–8 percent across the portfolio of SMEs in Indonesia engaged in sustainable agriculture, agroforestry, aquaculture, land regeneration, and forest protection, with individual investments aiming for returns of up to 12 percent (Capital for Climate 2024; Bang 2023).

Investment structure

The ACLF is structured as a blended finance vehicle, managed by ADM Capital, aiming to combine concessional funding from public and philanthropic sources with commercial investments to provide senior secured loans with medium-to-long-term high-impact debt to SMEs (which usually have access to only inflexible, short-term debt due to their size) (ADM Capital n.d.; Capital for Climate 2024; Bang 2023). The fund leverages a 50 percent asset-level guarantee from the US International Development Finance Corporation (DFC), with the US Agency for International Development, the Rabo Foundation, and the Australian government's Department of Foreign Affairs and Trade also participating in the guarantee, allowing it to offer favorable loan terms while managing risk (ADM Capital 2023).

The ACLF's portfolio will consist of about 15 projects, each with investments ranging from $5 million to $20 million, focused on high-impact opportunities across Indonesia's sustainable land use and agricultural sectors (ADM Capital 2023, n.d.; Kiernan-Stone 2024). Performance fees are linked to the achievement of impact

targets, with 50 percent contingent on meeting specific environmental and social outcomes (ADM Capital 2023; Bang 2023).

Initial commitments have been secured from Ceniarth, the David and Lucile Packard Foundation, the John D. and Catherine T. MacArthur Foundation, Margaret A. Cargill Philanthropies, RS Group, and Calvert Impact Capital (PfF 2024; ADM Capital 2023). Legal advisory support from A&O Shearman has supported structuring of the financing deal for the portfolio company PT Bening Big Tree Farms (A&O Shearman 2024).

Measuring and managing impact

Incentives were built into the fund's framework from the outset, with clear, measurable fund-level impact targets: sequestering 12 million tons of carbon dioxide equivalent; creating 8,000 jobs (30 percent of which are for women); and improving land-use practices across 125,000 hectares (ADM Capital 2023; Bang 2023; Capital for Climate 2024; A&O Shearman 2024). Pipeline projects are managed according to eight social and environmental project-level objectives (forest retention, improved rural livelihoods, landscape protection, sustainable supply chain, clean energy, emissions reduction, biodiversity protection, and pollution protection), which are aligned with key Sustainable Development Goals, with accompanying indicators for each (Bang 2023). A designated impact committee will oversee the monitoring of progress against these objectives and targets at both the project and fund levels (Bang 2023).

To align financial performance with impact outcomes, ADM Capital introduced a 50 percent conditional carry pool that ties compensation to the successful attainment of its impact targets (ADM Capital 2023; Bang 2023). This structure incentivizes the investment team to prioritize both financial and impact goals, fostering a culture of accountability and commitment to achieving measurable results.

The ACLF integrates biodiversity considerations into its impact measurement through a two-level biodiversity

accounting framework. Level 1 offers a broad baseline of biodiversity using global metrics, while Level 2 provides more detailed, site-specific analysis. The framework helps inform strategies for minimizing negative impacts and identifying opportunities for restoration, ensuring that projects align with the IFC Performance Standards and the mitigation hierarchy (Bang 2023).

The fund leverages partnerships with organizations such as Partnerships for Forests, Convergence, and the National University of Singapore Centre for Nature-based Climate Solutions to strengthen its environmental and social impact framework. These partnerships contribute local expertise and support the development of methodologies for carbon, biodiversity, and high conservation value assessments, ensuring that projects adhere to best practices in environmental impact measurement (ADM Capital 2023; WEF 2025).

Scalability and replicability

The ACLF is pioneering sustainable agriculture and land-use investments in Indonesia, acting as a proof of concept for high-impact investments delivering balanced returns by filling a financing gap in underserved lending markets, and creating a model for replication in other emerging economies (ADM Capital n.d.; Capital for Climate 2024; Kiernan-Stone 2024). Indonesia, as the fourth most populous country in the world and largest economy in Southeast Asia, presents significant scaling opportunities, especially with a government focus on aligning emissions reductions with poverty alleviation through sustainable agriculture (ADM Capital 2023).

By combining concessional capital with commercial investments and leveraging asset-level guarantees (such as the 50 percent guarantee from DFC), the ACLF addresses market gaps and mitigates risks. While it still faces challenges attracting private investment due to perceptions of it being a "first-time fund," this blended financing approach offers a scalable model for investors and asset managers looking to expand into new markets with similar characteristics (PfF 2024).

Finally, the ACLF's emphasis on linking financial returns to environmental and social outcomes through a rigorous and integrated impact measurement framework sets a strong precedent for future funds. This framework tracks impact at multiple levels, connecting overarching portfolio goals with specific objectives and indicators that reflect a wide range of benefits and impacts, rather than relying on just one or two arbitrary metrics. Furthermore, the fund's partnerships with stakeholders possessing both technical expertise and extensive local knowledge have not only ensured a robust approach to impact tracking at both the project and portfolio levels but also helped mitigate the common challenges of building a strong project pipeline.

Tikehau Capital's private equity regenerative agriculture strategy

Overview of NBS investment

Tikehau Capital's Private Equity Regenerative Agriculture Strategy aims to achieve a gross return of 20 percent by investing in companies that enhance soil health, promote biodiversity, and advance sustainable farming technologies, thereby positioning itself to capitalize on the increasing demand for regenerative agricultural practices (GFI 2024b; Tikehau Capital 2024b). Key investment characteristics are detailed in Table 11, while key investment challenges and the strategies used to overcome them are outlined in Table 12.

Table 11 | **Investment characteristics of Tikehau Capital's Private Equity Regenerative Agriculture Strategy**

INVESTMENT CHARACTERISTIC	CASE-SPECIFIC DETAIL
NBS type	Regenerative agriculture
Location	Global
Sector	Agriculture
Instrument	Equity
Vehicle	Private equity impact fund
Size	€1 billion ($1.05 billion) (target size); investment €15–€150 million ($15.8–$158 million) (investment ticket size)
Revenue	Revenue growth through expansion and acquisitions
Projected returns	Targeted 20% gross over 5–7 years (not guaranteed)
Horizon	12 years (4–5-year investment period, 5–7-year holding period), launched 2022, subscription ended in 2024
Liquidity	Limited
Risks	Moderate due to market uncertainties
Investee	Corporations in regenerative agriculture (e.g., Biobest)
Investors	Tikehau Capital, AXA Climate, and Unilever (€100 million [$105.4 million] each), Bpifrance, European Investment Fund

Note: NBS: nature-based solutions; Bpifrance: Banque Publique d'Investissement France.

Sources: WRI authors based on information in Tikehau Capital 2022, 2023, 2024a, 2024b; GFI 2024b, 2024c; Capital for Climate n.d.; Environmental Finance n.d.a.

Table 12 | **How Tikehau Capital addresses common NBS investment challenges**

TYPICAL CHALLENGE IN NBS INVESTING	HOW TIKEHAU CAPITAL'S PRIVATE EQUITY REGENERATIVE AGRICULTURE STRATEGY HELPS ADDRESS IT
Illiquidity, high risks with uncertain returns: illiquid long-term private equity asset with higher risk due to market uncertainties	▪ **Market positioning:** focuses on mid-cap companies with strong demonstrated growth in maturing markets ▪ **Engagement with portfolio companies:** acquires minority or majority stakes, ensures each investment aligns with strategic objectives, and mandates measurable impact assessment throughout the holding period
High transaction costs: targets diverse companies	▪ **Pooling investments:** aggregates investments to enable larger investment ticket sizes ▪ **Financial collaboration:** Tikehau Capital, AXA Climate, and Unilever combine expertise in industries, risk assessment, and finance
Internal capacity constraints: complexity in monitoring and assessing impact outcomes	▪ **Partnerships:** collaboration with industry leaders, framework developers, and accreditors for IMM ▪ **Established IMM frameworks:** uses recognized and robust frameworks (e.g., One Planet Business for Biodiversity, Sustainable Agriculture Initiative Platform) for efficient impact monitoring and reporting with third-party verification

Note: NBS: nature-based solutions; cap: capitalization; IMM: impact measurement and management.
Sources: WRI authors based on information in Tikehau Capital 2022, 2023, 2024a; GFI 2024b, 2024c; Environmental Finance n.d.a.

Revenue model

Tikehau Capital's Private Equity Regenerative Agriculture Strategy aims to generate returns by increasing revenues and enhancing the EBITDA of portfolio companies through geographic and product expansion and strategic acquisitions, leading to high valuations (GFI 2024b, 2024c). Targeted returns of 20 percent gross are anticipated over a 5–7-year holding period, facilitating value realization from equity investments in strong-growth corporations well poised to capitalize on the growing demand for sustainable agricultural solutions (Tikehau Capital 2024a; GFI 2024b, 2024c).

Investment structure

The strategy is structured as a private equity impact fund with a target capitalization of €1 billion ($1.05 billion) (Tikehau Capital 2022, 2024c). The fund has a 12-year investment horizon comprised of a 4–5-year investment period followed by a 5–7-year holding period (GFI 2024b; Capital for Climate n.d.). The fund was launched in 2022, and the subscription period concluded in 2024 (Tikehau Capital 2024b; GFI 2024b).

The fund is a collaboration among Tikehau Capital, AXA Climate, and Unilever, each contributing €100 million ($105.4 million), with additional backing from Banque Publique d'Investissement France and the European Investment Fund (Tikehau Capital 2022; GFI 2024b). External investors can participate with investment ticket sizes ranging from €15 million to €150 million ($15.8–$158 million) (Capital for Climate n.d.; GFI 2024c). As an Article 9 (SFDR) impact fund, it prioritizes investments in corporations that positively contribute to biodiversity, carbon, or water impact while ensuring no significant harm is done to health and social outcomes (GFI 2024b; Tikehau Capital 2024b).

Tikehau Capital's approach to private equity is flexible, allowing for the acquisition of either minority or majority stakes in portfolio companies. This flexibility enables tailored support for scaling, ensuring alignment with strategic objectives and fostering product and geographic expansion (Tikehau Capital 2024a, 2024b). The strategy focuses on companies that enable the scaling of regenerative agriculture across four verticals: inputs, farming equipment, ingredients, and enablers (e.g., impact measurement and monitoring technologies) (Tikehau Capital 2024a; GFI 2024b).

Measuring and managing impact

Each portfolio company in the strategy must demonstrate a positive contribution to at least one of three core objectives—carbon reduction, water management, and biodiversity restoration—while ensuring that none are negatively impacted by the investment (Tikehau Capital 2024a; GFI 2024b). This is consistent with the EU Taxonomy's "do no significant harm" principle, with part of the strategy's performance fee linked to achieving these targets (Tikehau Capital 2024a; Environmental Finance n.d.a). Additionally, the strategy tracks improvements in health and social conditions for farmers (GFI 2024b). To facilitate this, it uses industry-recognized frameworks, including the Sustainable Agriculture Initiative Platform and the Regenerative Agriculture Framework, through Tikehau Capital's membership with One Planet Business

for Biodiversity (Tikehau Capital 2024a; GFI 2024b, 2024c). During the due diligence phase, tailored KPIs and baselines for each objective are established for every investment (GFI 2024b, 2024c). Investees are required to report their annual progress against these KPIs, subject to third-party verification (Tikehau Capital 2024a; GFI 2024b, 2024c). An annual ESG and impact report compiles these results and is shared with investors (Tikehau Capital 2024a).

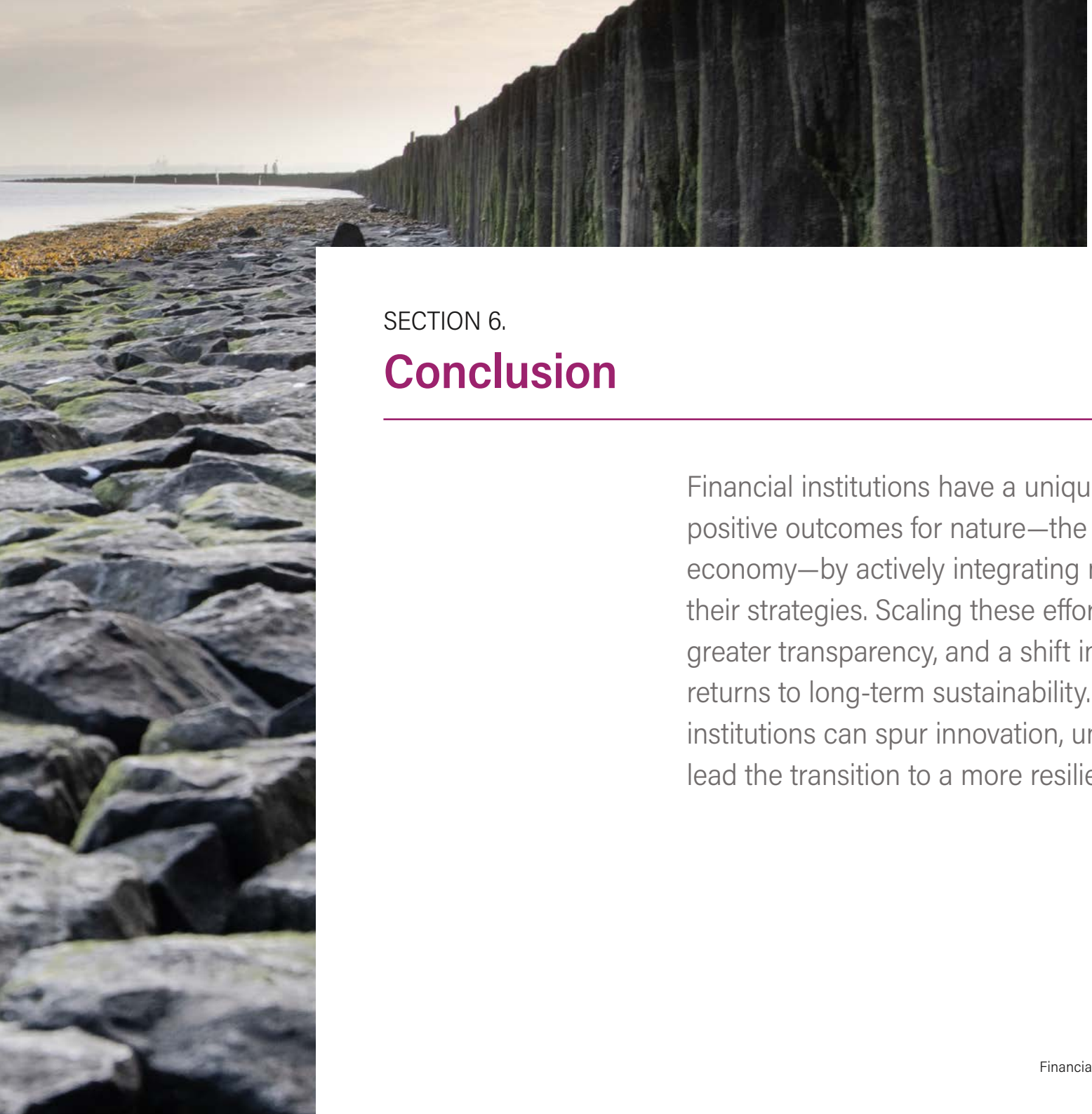
Scalability and replicability

The Private Equity Regenerative Agriculture Strategy demonstrates that investments in NBS can target substantial returns by focusing on enabling solutions. This strategy makes it possible for investors to identify high-potential opportunities by targeting scalable, proven business models within the NBS sector, while mitigating risks through structured capital pooling. By forming strategic partnerships with industry leaders, investors gain access to specialized expertise, market knowledge, and operational resources, allowing for the efficient scaling of investments across geographies and product categories (Tikehau Capital 2022, 2024b).

