

Investing with Nature:
Exploring Investment Opportunities
Across Ecosystems

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Primer 3: Nature-based Solutions in Forests

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Authors

UNEP FI

Katy Baker
Rhea Kochar
Romie Goedicke

FOLUR-GGP

Lara Jacob

GIZ

Charlotte Waldraff

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The full Investing with Nature series can be viewed [here](#).



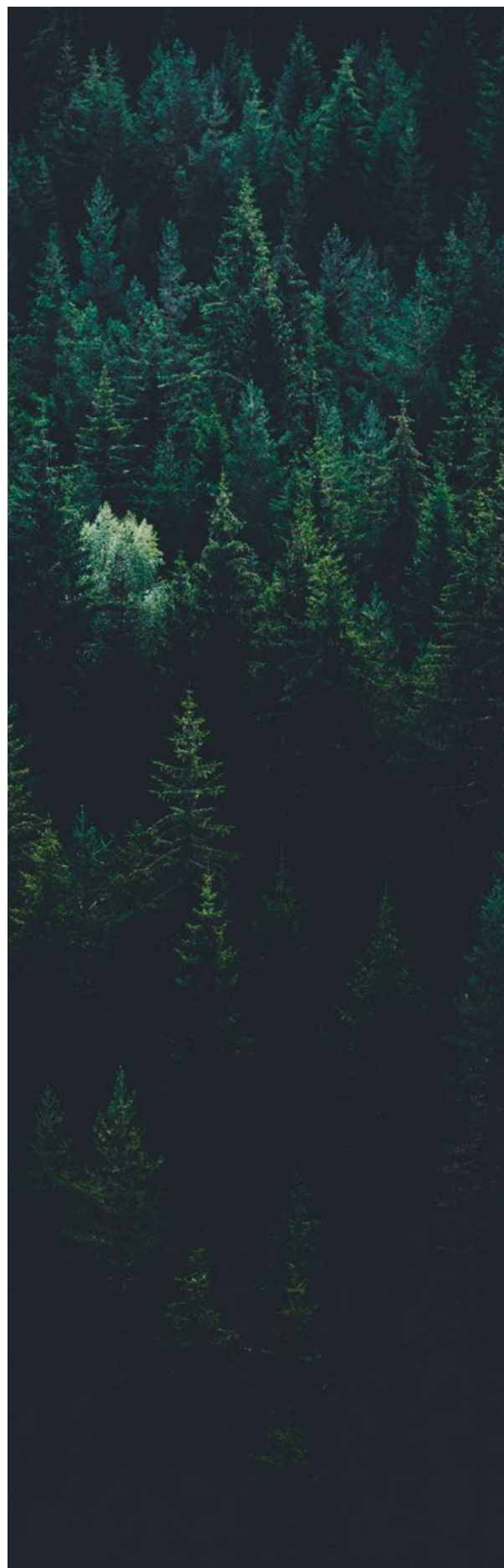
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Introduction

Forest ecosystems are rich in biodiversity and value, as a habitat to 80% of all terrestrial species. They help sequester carbon, regulate our climate, act as flood barriers, recharge groundwater, filter air, and protect biodiversity. Forests offer significant financial, economic, and social benefits worldwide. Approximately 1.6 billion people depend directly on forests for food, water, wood, and employment, and forests have an estimated economic value of USD 150 trillion ([WEF, 2022](#)). They also contribute directly to the livelihoods of 90% of over one billion people that live in extreme poverty. They play a central role in the world's economic health, as the forestry industry generates over USD 186 billion in global trade in primary wood products to supply the growing population of consumers around the world ([WEF, 2022](#)). Forests are also fundamental for regulating the Earth's climate, exchanging more carbon, water and energy with the atmosphere than any other terrestrial ecosystem. For example, between 2001 and 2019 forests absorbed 18% of all human-caused carbon emissions per year ([WWF, 2022](#)).

However, forest ecosystems are fast deteriorating. Already, one third of the earth's forests have been destroyed ([Our World in Data](#)). In the Amazon, for example, around 17% of its forest cover has been lost in the last five decades, mostly due to forest conversion for cattle ranching. Deforestation currently stands as a substantial contributor to nearly 15% of global CO₂ emissions; if we don't halt deforestation by 2030 at the very latest, it will not be possible to reach the target of limiting warming to 1.5°C (WWF, 2022). The intricate relationship between forest ecosystems and climate regulation thereby underscores the significance of preserving such ecosystems, and nature-based solutions (NbS) can help move us towards the attainment of this ambitious goal. NbS can provide a multitude



of benefits: they can save money, generate attractive returns for investors, increase resilience and protection of communities and infrastructure, and enhance natural capital assets ([WRI, 2021](#)). NbS in forest ecosystems can provide one-third of the mitigation needed to limit global warming to 1.5°C.

In a 2020 scoping study ([UNEP, 2020](#)), the Restoration Seed Capital Facility (RSCF) found that the investment volume of private sector funds targeting forest landscape restoration aligned activities totalled USD 3.1 billion. This falls far short of the annual USD 36 billion required to restore 350 million hectares of degraded and deforested land in line with the Bonn Challenge.¹ Commitments made under the Paris Agreement (in particular, the Warsaw Framework on REDD+ (WFR)), the Global Biodiversity Framework, and the growing momentum around NbS and companies' net-zero commitments have prompted much-needed interest in