Investors can take advantage of favorable policy frameworks—including the European Green Deal's Common Agricultural Policy, which promotes corporate commitments to adopt regenerative agriculture practices—and benefit from increasing consumer demand for sustainable production (GFI 2024b; Capital for Climate n.d.).

Tikehau Capital specifically targets mid-cap companies with revenues between €20 million and €1 billion ($21.1 million–$1.05 billion) (Tikehau Capital 2024b). The fund is structured to scale demonstrated growth through the product and geographic expansion of portfolio companies, exemplified by its €120 million ($126 million) investment in Biobest, which facilitated Biobest's expansion in Latin America with the acquisition of Biotrop, a Brazilian company specializing in biological solutions for crop nutrition and protection (Environmental Finance n.d.a; Tikehau Capital 2024b).

Finally, the strategy's success is supported by the alignment of social, environmental, and financial incentives. Nearly 80 percent of Tikehau Capital's balance sheet is dedicated to impactful strategies, reflecting the firm's commitment to driving positive change. The performance fee structure ties financial rewards to the achievement of social and environmental objectives, ensuring accountability (Tikehau Capital 2024c). Additionally, investee companies report on their progress against KPIs established during the due diligence phase (Tikehau Capital 2024a; GFI 2024b, 2024c). The integration of IMM frameworks, along with third-party verification, addresses the complexities of measuring impact in regenerative agriculture.



SECTION 6.

Conclusion

Financial institutions have a unique opportunity to generate positive outcomes for nature—the foundation of the global economy—by actively integrating nature-based solutions into their strategies. Scaling these efforts will require internal reforms, greater transparency, and a shift in focus from short-term returns to long-term sustainability. By making this shift, financial institutions can spur innovation, unlock private capital, and help lead the transition to a more resilient and nature-positive economy.

While not all nature-based solutions have established track records for generating recoverable financial returns, the *Guidebook* underscores the pivotal role that NBS can play in strengthening resource bases and enhancing ecosystem resilience, ultimately supporting long-term financial stability. By clarifying standard NBS definitions for finance, it highlights key NBS opportunities, examines the challenges in scaling NBS finance, and provides step-by-step guidance for mainstream financial institutions to effectively integrate NBS into their investment strategies. The *Guidebook* also explores financial instruments and partnerships that can help address common challenges such as uncertain returns, long payback periods, illiquidity, and potential cost overruns.

The *Guidebook* can serve as a resource for financial institutions in identifying the most suitable types of NBS investments. It contains an NBS investment catalog to support the development of investable NBS portfolios in priority sectors and regions that are highly exposed to nature risk. It also provides concrete recommendations on frameworks, tools, data, and metrics for measuring and monitoring the financial, environmental, and social impacts of NBS investments. Further, it highlights the importance of increasing data transparency, improving reporting practices, building technical capacity and partnerships, and reforming incentive structures within the financial systems to drive impact-oriented investments.

By showcasing concrete examples, the *Guidebook* seeks to inspire financial institutions to embrace NBS investments and pioneer innovative financial instruments and tools that address the challenges faced by NBS investments and barriers to scaling. Proactively engaging in NBS offers financial institutions a transformative opportunity to address nature-related risks systematically while unlocking new market opportunities. Integrating NBS into investment strategies not only enhances financial resilience and drives stronger returns but also contributes to a more sustainable and equitable future.

However, achieving this transformation requires change from within. Financial professionals must adopt a systemic approach, deepen understanding of the technical challenges unique to NBS projects, and demonstrate a strong commitment to reforming traditional financial systems to prioritize long-term sustainability over short-term gains. This shift will accelerate financial innovation and unlock new investment opportunities.

By actively engaging with key stakeholders, financial institutions could take a central role in mobilizing much-needed private capital into nature, paving the way for new and scalable pathways for sustainable finance.

Appendices

Appendix A. Methodology

The development of the *Guidebook* followed a structured four-step approach to ensure industry relevance:

Step 1. Stakeholder consultations: placing industry users at the center from the start

Between November 2023 and January 2024, WRI held 23 consultations with 25 stakeholder institutions from various sectors of the finance industry, including asset managers, pipeline developers, multilateral development banks, networks and alliances, and regulators. The consultations aimed to achieve two key objectives:

- Inform the development of the *Guidebook* and ensure its relevance to the industry, including clarifying the *Guidebook*'s objectives, identifying its target audience, and determining the most suitable format for the *Guidebook*
- Engage with interested stakeholders, allowing them to contribute to the *Guidebook* development process by sharing examples, offering comments and recommendations captured in the consultation report, and supporting dissemination within their networks

Those consulted were chosen to represent a broad spectrum of financial perspectives, ranging from asset managers to commercial, public, and retail banks, to investor networks and pipeline developers. We sought to engage with leading experts and front-runners in the space who could provide insights into the challenges facing private investment in NBS—and the strategies and approaches for overcoming these challenges. We selected these individuals based on their roles in relevant institutions and their track records in NBS investments or related areas. Experts were identified through a combination of publicly available information, professional and personal networks, and recommendations from stakeholders already in our circles. This process ensured that the consulted stakeholders had the appropriate backgrounds and experience to provide credible and insightful input.

While we made efforts to ensure a diverse range of stakeholders, one limitation of this approach is that it led to a bias toward respondents from the Global North, as these individuals and institutions were more readily accessible through our professional and personal networks. To address

this, we actively sought representation in the extensive peer review process by including experts and institutions with deep experience in the Global South.

These consultations provided insights into the private finance landscape for NBS and helped identify five key challenges that are preventing mainstream investment in NBS, as summarized in Figure A-1, which directly informed the *Guidebook*'s development.

Step 2. Desk research: identifying catalytic NBS investments and impact assessment methods

Desk research consisted of two main components: a review of the literature on IMM methods and data; and a critical analysis of NBS investment examples identified through the research and provided by participating financial institutions.

- The literature review focused on empirical studies published in English, emphasizing industry reports, case studies, and other relevant sector and academic publications rather than purely conceptual or theoretical academic research. The review broadly examined various IMM methodology repositories pertinent to financial institutions as well as published reports on NBS finance aimed at the private sector.
- We gathered and categorized investment examples based on the investment characteristics we identified during the consultation process, considering various investor profiles (including preferences related to social and environmental impact, risk-return, time horizons for maturity, scalability, and other relevant factors for asset managers). We prioritized examples based on the criteria outlined above, focusing on practical applicability, business case strength, diversity of risk-return profiles, and quality and quantity of investment information. The *Guidebook* uses these examples to help investors understand the concept of NBS, as defined by the United Nations Environment Assembly, and illustrate what such investments entail. Recognizing the diverse landscape of investors, the *Guidebook* outlines a spectrum of NBS investments using financial terminology, offering examples across asset classes and sectors, while addressing varying investment objectives.

Figure A-1 | **Key challenges identified in stakeholder consultations**

RISK AND UNCERTAINTIES FOR RETURNS (NBS market is still emerging and is unproven)	Unproven returns, scalability, and replicability; limited appropriability of public benefits	NBS lacks compelling narrative of opportunities	Lack of enabling policies	Higher (perceived) risks
ILLIQUIDITY (characteristics of NBS not well aligned with finance sector)	NBS are small scale and have long investment horizons	Localized nature of NBS	Regulatory frameworks poorly aligned with NBS	
HIGH TRANSACTION COSTS (financial engineering more expensive for NBS)	High management costs	High transaction and structuring costs	Nature is complex and context specific	
INTERNAL CAPACITY CONSTRAINTS (impact on nature and people not incentivized)	NBS definition and measurement not mainstreamed for finance	Lack of incentives and internal NBS strategy limits buy-in, expertise, impact	Limited deal flow restricts expertise development	Lack of practical guidance relevant to the sector

Note: NBS: nature-based solutions.

Source: WRI authors based on interviews with representatives from 25 stakeholder institutions across diverse sectors related to private investment in NBS, conducted between November 2023 and January 2024.

Step 3. Guidebook development: integrating real-world examples throughout

The *Guidebook* was designed to clarify NBS investment for mainstream finance, addressing key challenges raised by financial institutions during the consultation phase. It offers a comprehensive, structured approach for institutional investors and asset managers, regardless of their prior experience with NBS projects, to navigate the NBS investment process by assessing NBS investment needs, aligning strategies with institutional goals, integrating NBS into portfolio strategies, and conducting science-based impact evaluations. Each step includes targeted recommendations on methodologies, tools, and data, along with examples from the literature to support practical implementation.

Step 4. User testing and peer review: seeking earlier feedback and ensuring scientific rigor

To ensure its relevance and robustness, the *Guidebook* underwent user testing and an extensive external review process. A small group of three users from the target

audience reviewed an early draft, participated in a focus group session, and provided both written or verbal feedback to enhance the early drafts of the *Guidebook*, ensuring its relevance and value to the broader financial sector. This was followed by a peer review process involving external experts, recognized authorities in the field from 14 organizations across asset management firms and financial institutions, sustainable finance and investment platforms, investor networks, multilateral institutions, global initiatives, and data and analytics providers. Their input helped validate the rigor of the research methods and strengthened the *Guidebook*'s contribution to existing literature.

Appendix B. Financial instruments and coping strategies for scaling NBS investments

The following outlines key strategies and financial instruments to address each of the key challenges identified in the *Guidebook* to scaling private investment in NBS, organized into three core categories for action: partnerships and collaboration, which focuses on strengthening internal capacity and building external alliances; impact monitoring and management, ensuring effective tracking of environmental, social, and financial outcomes; and investment structuring and financial products, which leverages innovative financial mechanisms to reduce costs and attract capital.

Strategies to mitigate risks for returns and improve liquidity

These two challenges can be tackled together using a combination of strategies and financial instruments.

Investment structuring and financial products

- **Hybrid instruments:** NBS investments structured through hybrid instruments offer a balanced risk-return profile for investors seeking high returns and willing to accept higher risks than those associated with typical fixed-income investments. For investors with higher risk tolerance seeking high returns, NBS investments structured through hybrid instruments offer a way for investors to gain exposure to NBS investment that balances risk and return by combining features of both debt and equity. This method allows investors to take on more risk and potential reward than with traditional debt while presenting lower risks and returns compared with equity. Consequently, in the event of insolvency, hybrid investors rank between debt and equity holders (OECD 2015). Common hybrid instruments include subordinated debt (loans or bonds); participating loans with profit sharing; silent participation; convertible debt and warrants that allow conversion to equity; and mezzanine finance, which combines two or more of these instruments.

  The African Development Bank's Perpetual Non-call (PerpNC) 10.5-year USD Global Sustainable Hybrid capital issuance exemplifies an attractive hybrid instrument for investors: It offers a 5.75 percent coupon rate, high compared with typical fixed-income securities; boasts a strong credit rating; garnered over $6 billion in orders, indicating robust market confidence and potential secondary market liquidity; and may qualify as regulatory capital for financial institutions (AfDB 2024).

  Mezzanine financing can be effectively used for NBS projects associated with carbon markets by including an option for lenders to convert part of the loan into equity. Two German solar developers, SUNfarming and Münch, have successfully employed this approach to scale their large solar projects, with support from financial adviser Capcora. Both companies recently secured mezzanine financing at the operating portfolio level from a German pension fund managed by Prime Capital AG, amounting to €17.5 million ($18.9 million) for SUNfarming and €21 million ($22.7 million) for Münch (Kuhn et al. 2023). Additionally, investors may pursue aggregated funds to lower transaction costs and increase liquidity. By pooling various projects, they can reduce risk exposure and aggregate projects valued between $1 million and $10 million to create larger funds. This approach opens participation to a broader range of investors, including pension funds, mutual funds, and retail investors (Ding et al. 2017).

- **Tranching:** Tranching is a financial structuring method that segments an investment or debt instrument into multiple layers, or tranches, each with different levels of risk, return, and maturity. Each tranche is tailored to meet the preferences of various investors. Senior tranches typically offer lower risk and higher priority in repayment but come with lower returns, while junior tranches assume higher risk in exchange for greater potential returns. This flexible structure also enhances liquidity by allowing investors to select tranches based on their preferred exit timelines, making a given NBS investment more accessible and attractive to a broader range of investors.
- **Revenue stacking:** This strategy involves combining multiple income streams from various sources to diversify risks and enhance returns. A review of 88 NBS investment transactions found that 40 percent used revenue stacking, enabling investors to achieve target returns in less developed NBS such as peatland restoration or coastal projects (Finance Earth 2021). Investors can blend traditional revenue from commodities, such as sustainable timber harvesting, with newer sources like carbon, water, or biodiversity credits and ecotourism to strengthen revenue generation (Finance Earth 2021; NCSA 2024). For example, in 2023 Triodos Bank UK structured a £20.55 million ($25.6 million) loan with repayments linked to carbon credit revenues over 25 years for Oxygen Conservation that integrates diverse income streams—carbon credits, organic agriculture, renewable energy, and ecotourism (Triodos Bank 2024a; GFI 2023). This approach is especially beneficial for long-term institutional investors, like pension funds and insurance companies, as it aligns with their value creation goals and offers diversification.

  However, revenue stacking may be less attractive to debt investors seeking shorter repayment periods and entails higher execution risks due to added structuring (WWF and South Pole 2023). By pairing revenue stacking with aggregation strategies, investments can attract a wider range of investors, each drawn to specific revenue streams. This increased interest fosters more investment opportunities, as seen with Miro Forestry, which manages sustainably operated plantations and generates carbon credits in West Africa (Miro Forestry 2022).
- **Special purpose vehicles:** An SPV is a subsidiary created by a parent company to manage the financial risks related to specific projects, offering a legal framework that protects the parent from potential liabilities (WWF 2024). SPVs enable the pooling of capital, isolation of risks, and customization of financing structures for specific purposes, such as investing in landscape-level projects. This structure is particularly advantageous for NBS, as it facilitates the aggregation and coordinated management of diverse projects, enhancing risk management and financial oversight while supporting large-scale initiatives. However, SPVs may be less suitable for passive investors who prefer a hands-off approach or want NBS investments reflected on their balance sheets.
- **Strategic investment structuring:** Financial institutions can enhance their risk-return profiles by targeting projects or assets with high scalability potential in maturing markets. By focusing on opportunities that demonstrate strong growth prospects and are positioned for expansion, institutions can maximize returns over time while ensuring market stability. This strategy helps institutions tap into assets that, as they mature, offer higher valuations, enhanced liquidity, and more attractive exit strategies, ultimately improving both long-term profitability and overall market positioning.
- **Blended finance:** Blended finance, which involves catalytic capital from public or philanthropic sources, enables investors to engage in high-impact NBS projects that might otherwise be deemed noninvestable due to their unique risks and the early stage of the market. This approach combines public and private funding through concessional capital, guarantees, insurance, and grants to mitigate risks associated with early-stage NBS projects. It enhances the scalability of these investments by addressing risks such as currency fluctuations in emerging economies and fostering partnerships that align stakeholders' roles.

  Moreover, blended finance can unlock private capital for adaptation-focused NBS projects by using concessional funding to cover nonmonetizable benefits and providing technical assistance for capacity-building and project management improvements (Convergence 2024). It is typically categorized into four main types: design and preparation funds, technical assistance funds, guarantees and risk insurance, and concessional capital, each addressing a specific investment scaling challenge (Convergence 2024; Earth Security 2021a). Examples of these categories are summarized in Table B-1.

  While blended finance is a valuable tool for investors, particularly in emerging economies, it should be viewed as a structural approach to address market failures that block investment, rather than as a standalone investment strategy (Convergence 2024). Given its current limited supply (WBCSD 2023), it should not be relied on as a comprehensive solution.
- **Listed vehicles:** The listed NBS space remains nascent, and opportunities within listed public equities are still relatively limited. That said, listed investment vehicles, such as exchange-traded funds (ETFs) and sustainability-linked bonds, aggregate capital and offer enhanced liquidity. By eliminating the need for individual investors to structure their own investments, these vehicles lower management costs and are well-suited for those seeking diversified exposure to NBS. Thematic public equity funds, like those from AXA Investment Managers and Mirova Asset Management, aggregate smaller projects into investable sizes for institutional investors while

Table B-1 | **Overview of blended finance structures and applications**

	DESIGN AND PREPARATION FUNDS	TECHNICAL ASSISTANCE FUNDS	GUARANTEES AND RISK INSURANCE	CONCESSIONAL CAPITAL
Mechanism	Grants or convertible grants support design and preparation of projects, improving their bankability	Grants to build technical capacity of investees and stakeholders in areas like financial management and impact monitoring	Risk guarantees and insurance cover investor losses to de-risk high-risk projects and attract capital at better rates	Public entities offer debt or equity at below-market rates to reduce capital costs and attract risk-averse investors
Applicability in NBS	Funds early-stage NBS project development Supports proof-of-concept and pipeline development Prepares NBS projects for private investment by enhancing their viability	Enhances technical capacity for NBS implementation Supports local stakeholders and project developers in managing NBS projects Improves overall project viability and operational effectiveness	Mitigates risks associated with high-risk NBS projects Reduces perceived financial risks Provides assurance through mechanisms like political risk insurance	Lowers the cost of capital for large-scale NBS projects Offers investors more favorable financing terms like accepting junior terms (e.g., first-loss equity) Supports NBS projects by providing affordable financing with performance-linked terms
Example	The Climate Finance Lab's grant funding for the Cloud Forest Blue Energy Mechanism to restore and protect cloud forests in Latin America	Technical assistance provided by Agence Française de Développement and the Global Environment Facility in the Land Degradation Neutrality Fund	The World Bank's repayment guarantee and the Global Environment Facility's nongrant instrument for the Seychelles Blue Bond	Early-stage design grants provided by the Rockefeller Foundation and the Gordon and Betty Moore Foundation for the Forest Resilience Bond

Note: NBS: nature-based solutions.

Sources: Convergence 2024; Earth Security 2021a.

ensuring liquidity. An example targeting the retail sector is detailed in Box B-1. However, opportunities will be less appealing to those seeking highly customized investments or intolerant of market fluctuations. For those preferring stable, lower-risk returns, publicly traded sustainability-linked bonds provide another option, offering liquidity while transferring risks primarily to the issuer (CFA 2020; Favero and Hinkel 2024).

While listed opportunities are generally limited, for investors focused on real assets like forestry and agriculture, emerging listed vehicles such as listed trust structures and semiliquid funds with quarterly or annual subscriptions offer new opportunities (GFI 2024b).

Impact monitoring and management

- **Engagement with portfolio companies:** Financial institutions can acquire minority or majority stakes in portfolio companies to ensure alignment with

Box B-1 | First natural capital listed fund for the retail sector maintains daily liquidity while targeting long-term biodiversity objectives

The ASN Biodiversity Fund, managed by ASN Impact Investors and launched in 2021, is the first publicly traded fund focused on natural capital for the retail market.[a] It offers daily liquidity, a minimum investment horizon of five years, and an estimated net IRR of 5–15 percent.[b] Listed on Euronext, the fund employs a diversified investment strategy that combines impact investments, debt and equity positions, and revenue from sustainable products and carbon credits.[b] It focuses on biodiversity sectors such as sustainable forestry, regenerative agriculture, marine conservation, and ecotourism, aiming to deliver measurable biodiversity benefits while creating green jobs.[a] Managing €30 million ($32.5 million) in 2024, the fund aims to grow to €500 million ($541.1 million).[a,b]

Sources: a. ASN II 2023; b. GFI 2024b.

strategic objectives and mandates for measurable impact assessment throughout the holding period. By actively managing these investments and tracking their environmental and social outcomes, institutions can enhance value creation, mitigate risks, and ensure that NBS-related projects deliver both financial and impact returns. This approach strengthens governance, optimizes performance, and supports compliance with emerging standards and regulatory requirements.

Strategies to tackle high transaction costs

The majority of NBS investments are under $5 million (PwC 2023). These small-scale deals fall below the preferred thresholds of institutional investors, contributing to high transaction costs and limiting private capital flows (PwC 2023; Mayor et al. 2021; EIB 2023; WBCSD 2023; TNC 2019).

To tackle high transaction costs, a number of strategies can be employed:

Partnerships and collaboration

- **Collaborate with other financial institutions:** Financial institutions can reduce high transaction costs by partnering with other investors that bring complementary expertise and resources. These partnerships can help pool resources, share the due diligence process, and create economies of scale, decreasing the costs to each investor. By combining industry-specific knowledge, risk assessment capabilities, and financial expertise, such partnerships can streamline investment management, reduce transaction costs, and improve overall efficiency in structuring NBS investments.

Impact monitoring and management

- **Harness emerging technologies:** Investors can leverage advanced technologies to streamline investment processes, enhance due diligence, and reduce the transaction costs associated with NBS projects. For instance, blockchain-enabled smart contracts automate and secure transactions, ensuring transparency while minimizing the need for intermediaries (Favero and Hinkel 2024). Similarly, advanced monitoring, reporting, and verification technologies improve the accuracy and efficiency of tracking environmental impacts, allowing for real-time adjustments and better risk management (TLG n.d.). These innovations not only lower operational costs but also bolster investor confidence by providing robust, verifiable data that support informed decision-making and more effective resource allocation. However, it's important to note that the successful implementation of these technologies requires sufficient digital literacy among stakeholders.

Investment structuring and financial products

- **Align with financing frameworks:** Financial institutions can reduce transaction costs by structuring NBS investments to align with established financing frameworks and principles such as the Sustainability-Linked Bond Principles, Sustainability-Linked Loan Principles, Green Bond Principles, and Green Loan Principles. These frameworks provide clear guidelines for structuring deals, standardizing key metrics, and ensuring transparency across the investment lifecycle. By leveraging these frameworks, financial institutions can simplify the due diligence process, streamline negotiations, and minimize legal and administrative complexities.
- **Pool investments:** Another option for enhancing NBS investments is to engage intermediaries that can aggregate smaller projects, creating economies of scale that make them more appealing to investors. Additionally, financial institutions could invest in aggregated funds specifically focused on enhancing nature, biodiversity, and ecosystem services. Notable examples include the UBAM Biodiversity Restoration Fund, Federated Hermes Biodiversity Equity Fund, AXA World Funds ACT Biodiversity Fund, and HSBC World ESG Biodiversity Screened Equity UCITS ETF (Campbell 2024; Cox 2024). In 2023, the HSBC World ESG Biodiversity Screened Equity UCITS ETF, which targets biodiversity risks, achieved a return of over 25 percent. Meanwhile, the AXA WF ACT Biodiversity and La Financière de l'Échiquier's Climate & Biodiversity Impact Europe funds reported returns around 10 percent (Cox 2024). The market for these opportunities is rapidly expanding, with eight biodiversity-specific funds launched between June and November 2023. By year-end, total investments in biodiversity-related funds exceeded $1.5 billion, an increase of $520 million from the previous year (Cox 2024).
- **Embed NBS within larger investments:** Financial institutions can reduce transaction costs by integrating NBS—such as biodiversity restoration, carbon sequestration, or water management—into larger investment projects of sizes more appealing to investors. By embedding NBS into broader initiatives, the need for separate investment structures is minimized, streamlining due diligence and operational processes. This approach enhances efficiency, reduces transaction costs, and allows institutions to leverage existing regulatory frameworks and funding sources, making NBS investments more financially attractive and easier to scale.

Strategies to overcome internal capacity constraints

Partnerships and collaboration

- **Partner to bridge short-term capacity gaps:** To address internal capacity gaps in the short term, financial institutions should collaborate with external technical partners specializing in NBS pipeline development and impact measurement. These partnerships can help bridge internal capacity constraints, providing the technical support needed to quantify the environmental, social, and financial benefits of NBS. By improving the assessment of

NBS outcomes and risks, these collaborations can foster confidence in future investments. Additionally, enhanced information will facilitate standardization, reducing transaction and due diligence costs.

- **Build long-term capacity:** Over time, institutions must focus on building internal technical expertise to better integrate NBS into their investment strategies (see section 4: "Harnessing NBS to create financial opportunities"). This also involves assigning dedicated staff for research, finance database management, policy support, and data analysis, ensuring that relevant insights feed into investment committee discussions and decision-making. Rabobank's Project Acorn sets a good example. Launched in 2022, this initiative promotes agroforestry on small-scale farms across Africa, Asia, and Latin America, demonstrating how a financial institution can support NBS while gradually developing the expertise to handle complex sustainability projects internally (Rabobank 2022). By investing in technical capacity, early movers like Rabobank will be able to stay competitive in the growing NBS market and align with emerging regulatory frameworks and investor expectations. Additionally, improving data transparency and access to relevant impact and financial data are key to addressing capacity gaps and boosting investor confidence. Enhanced data comparability will enable institutions to better assess, monitor, and scale NBS investments. By building in-house capabilities, institutions can more effectively manage these investments independently, ensuring long-term success.

Impact monitoring and management

- **Implement impact-linked compensation:** As detailed in "'INSPIRE' strategic alignment of investments with NBS opportunities," Step 6.
- **Develop specialized training programs:** As detailed in "'INSPIRE' strategic alignment of investments with NBS opportunities," Step 6.
- **Leverage established frameworks:** To overcome internal capacity constraints, financial institutions can leverage recognized IMM frameworks and align KPIs with established standards such as the Sustainability-Linked Bond Principles, Sustainability-Linked Loan Principles, Science Based Targets Network, and Sustainable Development Goals. This approach ensures NBS investments are assessed with rigor and transparency. By integrating third-party verification, institutions can alleviate internal challenges associated with measuring and reporting impacts, reduce the risks of impact washing, and enhance credibility. Furthermore, this strategy helps institutions comply with evolving regulatory requirements, mitigate reputational risks, optimize long-term portfolio performance, and capture emerging market opportunities by ensuring that sustainability claims are substantiated by measurable, verifiable data (see "'INSPIRE' strategic alignment of investments with NBS opportunities," Step 4).

Appendix C. Methods and tools to assess risk exposure

Assessing risk exposure in portfolios

To assess nature-related risks, financial institutions need to identify which ecosystems and ecosystem services are likely to be most critical from a macro-financial perspective given the size and location of dependencies, and which of those are at risk of decline or collapse in their current portfolios (NGFS 2024). Asset managers can follow three steps to assess the risk exposure of their investment portfolios:

1. **Map exposure by sector:** Nature-related risks vary significantly across sectors, with industries that rely heavily on natural resources or sensitive ecosystems being particularly exposed. Key examples include the following:
    - **Agriculture and food:** highly exposed due to dependence on water, soil health, and pollination services as well as the physical risks of climate change (e.g., acute like extreme weather events and chronic like temperature changes, pests, and diseases)
    - **Real estate and infrastructure:** vulnerable to flooding, extreme weather, and evolving land-use regulations
    - **Energy:** especially exposed to transition risks as regulations on deforestation and land use become more stringent
    - **Forestry and commodities:** face high exposure to biodiversity loss, ecosystem degradation, and changing consumer preferences for sustainable products as well as the physical risks of climate change (e.g., acute like extreme weather events and chronic like temperature changes, pests, and diseases)

By assessing the natural capital dependence and impact at the industry level, financial institutions can identify the sectors most exposed to various risk types throughout their value chains. The TNFD's sector guidance enables investors and asset managers to apply its LEAP methodology to specific sectors with tailored disclosure indicators, which, as of January 2025, covered 13 sectors, representing 50 percent of SICS® industries (TNFD 2025).

2. **Assess geographic exposure:** Nature-risk exposure is also geographically dependent. Companies or portfolios with investments in regions prone to environmental degradation (e.g., deforestation hot spots, water-scarce areas) are at higher risk. Geographic exposure to natural capital depletion risks can be assessed by mapping the locations of company operations to areas experiencing significant capital depletion. For example, investments in real estate or agriculture in regions vulnerable to drought or desertification, such as parts of Africa or South Asia, face elevated nature-related risks. World Resources Institute's Global Forest Watch and Aqueduct Water Risk Atlas provide the latest data, technology, and tools to help users visualize and monitor deforestation and water risks worldwide (WRI n.d.a, n.d.b). Widely used by companies, investors, governments, and communities, these platforms empower decision-makers with real-time insights to assess environmental risks and inform sustainable strategies. Additionally, the TNFD's *Guidance on Biomes* helps investors link sectors to the biomes they interact with, such as tropical and subtropical forests, rivers and streams, marine shelves, and urban ecosystems (TNFD 2023a).
3. **Create heatmaps of nature dependencies and impacts by sector:** Financial institutions can use heatmaps to assess and visualize their portfolios' exposures to nature-related risks by evaluating sector-specific dependencies and impacts on natural capital. High-risk sectors often rely heavily on ecosystem services such as water, soil quality, or climate regulation. For example, the food and beverage sector is highly dependent on water (see Table C-1), making it particularly vulnerable to risks like water scarcity. The land use impact hub developed by the United Nations Environment Programme World Conservation Monitoring Centre enables investors to select relevant impact areas (biodiversity, climate action, sustainable production, and livelihoods) and SDGs for their investments to identify appropriate indicators and guidance for measurement (UNEP-WCMC n.d.).

Existing tools for assessment

There are existing tools and frameworks available to help assess the risk exposure of financial portfolios:

- **Leverage emerging global disclosure guidelines:** Use evolving global frameworks, such as those developed by the TNFD and International Sustainability Standards Board, to align with best practices in risk disclosure and management. For instance, financial institutions can begin the analysis with a high-level scan of impacts and dependencies following TNFD's framework. Key questions for high-level screening can include the following: "In which sectors do we allocate capital or provide products and services?"; regarding value chains, "In which upstream and downstream value chains do we participate?"; and regarding geography, "Where are the geographic locations of our direct operations and, where easily possible to identify, those of our value chain partners?" (TNFD 2023c).
- **Identify relevant data, metrics, tools, and examples:** Using tools like the WWF Biodiversity Risk Filter and ENCORE (Exploring Natural Capital Opportunities, Risks, and Exposure)[8] can help financial institutions assess their exposure to nature-related risks and outline physical and transition risks across sectors and geographies. Additionally, existing tools for assessing biodiversity impacts include IBAT (the Integrated Biodiversity Assessment Tool) and the Biodiversity Impact Analytics—Global Biodiversity Score (FfBF 2025). Trase, an open data platform, empowers organizations with data and insight to eliminate deforestation and transition toward more sustainable and equitable agricultural supply chains (Trase n.d.).
- **Enrich understanding of nature-related financial risks:** It is important to deepen the understanding of these risks and the range of actions available to mitigate them, considering differences among financial institutions in mandate, capacity, experience, and context.

By mapping risk exposure, financial institutions can prioritize sectors that are most vulnerable to nature-related disasters. These tools also help identify sectors where NBS offer the most potential, such as agriculture (where soil health is critical) or real estate (where urban heat islands pose significant risks). For example, prioritizing agroforestry—the integration of trees into agricultural landscapes—can be a promising investment in regions like the Amazon Basin that face significant deforestation. Agroforestry restores ecosystems, sequesters carbon, and enhances biodiversity and ecosystem functioning, generating public goods. At the same time, it delivers private benefits through sustainable yields and financial returns, supporting local communities. To achieve impact at scale, financial institutions have a unique lever to influence the widespread adoption of such initiatives, driving broader environmental and social benefits and securing financial returns. This approach balances the creation of public goods within the company's operational space, while ensuring enough private benefits to yield positive financial outcomes.

Table C-1 | **An illustrative example of a heatmap that helps identify sector-level exposure to nature-related risks**

	Dependencies		Impacts							
			Land use	Water use	Pollution				Low	High
SASB Sectors	Soil quality	Water	Land use	Water use	Air pollution	Solid waste pollution	Soil pollution	Water pollution	AUM (% of total)	
1. Agricultural products and tobacco	High	High	High	High	Low	Low	High	High	2%	
2. Consumer goods	Low	Low	Low	High	Moderate	Low	Moderate	Moderate	5%	
3. Extractives and mineral processing	Low	Moderate	High	High	High	High	Moderate	High	14%	
4. Financials	Low	Low	Low	Low	Low	Low	Low	Low	16%	
5. Food and beverage (ex. agriculture and tobacco)	Low	Moderate	Low	High	Low	Moderate	Low	Low	11%	
6. Health care	Low	High	Low	High	Low	Moderate	High	High	2%	
7. Infrastructure (ex. utilities and generators)	Low	High	High	Low	Low	High	Low	Low	2%	
8. Renewable resources and alternative energy	Low	High	Low	High	Low	Low	High	High	3%	
9. Resource transformation	Low	Low	Low	High	Moderate	High	High	High	2%	
10. Services	Low	Low	Low	Moderate	Low	Low	Moderate	High	12%	
11. Technology and communications	Low	Low	Low	Low	Low	Low	High	High	15%	
12. Transportation	Low	Low	Moderate	High	Moderate	Moderate	High	High	5%	
13. Utilities and electricity generators	High	High	High	High	High	High	High	High	3%	

Note: SASB: Sustainability Accounting Standards Board; AUM: assets under management; ex.: excluding.

Source: See TNFD 2023c, Annex 4, for detailed methodology to develop the heatmap.

List of abbreviations

AI	artificial intelligence
CSRD	European Union's Corporate Sustainability Reporting Directive
EBITDA	earnings before interest, taxes, depreciation, and amortization
ESG	environmental, social, and governance
ETF	exchange-traded fund
EUDR	European Union Regulation on Deforestation-Free Products
GHG	greenhouse gas
ILC	impact-linked compensation
IMM	impact measurement and management
IRR	internal rate of return
KPI	key performance indicator
NBS	nature-based solutions
ROI	return on investment
SDG	Sustainable Development Goal
SFDR	Sustainable Finance Disclosure Regulation
SLB	sustainability-linked bond
SLBP	Sustainability-Linked Bond Principles
SLLP	Sustainability-Linked Loan Principles
SPT	sustainability performance targets
TNFD	Taskforce on Nature-related Financial Disclosures
VCM	voluntary carbon market

Endnotes

1. Berkman et al. (2024) examined how climate risk is reflected in market valuation following the Securities and Exchange Commission's (SEC's) guidance to include climate-material risks in the SEC regulatory filings. Their findings indicate a significant negative association between market valuation and climate risk. As climate concerns rise, perceived costs and risks associated with climate change increase, leading to a decline in value for firms with high climate exposure relative to those with lower exposure.

2. Short-termism in finance refers to the focus placed by market participants on short-run profitability at the expense of long-term investments (Guagliano 2020).

3. The Equator Principles are intended to serve as a common baseline and risk management framework for financial institutions to identify, assess, and manage environmental and social risks when financing projects.

4. The Taskforce on Nature-related Financial Disclosures is a global initiative established to provide organizations with a framework for assessing and reporting on nature-related dependencies, impacts, risks, and opportunities. By providing standardized reporting guidelines, the TNFD encourages transparency and accountability regarding how businesses interact with nature. This initiative can enhance the credibility of NBS investments, attract environmentally conscious investors, and help financial institutions assess and manage their exposure to nature-related risks. Compliance with TNFD recommendations may also become a prerequisite for investment, thereby increasing demand for NBS that align with these standards.

5. The Sustainable Finance Disclosure Regulation is an EU regulation that mandates that financial market participants disclose how they integrate sustainability risks and consider adverse sustainability impacts in their investment decisions. Effective from March 10, 2021, the SFDR aims to enhance transparency in the market for sustainable investment products, thereby reducing greenwashing and ensuring comparability. The regulation requires disclosures at both the entity and product levels, compelling firms to provide detailed information on their sustainability practices.

6. Permeable pavements can be considered a nature-based solution under the UNEA (2022) definition of NBS, as they involve the sustainable management of modified urban ecosystems to address environmental and social challenges. By replicating natural infiltration processes, they help reduce stormwater runoff, mitigate urban flooding, and support groundwater recharge. These benefits contribute to ecosystem services and urban resilience while enhancing human well-being through improved water management and reduced flood risk.

7. High-integrity carbon credits are those that meet strict criteria, ensuring that the emission reductions or removals claimed by a project are accurate, additional, verifiable, and environmentally sustainable. These credits follow established certification standards, ensuring transparency and trustworthiness in the carbon market (see "How to Buy Quality Carbon Credits on a Budget," Climate Trade, February 1, 2024, https://climatetrade.com/how-to-buy-quality-carbon-credits-on-a-budget/).

8. ENCORE is a free online tool that helps organizations explore their exposure to nature-related risk. ENCORE sets out how the economy—sectors, subsectors, and economic activities—depend on and impact nature. Financial institutions in particular can use data from ENCORE to identify the nature-related risks they are exposed to through their lending, underwriting, and investments in high-risk industries and subindustries. The long list of potential dependencies and impacts of different economic activities and sectors from ENCORE can be used to scope and prioritize the assessment of nature-related dependencies, impacts, risks, and opportunities.

References

ADB (Asian Development Bank), African Development Fund, Asian Infrastructure Investment Bank, Caribbean Development Bank, European Bank for Reconstruction and Development, European Investment Bank, Inter American Development Bank, et al. 2023. "MDB Common Principles for Tracking Nature-Positive Finance." https://thedocs.worldbank.org/en/doc/2172d705757311c25a67451763548735-0320012023/original/2023-0329-MDB-Common-Principles-V3.pdf.

ADM Capital. 2023. "ADM Capital Launches First Impact Fund: The Asia Climate-Smart Landscape Fund ('ACLF')." https://www.admcapital.com/adm-capital-launches-first-impact-fund/.

ADM Capital. n.d. "Bridging the Financing Gap. Delivering Change." ADM Capital Climate. https://www.admcapital.com/adm-capital-climate/. Accessed March 17, 2025.

AfDB (African Development Bank). 2024. "African Development Bank Launches Historic Perpetual Non-call (PerpNC) 10.5-Year Inaugural USD Global Sustainable Hybrid Capital Transaction." African Development Bank, January 31. https://www.afdb.org/en/news-and-events/press-releases/african-development-bank-launches-historic-perpetual-non-call-perpnc-105-year-inaugural-usd-global-sustainable-hybrid-capital-transaction-68374.

Ahmed, S., and R. Bravo Gonzalez. 2023. "Recent Developments in the Voluntary Carbon Market: Key Implications." London: Deloitte. https://www.deloitte.com/uk/en/Industries/financial-services/blogs/navigating-challenges-within-the-voluntary-carbon-market.html.

Al-Mashaqbeh, O., L. Alsalhi, L. Salaymeh, and T. Lyu. 2024. "Assessment of Novel Hybrid Treatment Wetlands as Nature-Based Solutions for Pharmaceutical Industry Wastewater Treatment." *Water and Environment Journal* 38 (2): 212–20. doi:10.1111/wej.12907.

A&O Shearman. 2024. "ADM Capital Looks to A&O Shearman to Advise on Landmark Sustainable Investment Initiative." Client News, October 23. https://www.aoshearman.com/news/adm-capital-looks-to-ao-shearman-to-advise-on-landmark-sustainable-investment-initiative.

APLMA (Asia Pacific Loan Market Association), Loan Market Association, and LSTA. 2023. *Sustainability-Linked Loan Principles: Supporting Environmentally and Socially Sustainable Economic Activity*. APLMA, LMA, and LSTA. https://www.lsta.org/content/guidance-on-sustainability-linked-loan-principles-sllp/.

ASN II (ASN Impact Investors). 2023. *Impact Report: ASN Biodiversity Fund*. The Hague, Netherlands: ASN Bank.

Attwell, W., A. Britsch, and J. Jia. 2023. *Biodiversity in ESG: State of the Sustainable Finance Market: Niche Market Segment Offers Growing Options to Finance Nature-Related Impacts*. Sustainable Fitch.

AXA IM (AXA Investment Managers). 2022. "AXA IM Launches Biodiversity Listed Equity Strategy Investing for Ecosystem Preservation and Restoration." Product News, April 27. https://core.axa-im.com/news/axa-im-launches-biodiversity-listed-equity-strategy-investing-ecosystem-preservation-and-restoration.

AXA IM. 2025. *Responsible Investing: AXA IM Ecosystem Protection & Deforestation Policy*. Paris: AXA Investment Managers. https://www.axa-im.com/document/7530/view.

Bang, A. 2023. *Accounting for Biodiversity: Towards Measuring and Valuing the Biodiversity Impacts of Financial Investments*. Hong Kong: ADM Capital Foundation. https://www.admcf.org/wp-content/uploads/2022/10/Accounting-for-Biodiversity-Full-Report-Jan2023.pdf.

Banktrack. 2024. "Dodgy Deals." https://www.banktrack.org/dodgydeals.

Berkman, H., J. Jona, and N. Soderstrom. 2024. "Firm-Specific Climate Risk and Market Valuation." *Accounting, Organizations and Society* 112 (June): 101547. doi:10.1016/j.aos.2024.101547.

Blue Mark. 2024. *Making the Mark V*. New York: Blue Mark. https://bluemark.co/app/uploads/2024/10/making-the-mark-v.pdf.

BNP Paribas. 2020. "UPM Links EUR 750M Loan to Forest Biodiversity and CO_2 Targets." BNP Paribas. https://cib.bnpparibas/upm-links-eur-750m-loan-to-forest-biodiversity-and-co2-targets/.

BNP Paribas. 2022. "10 Commitments to Net Zero." *ViewPoint*, November 8. https://viewpoint.bnpparibas-am.com/10-commitments-to-net-zero/.

BNP Paribas. 2023a. *Position of BNP Paribas on Voluntary Carbon Credits*. Paris: BNP Paribas. https://cdn-group.bnpparibas.com/uploads/file/bnpparibas_csr_voluntary_carbon_credits_position.pdf.

BNP Paribas. 2023b. "Exploring the Carbon Offset Market: Issues, Reforms and the Future." *Viewpoint*, March 28. https://viewpoint.bnpparibas-am.com/exploring-the-carbon-offset-market-issues-reforms-and-the-future/.

BNP Paribas. 2024. "Acting to Protect and Restore Biodiversity Is Also a Business Issue." News, October 14. https://group.bnpparibas/en/news/acting-to-protect-and-restore-biodiversity-is-also-a-business-issue.

Boedijanto, F.J.O., and L.L. Delina. 2024. "Potentials and Challenges of Artificial Intelligence–Supported Greenwashing Detection in the Energy Sector." *Energy Research & Social Science* 115 (September): 103638. doi:10.1016/j.erss.2024.103638.

Boehe, D.M., L.S. Pongeluppe, and S.G. Lazzarini. 2014. "Natura and the Development of a Sustainable Supply Chain in the Amazon Region." In *Multinationals in Latin America: Case Studies*, edited by L. Liberman, S. Garcilazo, and E. Stal, 147–56. London: Palgrave Macmillan UK. doi:10.1057/9781137024107_13.

Braverman, S. 2024. "COP29 & Article 6.4: A New Chapter in Global Carbon Markets." Carbon Direct, last updated November 26. https://www.carbon-direct.com/insights/cop29-article-6-4-a-new-chapter-in-global-carbon-markets.

Brears, R.C. 2022. *Financing Nature-Based Solutions: Exploring Public, Private, and Blended Finance Models and Case Studies*. Palgrave Studies in Green Finance. Cham, Switzerland: Palgrave Macmillan. https://research.ebsco.com/linkprocessor/plink?id=cbd59011-66b8-34cf-b0e4-8b263b96f2c8.

Campbell, L. 2024. "How to Invest in Biodiversity: 4 Funds We Like." *Good with Money*, July 30. https://good-with-money.com/2024/07/30/top-4-funds-investing-in-biodiversity/.

Capital for Climate. 2024. "ADM Capital Asia Climate-Smart Landscape Fund LP." Capital for Climate NBS Investment Platform. https://nbs.capitalforclimate.com/opportunities/20009.

Capital for Climate. n.d. "Regenerative Agriculture." Capital for Climate NBS Investment Platform. https://nbs.capitalforclimate.com/solutions/7. Accessed February 18, 2025.

Carbon Direct. 2024. *2024 State of the Voluntary Carbon Market*. New York: Carbon Direct. https://www.carbon-direct.com/research-and-reports/state-of-the-voluntary-carbon-market-2024.

Carvalho, S.H.C. de, T. Cojoianu, and F. Ascui. 2023. "From Impacts to Dependencies: A First Global Assessment of Corporate Biodiversity Risk Exposure and Responses." *Business Strategy and the Environment* 32 (5): 2600–14. doi:10.1002/bse.3142.

CDB (Caribbean Development Bank). 2019. *Strategic Plan 2020–2024*. Wildey, St. Michael, Barbados: Caribbean Development Bank. https://www.caribank.org/sites/default/files/publication-resources/CDB%27s%20Strategic%20Plan%202020-24%20%281%29.pdf.

CFA (Conservation Finance Alliance). 2020. *Conservation Finance: A Framework*. Conservation Finance Alliance. https://static1.squarespace.com/static/57e1f17b37c58156a98f1ee4/t/5e728a4e1e6cc747e7cdbdc2/1584564815888/Conservation+Finance+Framework+March+2020.pdf.

Chausson, A., S. zu Ermgassen, J. Bull, C. Hafferty, E. Milner-Gulland, H. Newing, T. Swinfield, et al. 2025. *Striving for Investment-Ready, High-Integrity NbS: Understanding and Managing Tensions between Bankability and High-Integrity*. Surrey, UK: WWF-UK.

Chavkin, S. 2025. "How Mega-Polluters Take Advantage of Billions in Green Loans." *AP News*, January 15. https://apnews.com/article/shell-drax-greenwashing-pollution-sustainability-links-loans-slls-a28e03c7421222c58025b31ab8185272.

Ching, C., C. VanderWilde, and M. Richards. 2024. *Exploring Nature Impacts and Dependencies: A Field Guide to Eight Key Sectors.* Nature Action 100. https://www.ceres.org/resources/reports/exploring-nature-impacts-and-dependencies-field-guide-eight-key-sectors.

CI and IFC (Conservation International and International Finance Corporation). 2023. *Catalogue of Nature-Based Solutions for Infrastructure Projects*. Washington, DC: International Finance Corporation. https://www.ifc.org/content/dam/ifc/doc/2023/catalogue-of-nature-based-solutions-for-infrastructure-projects.pdf.

Clark, R., J. Reed, and T. Sunderland. 2018. "Bridging Funding Gaps for Climate and Sustainable Development: Pitfalls, Progress and Potential of Private Finance." *Land Use Policy* 71 (February): 335–46. doi:10.1016/j.landusepol.2017.12.013.

Climate Focus. 2023. *Biodiversity Credits Markets: Charting Pathways for Early Investment and Sustainable Market Growth*. Amsterdam: Climate Focus. https://climatefocus.com/publications/biodiversity-credits-markets-charting-pathways-for-early-investment-and-sustainable-market-growth/.

Convergence. 2024. *State of Blended Finance 2024.* Convergence. https://www.convergence.finance/resource/state-of-blended-finance-2024/view.

Convergence. n.d. "Design of Asia Climate-Smart Landscape Fund (ACLF)." https://www.convergence.finance/design-funding/grant-portfolio/16KXxuXs5zzXF5ZH55PsCC/view. Accessed March 17, 2025.

Cox, T. 2024. "Biodiversity Funds Pass $1.5 Bln in 2023 with Eight Fund Launches." *Carbon Pulse*, March 12. https://carbon-pulse.com/267890/.

CPIC (Coalition for Private Investment in Conservation). n.d. "Investment Blueprints." https://www.cpicfinance.com/blueprints/. Accessed March 18, 2025.

Credit Suisse. 2022. *Treeprint Carbon Markets: The Beginning of the Big Carbon Age*. Zürich: Credit Suisse AG.

CSF (Center for Sustainable Finance). 2022. "Aligning Financial and Monetary Policies with the Concept of Double Materiality: Rationales, Proposals and Challenges." 05. The Inspire Sustainable Central Banking Toolbox Policy Briefing Paper. Center for Sustainable Finance. https://eprints.lse.ac.uk/115539/1/INSPIRE_Sustainable_Central_Banking_Toolbox_Policy_Briefing_Paper_5.pdf.

Debele, S.E., L.S. Leo, P. Kumar, J. Sahani, J. Ommer, E. Bucchignani, S. Vranić, et al. 2023. "Nature-Based Solutions Can Help Reduce the Impact of Natural Hazards: A Global Analysis of NBS Case Studies." *Science of the Total Environment* 902 (December): 165824. doi:10.1016/j.scitotenv.2023.165824.

Ding, H., S. Faruqi, A. Wu, J.-C. Altamirano, A.A. Ortega, R.Z. Cristales, R. Chazdon, et al. 2017. *Roots of Prosperity: The Economics and Finance of Restoring Land*. Washington, DC: World Resources Institute. https://www.wri.org/research/roots-prosperity-economics-and-finance-restoring-land.

Ding, H., T. Yu, W. Xi, L. Lu, W. Fong, Y. Cao, S. Kuang, et al. 2021. "Accelerating Climate-Resilient Infrastructure Investment in China." Beijing: World Resources Institute. https://www.wri.org/research/accelerating-climate-resilient-infrastructure-investment-china.

Du, K., J. Harford, and D. (Dongheon) Shin. 2022. "Who Benefits from Sustainability-Linked Loans?" 917/2023. Finance Working Paper. Brussels: European Corporate Governance Institute. https://papers.ssrn.com/abstract=4260717.

Dunlop, T., D. Khojasteh, E. Cohen-Shacham, W. Glamore, M. Haghani, M. van den Bosch, D. Rizzi, et al. 2024. "The Evolution and Future of Research on Nature-Based Solutions to Address Societal Challenges." *Communications Earth & Environment* 5 (1): 1–15. doi:10.1038/s43247-024-01308-8.

Earth Security. 2021a. *The Blended Finance Playbook for Nature Based Solutions.* London: Earth Security. https://www.earthsecurity.org/reports/the-blended-finance-playbook-for-nature-based-solutions.

Earth Security. 2021b. *The Investment Value of Nature: The Case of Zephyr Power Limited*. London: Earth Security. https://cdn.prod.website-files.com/62b199427426cd16f424589f/63185778da5f4675fff28fc3_ES-Investment-Value-Nature-CDC.pdf.

Eckstein, D., V. Künzel, and L. Schäfer. 2021. "Global Climate Risk Index 2021: Who Suffers Most from Extreme Weather Events? Weather-Related Loss Events in 2019 and 2000 to 2019." 16th ed. Global Climate Risk Index. GermanWatch. https://www.germanwatch.org/en/19777.

EIB (European Investment Bank). 2023. *Investing in Nature-Based Solutions: State-of-Play and Way Forward for Public and Private Financial Measures in Europe*. Luxembourg: European Investment Bank. https://www.eib.org/attachments/lucalli/20230095_investing_in_nature_based_solutions_en.pdf.

ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure). 2024. "ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure)." https://encorenature.org/en/explore.

Environmental Finance. n.d.a. "Asset Manager of the Year—Large; Impact Project/Investment of the Year—Agriculture and Sustainable Land Use: Tikehau Capital." https://www.environmental-finance.com/content/awards/impact-awards-2023/winners/asset-manager-of-the-year-large-impact-project/investment-of-the-year-agriculture-and-sustainable-land-use-tikehau-capital.html.

Environmental Finance. n.d.b. "Green Bond of the Year—Corporate (EMEA): Stora Enso." https://www.environmental-finance.com/content/awards/environmental-finances-sustainable-debt-awards-2024/winners/green-bond-of-the-year-corporate-(emea)-stora-enso.html.

Ermgassen, S.O.S.E. zu, K. Devenish, B.A. Simmons, A. Gordon, J.P.G. Jones, M. Maron, H. Schulte to Bühne, et al. 2023. "Evaluating the Impact of Biodiversity Offsetting on Native Vegetation." *Global Change Biology* 29 (15): 4397–4411. doi:10.1111/gcb.16801.

ESMA (European Securities and Markets Authority). 2023. "'Do No Significant Harm' Definitions and Criteria across the EU Sustainable Finance Framework." Paris: European Securities and Markets Authority. https://www.esma.europa.eu/sites/default/files/2023-11/ESMA30-379-2281_Note_DNSH_definitions_and_criteria_across_the_EU_Sustainable_Finance_framework.pdf.

European Commission. n.d. "Sustainability-Related Disclosure in the Financial Services Sector." https://finance.ec.europa.eu/sustainable-finance/disclosures/sustainability-related-disclosure-financial-services-sector_en. Accessed March 6, 2025.

Evison, W., L.P. Low, and D. O'Brien. 2023. *Managing Nature Risks: From Understanding to Action*. PwC. https://www.pwc.com/gx/en/strategy-and-business/content/sbpwc-2023-04-19-Managing-nature-risks-v2.pdf.

Favero, F., and J. Hinkel. 2024. "Key Innovations in Financing Nature-Based Solutions for Coastal Adaptation." *Climate* 12 (4): 53. doi:10.3390/cli12040053.

FfBF (Finance for Biodiversity Foundation). 2023. "Top 10 Biodiversity-Impact Ranking of Company Industries." Briefing Paper. Amsterdam: Finance for Biodiversity Foundation. https://www.financeforbiodiversity.org/wp-content/uploads/Top10_biodiversity-impact_ranking.pdf.

FfBF. 2024a. *Aligning Financial Flows with the Global Biodiversity Framework: Translating Ambition into Implementation: Key Recommendations for Governments from the Financial Sector*. Amsterdam: Finance for Biodiversity Foundation. https://www.financeforbiodiversity.org/wp-content/uploads/FfB_Aligning-financial-Flows-with-the-Global-Biodiversity-Framework_April2024.pdf.

FfBF. 2024b. *Nature Target Setting Framework for Asset Managers and Asset Owners*, 2nd ed. Amsterdam: Finance for Biodiversity Foundation. https://www.financeforbiodiversity.org/nature-target-setting-framework-for-asset-managers-and-asset-owners/.

FfBF. 2025. *Biodiversity Measurement Approaches: A Practitioner's Guide for Financial Institutions*, 4th ed. Amsterdam: Finance for Biodiversity Foundation. https://www.financeforbiodiversity.org/wp-content/uploads/Biodiversity-measurement-approaches-A-practitioners-guide-for-financial-institutions-4th-edition.pdf.

F&FC (Forests & Finance Coalition). 2024. "Finance's Role in Deforestation," August 14. https://forestsandfinance.org/.

Finance Earth. 2021. *A Market Review of Nature-Based Solutions: An Emerging Institutional Asset Class*. Finance Earth. https://finance.earth/wp-content/uploads/2021/05/Finance-Earth-GPC-Market-Review-of-NbS-Report-May-2021.pdf.

FOLU (Food and Land Use Coalition). 2023. *Aligning Regenerative Agricultural Practices with Outcomes to Deliver for People, Nature and Climate.* London: Food and Land Use Coalition. https://www.foodandlandusecoalition.org/wp-content/uploads/2023/01/Aligning-regenerative-agricultural-practices-with-outcomes-to-deliver-for-people-nature-climate-Jan-2023.pdf.

Foroughi, J. 2022. "ESG Is Not Impact Investing and Impact Investing Is Not ESG." *Stanford Social Innovation Review.* November 10, 2022. https://ssir.org/articles/entry/esg_is_not_impact_investing_and_impact_investing_is_not_esg.

FSB (Financial Stability Board). 2024. *Stocktake on Nature-Related Risks: Supervisory and Regulatory Approaches and Perspectives on Financial Risk.* Basel, Switzerland: Financial Stability Board. https://www.fsb.org/wp-content/uploads/P180724.pdf.

FTEM (Forest Trends, Ecosystem Marketplace). 2024. *State of the Voluntary Carbon Market 2024*. Washington, DC: Forest Trends Association.

GFANZ (Glasgow Financial Alliance for Net Zero). 2022. *Financial Institution Net-Zero Transition Plans: Fundamentals, Recommendations, and Guidance*. Glasgow: Glasgow Financial Alliance for Net-Zero Secretariat. https://assets.bbhub.io/company/sites/63/2022/09/Recommendations-and-Guidance-on-Financial-Institution-Net-zero-Transition-Plans-November-2022.pdf.

GFANZ. 2024. *Supplemental Guidance: Nature in Net-Zero Transition Plans*. Workstream Consultation Paper. Glasgow: Glasgow Financial Alliance for Net-Zero Secretariat. https://assets.bbhub.io/company/sites/63/2024/10/Nature-in-NZTP-October-2024.pdf.

GFI (Green Finance Institute). 2023. "Oxygen Conservation: Identify and Work with Investors," September 10. https://hive.greenfinanceinstitute.com/gfihive/toolkit/identifying-and-approaching-investors/oxygen-conservation.

GFI. 2024a. *Assessing the Materiality of Nature-Related Financial Risks for the UK*. Oxford, UK: Green Finance Institute.

GFI. 2024b. *Investing in Nature: Opportunities for Institutional Investors*. Oxford, UK: Sustainable Markets Initiative, Natural Capital Investment Alliance. https://www.greenfinanceinstitute.com/wp-content/uploads/2024/07/investing-in-nature_20240521.pdf.

GFI. 2024c. "Tikehau Capital's Regenerative Agriculture Strategy." Green Finance Institute HIVE. https://hive.greenfinanceinstitute.com/gfihive/revenues-for-nature/case-studies/tikehau-capitals-regenerative-agriculture-strategy/?highlight=tikehau.

GFI. n.d. "Quintana Roo Reef Protection (Parametric Insurance)." https://hive.greenfinanceinstitute.com/gfihive/revenues-for-nature/case-studies/quintana-roo-reef-protection-parametric-insurance/. Accessed February 2025.

Giglio, S., T. Kuchler, J. Stroebel, and X. Zeng. 2023. "Biodiversity Risk." Working Paper. Cambridge, MA: National Bureau of Economic Research. doi:10.3386/w31137.

GIIN (Global Impact Investing Network). 2024a. "An Introduction to Impact Measurement and Management." https://iris.thegiin.org/introduction/.

GIIN. 2024b. "IRIS+ System | Standards." https://iris.thegiin.org/metrics/?page=2&search=&category%5B0%5D=cat-biodiversity-and-ecosystems&sortby=.

Greenfield, P. 2024. "Trees and Land Absorbed Almost No CO_2 Last Year. Is Nature's Carbon Sink Failing?" *The Guardian*, October 14, sec. Environment. https://www.theguardian.com/environment/2024/oct/14/nature-carbon-sink-collapse-global-heating-models-emissions-targets-evidence-aoe.

Griscom, B.W., J. Busch, S.C. Cook-Patton, P.W. Ellis, J. Funk, S.M. Leavitt, G. Lomax, et al. 2020. "National Mitigation Potential from Natural Climate Solutions in the Tropics." *Philosophical Transactions of the Royal Society B: Biological Sciences* 375 (1794): 20190126. doi:10.1098/rstb.2019.0126.

Groot, R. de, L. Brander, S. van der Ploeg, R. Costanza, F. Bernard, L. Braat, M. Christie, et al. 2012. "Global Estimates of the Value of Ecosystems and Their Services in Monetary Units." *Ecosystem Services* 1 (1): 50–61. doi:10.1016/j.ecoser.2012.07.005.

Guagliano, C. 2020. *Financial Stability: Short-Termism Pressures from Financial Markets*. No. 1. ESMA Report on Trends, Risks, and Vulnerabilities. Paris: European Securities and Markets Authority. https://www.esma.europa.eu/sites/default/files/trv_2020_1-short_termism_pressures_from_financial_markets.pdf.

Hale, D., and J. Wasserman. 2023. "Why Renewable Energy Is Such a Good Fit for Private Investors." Schroders. https://www.schroders.com/en-us/us/institutional/insights/why-renewable-energy-is-such-a-good-fit-for-private-investors/.

Han, J., C. Wang, S. Deng, and E. Lichtfouse. 2023. "China's Sponge Cities Alleviate Urban Flooding and Water Shortage: A Review." *Environmental Chemistry Letters* 21 (3): 1297–314. doi:10.1007/s10311-022-01559-x.

Höck, A., C. Klein, A. Landau, and B. Zwergel. 2020. "The Effect of Environmental Sustainability on Credit Risk." *Journal of Asset Management* 21 (2): 85–93. doi:10.1057/s41260-020-00155-4.

Hoover, F.A., J.I. Price, and M.E. Hopton. 2020. "Examining the Effects of Green Infrastructure on Residential Sales Prices in Omaha, Nebraska." *Urban Forestry & Urban Greening* 54 (October). doi:10.1016/j.ufug.2020.126778.

HSBC. 2024. *Net Zero Transition Plan.* London: HSBC Holdings plc. https://www.hsbc.com/who-we-are/our-climate-strategy/our-net-zero-transition-plan.

Hsu, V., G. Lai, Y. Li, and G. Liang. 2024. "On the (In)efficiency of Sustainability-Linked Loans." Rochester, NY: SSRN Scholarly Paper. doi:10.2139/ssrn.4726761.

Hu, M. 2022. "Not All Green Buildings Are Made Equal: Green Building Construction Cost Premium." In *Empower*, 10–17. ACSA Press. doi:10.35483/ACSA.AM.110.1.

Huang, A.H., H. Wang, and Y. Yang. 2023. "FinBERT: A Large Language Model for Extracting Information from Financial Text." *Contemporary Accounting Research* 40 (2): 806–41. doi:10.1111/1911-3846.12832.

IATF (Inter-agency Task Force on Financing for Development). 2024. *Financing for Sustainable Development Report 2024: Financing for Development at a Crossroads*. New York: Inter-agency Task Force on Financing for Development. https://financing.desa.un.org/iatf/report/financing-sustainable-development-report-2024.

ICVCM (Integrity Council for the Voluntary Carbon Market). 2024. "Integrity Council Approves Three REDD+ Methodologies." *ICVCM* (blog). November 15. https://icvcm.org/integrity-council-approves-three-redd-methodologies/.

IFC (International Finance Corporation). 2023. *Biodiversity Finance Reference Guide: Building on the Green Bond Principles and Green Loan Principles*. Washinton, DC: IFC. https://www.ifc.org/content/dam/ifc/doc/mgrt/biodiversity-finance-reference-guide.pdf.

IFC. 2024. *Biodiversity Finance Metrics for Impact Reporting: Supplement to IFC Biodiversity Finance Reference Guide*. Washington, DC: IFC. https://www.ifc.org/content/dam/ifc/doc/2024/ifc-biodiversity-finance-metrics-for-impact-reporting.pdf.

Impact Frontiers. n.d.a. "Five Dimensions of Impact." https://impactfrontiers.org/norms/five-dimensions-of-impact/. Accessed March 6, 2025.

Impact Frontiers. n.d.b. "Module 10: Impact Risk." https://impactfrontiers.org/online-curriculum/impact-risk/. Accessed March 6, 2025.

IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services). 2019. *Global Assessment Report on Biodiversity and Ecosystem Services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. Bonn, Germany: IPBES Secretariat. https://doi.org/10.5281/zenodo.3831673.

IUCN and FOLU (International Union for Conservation of Nature and the Food and Land Use Coalition). 2023. *A Guide to Investing in Landscape Restoration to Sustain Agrifood Supply Chains: Reducing Risks, Raising Resilience, Reaping Returns.* Gland, Switzerland, and London, UK: IUCN. https://portals.iucn.org/library/sites/library/files/documents/2023-010-En.pdf.

JLL (Jones Lang Lasalle IP, Inc.). 2023. *The Commercial Case for Making Buildings More Sustainable*. Chicago: Jones Lang Lasalle IP, Inc. https://www.jll.co.uk/content/dam/jll-com/documents/pdf/research/global/jll-the-commercial-case-for-making-buildings-more-sustainable-nov-2023.pdf.

Kasprzyk, M., W. Szpakowski, E. Poznańska, F.C. Boogaard, K. Bobkowska, and M. Gajewska. 2022. "Technical Solutions and Benefits of Introducing Rain Gardens: Gdańsk Case Study." *Science of the Total Environment* 835 (August): 155487. doi:10.1016/j.scitotenv.2022.155487.

Khan, Y. 2024. "U.N. Negotiators Take Key Step to Global Carbon Deal." *Wall Street Journal*, November 12, sec. WSJ Pro. https://www.wsj.com/articles/u-n-negotiators-take-key-step-to-global-carbon-deal-1e23433e.

Kiernan-Stone, L. 2024. "ADM Capital Invests in the World's Largest and Most Sustainable Nira Supply Chain." Agriculture Investment Marketplace, October 29. https://investinag.com/2024/10/29/adm-capital-invests-in-the-worlds-largest-and-most-sustainable-nira-supply-chain/.

K-MGBF (Kunming-Montreal Global Biodiversity Framework). n.d. "Target 19: Mobilize $200 Billion per Year for Biodiversity from All Sources, Including $30 Billion through International Finance." Convention on Biological Diversity. Secretariat of the Convention on Biological Diversity. https://www.cbd.int/gbf/targets/19. Accessed March 13, 2025.

Knight, C., J. Stephenson, T. Chellew, and W. McFarland. 2022. *Nature Based Solutions: A Review of Current Financing Barriers and How to Overcome These.* London: Terranomics. https://www.wwf.org.uk/sites/default/files/2022-06/WWF-NBS-Public-Report-Final-270622.pdf.

Kooijman, E.D., S. McQuaid, M.-L. Rhodes, M.J. Collier, and F. Pilla. 2021. "Innovating with Nature: From Nature-Based Solutions to Nature-Based Enterprises." *Sustainability* 13 (3): 1263. doi:10.3390/su13031263.

Kousky, C. 2022. "Insurance-Sector Tools to Combat Biodiversity Loss." *Science* 377 (6607): 714–16. doi:10.1126/science.abo7282.

KraftHeinz. 2023. "Kraft Heinz Releases Global Deforestation- and Conversion-Free Policy." Press Release, June 23. https://news.kraftheinzcompany.com/press-releases-details/2023/Kraft-Heinz-Releases-Global-Deforestation--and-Conversion-Free-Policy/default.aspx.

Kuhn, A.E., B. Hofmann, J.J. Muñoz Osuna, and J. Golz. 2023. "Mezzanine Ascendance in Germany's Solar Sector." *PFI Yearbook 2024*. https://edition.pagesuite-professional.co.uk/html5/reader/production/default.aspx?pubname=&edid=c6401962-fe95-4c3f-a9da-85b2e70bbe4e.

LBG (Lloyds Banking Group). 2023. *Sustainable Financing Framework*. London: Lloyds Banking Group. https://www.lloydsbankinggroup.com/assets/pdfs/who-we-are/responsible-business/downloads/group-codes-and-policies/2023-lbg-sustainable-financing-framework.pdf.

Liu, Z., S. Fagherazzi, and B. Cui. 2021. "Success of Coastal Wetlands Restoration Is Driven by Sediment Availability." *Communications Earth & Environment* 2 (1): 1–9. doi:10.1038/s43247-021-00117-7.

Löfqvist, S., R.D. Garrett, and J. Ghazoul. 2023. "Incentives and Barriers to Private Finance for Forest and Landscape Restoration." *Nature Ecology & Evolution* 7 (5): 707–15. doi:10.1038/s41559-023-02037-5.

Maron, M., A. von Hase, F. Quétier, L.J. Sonter, S. Theis, and S.O.S.E. zu Ermgassen. 2025. "Biodiversity Offsets, Their Effectiveness and Their Role in a Nature Positive Future." *Nature Reviews Biodiversity*, February, 1–14. doi:10.1038/s44358-025-00023-2.

Mattos Filho. 2024. *Bill No. 182/2024: Brazilian Greenhouse Gas Emissions Trading System*. São Paulo: Mattos Filho. https://www.mattosfilho.com.br/wp-content/uploads/2024/11/mattos-filho-livreto-brazils-house-of-representatives-approves-bill-to-regulate-carbon-market.pdf.

Mayor, B., H. Toxopeus, S. McQuaid, E. Croci, B. Lucchitta, S.E. Reddy, A. Egusquiza, et al. 2021. "State of the Art and Latest Advances in Exploring Business Models for Nature-Based Solutions." *Sustainability* 13 (13): 7413. doi:10.3390/su13137413.

McKinsey and NielsenIQ. 2023. "Consumers Care about Sustainability—and Back It Up with Their Wallets." McKinsey. https://www.mckinsey.com/industries/consumer-packaged-goods/our-insights/consumers-care-about-sustainability-and-back-it-up-with-their-wallets#/.

Medellín-Azuara, J., A. Escriva-Bou, J.A. Abatzoglou, J.H. Vier, J.M. Rodríguez Flores, and D.A. Sumner. 2022. *Economic Impacts of the 2021 Drought on California Agriculture*. Preliminary Report. Merced, California: University of California, Merced. http://drought.ucmerced.edu.

Miles, N., N.E. Duffus, J.W. Bull, and S.O.S.E. zu Ermgassen. 2025. "An Influential Biodiversity Market May Not Direct Investment towards Habitats of National Importance." EcoEvoRxiv. doi:doi.org/10.32942/X24W7G.

Miro Forestry. 2022. *Annual Report*. London: Miro Forestry. https://www.miroforestry.com/wp-content/uploads/2023/05/Miro_Annual-Report_2022_V5-Web.pdf.

Mirova. 2024. *Sustainable Ocean Fund Impact Report 2023*. Paris: Mirova. https://www.mirova.com/sites/default/files/2024-07/sustainable-ocean-fund-sof-2023-impact-report.pdf.

Moodaley, W., and A. Telukdarie. 2023. "Greenwashing, Sustainability Reporting, and Artificial Intelligence: A Systematic Literature Review." *Sustainability* 15 (2): 1481. doi:10.3390/su15021481.

NCSA (Natural Climate Solutions Alliance). 2024. *Natural Climate Solutions for the Voluntary Carbon Market: An Investor Guide for Companies and Financial Institutions*. Natural Climate Solutions Alliance. https://www.wbcsd.org/resources/natural-climate-solutions-for-the-voluntary-carbon-market-an-investor-guide-for-companies-and-financial-institutions/.

NGFS (Network for Greening the Financial System). 2024. *Nature-Related Financial Risks: A Conceptual Framework to Guide Action by Central Banks and Supervisors*. Technical Document. Paris: Network for Greening the Financial System. https://www.ngfs.net/system/files/import/ngfs/medias/documents/ngfs-conceptual-framework-nature-risks.pdf.

NPI (Nature Positive Initiative). 2025. "Draft State of Nature Metrics for Piloting: Post-consultation Updates." Nature Positive Initiative. https://www.naturepositive.org/app/uploads/2025/01/Draft-State-of-Nature-Metrics-for-Piloting_170125.pdf.

OECD (Organisation for Economic Co-operation and Development). 2015. "Hybrid Finance Instruments for SMEs." In *New Approaches to SME and Entrepreneurship Financing Broadening the Range of Instruments*. Paris: OECD. https://read.oecd-ilibrary.org/finance-and-investment/new-approaches-to-sme-and-entrepreneurship-financing/hybrid-finance-instruments-for-smes_9789264240957-9-en.

PBAF (Partnership for Biodiversity Accounting Financials). 2024. *Impact on Ecosystem Services: A Return on Investment*. The Hague, Netherlands: Partnership for Biodiversity Accounting Financials. https://pbafglobal.com/files/downloads/PBAF_fsdimpact_ecosystem_services_return_investment-july_2024.pdf.

PfF (Partnerships for Forests). 2024. "Asia Climate-Smart Landscape Fund (ACLF)." https://partnershipsforforests.com/partnerships-projects/asia-climate-smart-landscape-fund-aclf/.

Pollination Group. 2023a. *State of Voluntary Biodiversity Credit Markets: A Global Review of Biodiversity Credit Scheme*. London: Pollination Group. https://pollinationgroup.com/wp-content/uploads/2023/10/Global-Review-of-Biodiversity-Credit-Schemes-Pollination-October-2023.pdf.

Pollination Group. 2023b. *Nature Finance Focus: Tracking Global Trends in Nature Investment*. London: Pollination Group. https://pollinationgroup.com/wp-content/uploads/2023/11/Pollination-Nature-Finance-Focus.pdf.

Pollination Group. 2024. "State of Voluntary Biodiversity Credit Markets." London: Pollination Group. https://pollinationgroup.com/global-perspectives/state-of-voluntary-biodiversity-credit-markets/.

Pollination Group and TNM (Taskforce on Nature Markets). 2023. *Biodiversity Credit Markets: The Role of Law, Regulation and Policy*. London: Pollination Group. https://cdn.prod.website-files.com/623a362e6b1a3e2eb749839c/6452340b9bcbb3ef3f82e6b6_BiodiversityCreditMarkets.pdf.

PRI (Principles for Responsible Investment). 2018a. *A Practical Guide to Active Ownership in Listed Equity*. Principles for Responsible Investment. https://www.unpri.org/download?ac=4151.

PRI. 2018b. "Stewardship." Principles for Responsible Investment. https://www.unpri.org/download?ac=12686.

PRI. 2024a. "An Introduction to Responsible Investment: Biodiversity for Asset Owners." Principles for Responsible Investment. https://www.unpri.org/download?ac=20757.

PRI. 2024b. *Stewardship in Private Equity: A Guide for General Partners*. London: Principles for Responsible Investment. https://www.unpri.org/download?ac=20604.

PwC (PricewaterhouseCoopers). 2023. *Accelerating Finance for Nature: Barriers and Recommendations for Scaling Private Sector Investment*. London: PwC. https://www.pwc.com/gx/en/nature-and-biodiversity/nature-fin-accelerator-mode.pdf.

Raalte, D. van, and N. Ranger. 2023. "Financing Nature-Based Solutions for Adaptation at Scale: Learning from Specialised Investment Managers and Nature Funds." Oxford, UK: Global Center on Adaptation and Environmental Change Institute, University of Oxford. https://ieeb.fundacion-biodiversidad.es/sites/default/files/financing_nbs_for_adaptation-gcaox-ford2023-finalv2_0.pdf.

Rabobank. 2022. "Acorn Auctions First Carbon Credits." https://www.rabobank.nl/nieuws/011321431/acorn-veilt-eerste-carbon-credits.

Rakoto, P.Y., K. Deilami, J. Hurley, M. Amati, and Q. (Chayn) Sun. 2021. "Revisiting the Cooling Effects of Urban Greening: Planning Implications of Vegetation Types and Spatial Configuration." *Urban Forestry & Urban Greening* 64 (September): 127266. doi:10.1016/j.ufug.2021.127266.

Ranger, N., J. Alvarez, A. Freeman, T. Harwood, M. Obersteiner, E. Paulus, and J. Sabuco. 2023. *The Green Scorpion: The Macro-criticality of Nature for Finance: Foundations for Scenario-Based Analysis of Complex and Cascading Physical Nature-Related Risks.* Oxford, UK: Environmental Change Institute, University of Oxford. https://www.ngfs.net/sites/default/files/medias/documents/ngfs_occasional_paper_green-scorpion_macrocriticality_nature_for_finance.pdf.

Rueedi, J., and E. Whieldon. 2022. "Biodiversity Is Still a Blind Spot for Most Companies around the World." S&P Global. https://www.spglobal.com/esg/insights/biodiversity-is-still-a-blind-spot-for-most-companies-around-the-world.

Seddon, N., A. Chausson, P. Berry, C.A.J. Girardin, A. Smith, and B. Turner. 2020. "Understanding the Value and Limits of Nature-Based Solutions to Climate Change and Other Global Challenges." *Philosophical Transactions of the Royal Society B: Biological Sciences* 375 (1794): 20190120. doi:10.1098/rstb.2019.0120.

SIF (Sustainable Insurance Forum Secretariat). 2021. *SIF Scoping Study: Nature-Related Risks in the Global Insurance Sector*. New York: UNDP Sustainable Insurance Forum. https://sustainableinsuranceforum.org/wp-content/uploads/2021/11/UN_Nature-Related-Risks-in-the-Global-Insurance-Sector_v9.pdf.

Simões-Coelho, M., A. Roder Figueira, and E. Russo. 2023. "Motivations for a Sustainable Ethos: Evidence from the Globally Present Brazilian Multinational Natura &Co." *Environment Systems and Decisions* 43: 321–36. doi:https://doi.org/10.1007/s10669-022-09890-y.

Soer, L., F. van den Berg, and S. Bandringa. 2024. *Finance in Support of Nature*. The Hague, Netherlands: The Netherlands Enterprise Agency. https://www.government.nl/documents/reports/2024/04/02/finance-in-support-of-nature.

Stora Enso. 2023a. *Stora Enso Green and Sustainability-Linked Financing Framework 2023*. Helsinki: Stora Enso. https://www.storaenso.com/-/media/documents/download-center/documents/investor-relations/2023/se_green-and-sustainability-linked-financing-framework_may2023.pdf.

Stora Enso. 2023b. *Stora Enso Green and Sustainability-Linked Financing Report 2023*. Helsinki: Stora Enso. https://www.storaenso.com/-/media/documents/download-center/documents/investor-relations/2023/se_green_bond_report_2023.pdf.

Stora Enso. 2024. *Stora Enso Investor Kit Q2 2024*. Helsinki: Stora Enso. https://www.storaenso.com/-/media/documents/download-center/documents/investor-relations/2024/stora-enso-investor-kit_q22024_final.pdf.

Sustainable Brands. 2018. "Unilever's Sustainable Living Brands Delivered 70% of Turnover Growth in 2017." Sustainable Brands, December 2. https://sustainablebrands.com/read/unilever-s-sustainable-living-brands-delivered-70-of-turnover-growth-in-2017.

Swiss Re. n.d. "Insurance to Protect Natural Assets and Enable Nature-Based Solutions." https://www.swissre.com/our-business/public-sector-solutions/insurance-to-protect-natural-assets-and-enable-nature-based-solutions.html. Accessed November 26, 2024.

TCCT (The Climate Champions Team); Capital for Climate; Innovative Finance for the Amazon, Cerrado and Chaco (IFACC); and Brunswick Group. 2024. *Scaling Nature Finance Now: The Opportunity for Investors in Brazil and Beyond*. The Climate Champions Team, Capital for Climate, IFACC, and Brunswick Group. https://cdn.prod.website-files.com/63f583127e9706bf18363927/66f155beb03a367d266d774b_Scaling%20nature%20finance%20now_%20The%20opportunity%20for%20investors%20in%20Brazil%20and%20beyond_final.pdf.

Teotónio, I., C.M. Silva, and C.O. Cruz. 2021. "Economics of Green Roofs and Green Walls: A Literature Review." *Sustainable Cities and Society* 69 (June): 102781. doi:10.1016/j.scs.2021.102781.

Thirion, I., P. Reichert, V. Xhauflair, and J.D. Jonck. 2022. "From Fiduciary Duty to Impact Fidelity: Managerial Compensation in Impact Investing." *Journal of Business Ethics* 179 (4). doi:10.1007/s10551-022-05155-5.

Tikehau Capital. 2022. "Regenerative Agriculture Transition to Be Accelerated through New Impact Strategy from AXA, Unilever and Tikehau Capital." Press Release, May 11. https://www.tikehaucapital.com/~/media/Files/T/Tikehau-Capital-V2/documents/media/en/pr-2022-en/AXA-Unilever-Tikehau-Capital-PR-11052022.pdf.

Tikehau Capital. 2023. "Tikehau Capital's Private Equity Regenerative Agriculture Strategy Commits €120 Million Investment in Biobest, a Global Leader in Biological-Control Products in Agriculture." Press Release, September 21. https://www.tikehaucapital.com/~/media/Files/T/Tikehau-Capital-V2/documents/media/en/pr-2023-en/210923-Press-Release-Biobest-EN.pdf.

Tikehau Capital. 2024a. "Chapter 4: Sustainable Development." In *Universal Registration Document*. Paris: Tikehau Capital. https://www.tikehaucapital.com/~/media/Files/T/Tikehau-Capital-V2/documents/sustainability/esg-publication/Copy%20of%20tikehau-capital-2023-universal-registration-document-chapter-4-en.pdf.

Tikehau Capital. 2024b. *Integrated Report 2023*. Paris: Tikehau Capital. https://www.tikehaucapital.com/~/media/Files/T/Tikehau-Capital-V2/documents/sustainability/activity-report-tikehau-capital-2023.pdf.

Tikehau Capital. 2024c. "Investor Presentation." Paris: Tikehau Capital. https://www.tikehaucapital.com/~/media/Files/T/Tikehau-Capital-V2/documents/shareholders/publications-en/tikehau-capital-investor-presentation-june-2024.pdf.

TLG (The Landbanking Group). n.d. "How Our Technology Works." https://www.thelandbankinggroup.com/technology. Accessed January 2025.

TNC (The Nature Conservancy). 2019. *Investing in Nature: Private Finance for Nature-Based Resilience*. Arlington, VA: The Nature Conservancy. https://www.nature.org/content/dam/tnc/nature/en/documents/TNC-INVESTING-IN-NATURE_Report_01.pdf.

TNC. 2024. "Key Takeaways on Article 6 at COP29." Arlington, VA: The Nature Conservancy. https://www.nature.org/content/dam/tnc/nature/en/documents/COP29-Article-6-Key-Outcomes.pdf.

TNFD (Taskforce on Nature-related Financial Disclosures). 2022. *The TNFD Nature-Related Risk & Opportunity Management and Disclosure Framework: A Prototype for Consultation with Market Participants*. Beta v0.1 Release. London: Taskforce on Nature-related Financial Disclosures. https://tnfd.global/wp-content/uploads/2022/03/220321-TNFD-framework-beta-v0.1-FINAL.pdf.

TNFD. 2023a. *Guidance on Biomes*. Version 1.0. London: Taskforce on Nature-related Financial Disclosures. https://tnfd.global/publication/guidance-by-biome/.

TNFD. 2023b. *Guidance on Engagement with Indigenous Peoples, Local Communities and Affected Stakeholders*. London: Taskforce on Nature-related Financial Disclosures. https://tnfd.global/publication/guidance-on-engagement-with-indigenous-peoples-local-communities-and-affected-stakeholders/.

TNFD. 2023c. *Guidance on the Identification and Assessment of Nature-Related Issues: The LEAP Approach*. London: Taskforce on Nature-related Financial Disclosures. https://tnfd.global/publication/additional-guidance-on-assessment-of-nature-related-issues-the-leap-approach/.

TNFD. 2024. *Discussion Paper on Nature Transition Plans.* London: Taskforce on Nature-related Financial Disclosures. https://tnfd.global/wp-content/uploads/2024/10/Discussion-paper-on-nature-transition-plans.pdf?v=1729942723.

TNFD. 2025. "TNFD Issues New Sector Guidance." Press Release, January 23. https://tnfd.global/new-set-of-sector-guidance-published/.

TNFD and GRI (Global Reporting Initiative). 2024. *Interoperability Mapping between the GRI Standards and the TNFD Disclosure Recommendations and Metrics*. London: Taskforce on Nature-related Financial Disclosures. https://tnfd.global/wp-content/uploads/2024/07/TNFD_GRI_Accompanying_guide_Interoperability-mapping-1.pdf?v=1722332939.

Tomczak, K. 2024. "Sovereign Green Bond Market: Drivers of Yields and Liquidity." *International Journal of Financial Studies* 12 (2): 48. doi:10.3390/ijfs12020048.

Trase. n.d. "Insights and Analysis on Commodity Trade Sustainability." Trase.Earth. https://trase.earth/. Accessed March 17, 2025.

Triodos Bank. 2022. *Our Approach to Impact: How We Assess, Monitor and Contribute as an Impact Investor.* Driebergen-Rijsenburg, The Netherlands: Triodos Bank. https://www.triodos-im.com/binaries/content/assets/tim/impact-management/our-approach-to-sustainability-and-impact-12-2022.pdf.

Triodos Bank. 2024a. "A Pioneering Partnership with Oxygen Conservation." Triodos Bank, January 11. https://www.triodos.co.uk/articles/2024/a-pioneering-partnership-with-oxygen-conservation.

Triodos Bank. 2024b. "Triodos Bank Backs South West's Largest New Woodland in Decades." Press Release, May 16. https://www.triodos.co.uk/press-releases/2024/triodos-bank-backs-south-wests-largest-new-woodland-in-decades.

Triodos Bank. 2024c. "Triodos Bank Commits to Financing €500 Million in Nature-Based Solutions." Press Release, November 19. https://www.triodos.com/en/press-releases/2024/triodos-bank-commits-to-financing-500-million-euro-in-nature-based-solutions.

UN Habitat (United Nations Human Settlements Programme). 2023. *UN Habitat Pakistan: Country Report 2023*. Islamabad: United Nations Human Settlements Programme. https://unhabitat.org/sites/default/files/2023/06/4._pakistan_country_report_2023_b5_final_compressed.pdf.

UNDP (United Nations Development Programme). 2023. *Standards Guidance for the SDG Impact Standards for Private Equity Funds.* New York: UNDP. https://sdgprivatefinance.undp.org/sites/default/files/resource-documents/20231016-undp-sdg-impact-standards-guidance-for-pe-fund-standards.pdf.

UNEA (United Nations Environment Assembly). 2022. "Resolution on Adopting a Multilaterally Agreed Definition of Nature-Based Solutions (NbS)." UNEA-5. Nairobi: UNEP. https://digitallibrary.un.org/record/3999268?ln=en&v=pdf.

UNEP (United Nations Environment Programme). 2021. *State of Finance for Nature: Tripling Investments in Nature-Based Solutions by 2030*. Nairobi: UNEP.

UNEP. 2023. *State of Finance for Nature: The Big Nature Turnaround—Repurposing $7 Trillion to Combat Nature Loss*. Nairobi: UNEP. https://www.unep.org/resources/state-finance-nature-2023#:~:text=Close%20to%20%247%20trillion%20is,Gross%20Domestic%20Product%20(GDP).

UNEP. 2024. *Global Resources Outlook 2024: Bend the Trend—Pathways to a Liveable Planet as Resource Use Spikes*. Nairobi: International Resource Panel. https://wedocs.unep.org/handle/20.500.11822/44901.

UNEP (United Nations Environment Programme); the Prince of Wales' International Sustainability Unit; International Coral Reef Initiative; and S&P Trucost Limited, an affiliate of S&P Dow Jones Indices LLC. 2018. "The Coral Reef Economy: The Business Case for Investment in the Protection, Preservation and Enhancement of Coral Reef Health." https://icriforum.org/wp-content/uploads/2019/12/The%20Coral%20Reef%20Economy.pdf.

UNEP-WCMC (UNEP World Conservation Monitoring Centre). 2024. *Accountability for Nature: January 2024 Comparison of Nature-Related Assessment and Disclosure Frameworks and Standards*. Cambridge, UK: UNEP-WCMC. https://www.unepfi.org/wordpress/wp-content/uploads/2024/01/Accountability-for-Nature.pdf.

UNEP-WCMC. n.d. "Positive Impact Indicators Directory." Land Use Impact Hub. https://landuseimpacthub.com/en/kpis. Accessed March 14, 2025.

Visser, I., E. Morrell, and D. Groot. 2023. *Catalysing Finance and Insurance for Nature-Based Solutions*. GIZ commissioned report. Bonn, Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. https://www.giz.de/en/downloads/giz2023-en-Catalysing-Finance-and-Insurance-for-Nature-based-Solutions.pdf.

Waite, R., L. Burke, E. Gray, and P. van Beukering. 2014. *Coastal Capital: Ecosystem Valuation for Decision Making in the Caribbean.* Washington, DC: World Resources Institute. https://www.wri.org/research/coastal-capital-ecosystem-valuation-decision-making-caribbean.

Wang, B., C. Waters, M.R. Anwar, A. Cowie, D.L. Liu, D. Summers, K. Paul, et al. 2022. "Future Climate Impacts on Forest Growth and Implications for Carbon Sequestration through Reforestation in Southeast Australia." *Journal of Environmental Management* 302 (January): 113964. doi:10.1016/j.jenvman.2021.113964.

WBCSD (World Business Council for Sustainable Development). 2023. *Forest Investor Club 2023 Annual Report*. New York: Forest Investor Club. https://www.wbcsd.org/wp-content/uploads/2023/09/Forest-Investor-Club_2023-Annual-Report.pdf.

WB (World Bank). 2020. *Private Finance for Nature: A World Bank Group Paper on Private Finance for Biodiversity and Ecosystem Services*. Washington, DC: World Bank Group. https://thedocs.worldbank.org/en/doc/916781601304630850-0120022020/original/FinanceforNature28Sepwebversion.pdf.

WB. 2021. *The Economic Case for Nature: A Global Earth-Economy Model to Assess Development Policy Pathways*. Washington, DC: World Bank Group. https://www.worldbank.org/en/topic/environment/publication/the-economic-case-for-nature.

WEF (World Economic Forum). 2020. *Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy.* New Nature Economy Series. Geneva: World Economic Forum. https://www3.weforum.org/docs/WEF_New_Nature_Economy_Report_2020.pdf.

WEF. 2023. "Making the $4.5 Trillion Circular Economy Opportunity a Reality." *Impact*, November 19. https://www.weforum.org/impact/helping-the-circular-economy-become-a-reality/#:~:text=A%20circular%20economy%20is%20a,additional%20economic%20output%20by%202030.

WEF. 2025. *Accelerating Impact Investments for Climate and Nature in Asia*. Insight Report. Geneva: World Economic Forum. https://reports.weforum.org/docs/WEF_Accelerating_Impact_Investments_for_Climate_and_Nature_in_Asia_2025.pdf.

Whelan, T., and R. Kronthal-Sacco. 2019. "Research: Actually, Consumers Do Buy Sustainable Products." *Harvard Business Review*, June 19. https://hbr.org/2019/06/research-actually-consumers-do-buy-sustainable-products.

WRI (World Resources Institute). n.d.a. "Aqueduct Water Risk Atlas." wri.org/applications/aqueduct/water-risk-atlas. Accessed March 19, 2025.

WRI. n.d.b. "Forest Monitoring, Land Use & Deforestation Trends." Global Forest Watch. https://www.globalforestwatch.org/. Accessed March 19, 2025.

WWF (World Wide Fund for Nature). 2023. *Regenerative Palm Oil Framework: An Opportunity for Sustainable Finance*. Gland, Switzerland: WWF. https://wwfint.awsassets.panda.org/downloads/wwf_-concept-note-for-regenerative-palm-oil-framework.pdf.

WWF. 2024. *Bankable Nature Solutions*. Gland, Switzerland: WWF. https://wwfint.awsassets.panda.org/downloads/bankable_nature_solutions_2__1.pdf.

WWF and South Pole. 2023. "WWF Bankable Nature Solutions: Case Studies." World Wide Fund for Nature. https://wwfint.awsassets.panda.org/downloads/230819_bns-case-studies.pdf.

Acknowledgments

The *Guidebook* was developed with generous input and support from a broad range of experts and practitioners. We are grateful to the many individuals who contributed their time and expertise throughout the development process.

We thank the individuals who participated in early stakeholder consultations and/or in subsequent discussions, as well as those who provided feedback on early outlines and consultation reports, whose perspectives helped shape the *Guidebook*'s direction and priorities, including Roel Nozeman (ASN Bank), Santiago Gallego (Anthesis Group), Rekia Foudel and William Higgins (Barka Fund), Jasmijn Resink (Biodiversity Fund of ASN Impact Investors), Edit Kiss and Karin Berardo (Capital Continuum Advisers), Arjan Ruijs (Cardano Group), Sjoerd van der Zwaag (De Nederlandsche Bank), Luis Salgado and Marcela Vera Escobar (Ecotierra), John Finisdore (ERM), Eva Mayerhofer (European Investment Bank), Velina Serafimov (Fondaction Asset Management), Marie Henniges (GFANZ), Felicity Spors (Gold Standard), Hilen Gabriela Meirovich and Mauricio Ayala Roa (IDB Invest), Cédric Livet (Impak Analytics), Gregory Watson (Inter-American Development Bank), Merel Hendriks (NWB Bank), Caroline van Leenders (Netherlands Enterprise Agency), Rafal Chudy (Norwegian Institute for Nature Research), Wijnand Broer (Partnership for Biodiversity Accounting Financials [PBAF]), the Restoration Seed Capital Facility, Katerina Elias-Trostmann (Salesforce), Ineke Keers (Smallholder Agroforestry Finance B.V.), Emily McKenzie and Sejal Patel (TNFD), Mareike Hussels, Pjotr Tjallema, and Simon Scholl (Triodos Group), Annabelle Cruz-Trinidad (United Nations Development Programme [UNDP] BIOFIN), Eva Bortolotti (UNDP Nature Hub), Jessica Smith, Katy Baker, and Romie Goedicke den Hertog (UNEP Finance Initiative), Dinara Akhmetova and Ana Karla Perea Blazquez (World Bank's NBS Invest project), Adriana Kocornik-Mina (WRI), and Alexandre Chausson (WWF).

We are especially grateful to Felicity Spors (Gold Standard), Elmedina Krilasevic (Palladium International), and Mareike Hussels (Triodos Group) for their comments, suggestions, and feedback on an early draft of the *Guidebook* during the user testing phase, in addition to also participating in the early stakeholder consultations and reviewing early outlines.

The authors wish to express their particular thanks to the following individuals for their valuable expertise in critically reviewing and strengthening the *Guidebook*: Wisnu Wibisono (Asia Investor Group on Climate Change), William Higgins (Barka Fund), Edit Kiss (Capital Continuum Advisers), Natacha Boric (Finance for Biodiversity Foundation), Velina Serafimov (Fondaction Asset Management), Marie Henniges (GFANZ), Paulina Villalpando Lorda (HSBC), Cédric Livet (Impak Analytics), Wijnand Broer (PBAF), Annabelle Cruz-Trinidad (UNDP BIOFIN), Aurélia Blin (United Nations Environment Programme [UNEP] Finance Initiative), Alena Cierna, Amandine Cremel, and Joanna Wolstenholme (UNEP World Conservation Monitoring Centre), Dinara Akhmetova and Ana Karla Perea Blazquez (World Bank's NBS Invest project), and Alexandre Chausson (WWF).

Many World Resources Institute colleagues provided comments on drafts of this report, including Achille Djeagou Tchoffo, Adriana Kocornik-Mina, Amy Swift, Esther Choi, Lara Horn, Lauren Redfield, Tiago Silveira, Xiaozheng Li, and Yigremachew Seyoum Lemma. The authors are also grateful to Daan Fortuin and Ksenija Levchuka for their assistance during the consultative and preliminary research stages. Special thanks to our Research, Data, and Integrity leads, Carlos Muñoz and Laura Malaguzzi Valeri, for their invaluable guidance and support. The authors would also like to acknowledge the publications, editing, and production support provided by Allison Meyer, Renee Pineda, Romain Warnault, Sarah DeLucia, and Shannon Collins, and the communications and outreach support provided by Carrie Dellesky, Gabrielle Nussbaum.

We are pleased to acknowledge our institutional strategic partners, who provide core funding to WRI: the Netherlands Ministry of Foreign Affairs, the Royal Danish Ministry of Foreign Affairs, and the Swedish International Development Cooperation Agency. The *Guidebook* was supported by a philanthropic grant from HSBC to WRI. The views and opinions expressed in this report are those of only the authors and do not reflect the views and opinions of WRI, HSBC, or other institutional funders.

About the authors

Helen Ding is head of restoration economics for the Global Restoration Initiative, WRI Food, Land, and Water Program.

Contact: helen.ding@wri.org

Courtney Mclaren is an equity economist for the Global Restoration Initiative, WRI Food, Land, and Water Program.

Contact: courtney.mclaren@wri.org

Photo Credits

Cover, San Hazize/iStock; Pg. 2, Michele Bitetto; Pg. 4, Joshua Stevens/NASA; Pg. 9, Aaron Minnick/WRI_2; Pg. 10, bere von awstburg/pixabay; Pg. 12, Lakshmi Narasimha/Unsplash; Pg. 14, 40, 44, 58, 70, Helen Ding; Pg. 17, Claire Fackler/NOAA; Pg. 21, Aaron Minnick/WRI; Pg. 25, valio84sl/iStock; Pg. 26, Alexey Marchenko/Unsplash; Pg. 30, nicolas_/iStock; Pg. 33, GoToVan/Wikimedia Commons; Pg. 43, Sjo/iStock; Pg. 47, wmaster890/iStock; Pg. 52, Richard Sagredo/Unsplash; Pg. 54, Owen Roth/Unsplash; Pg. 62, Tunatura/iStock; Pg. 65, Climagrün/Wikimedia Commons; Pg. 66, NiekGoossen/iStock; Pg. 68, indigojt/iStock.

About WRI

World Resources Institute works to improve people's lives, protect and restore nature, and stabilize the climate. As an independent research organization, we leverage our data, expertise, and global reach to influence policy and catalyze change across systems like food, land and water; energy; and cities. Our 2,000+ staff work on the ground in more than a dozen focus countries and with partners in over 50 nations.

WORLD
RESOURCES
INSTITUTE

10 G Street, NE
Washington, DC 20002
WRI.org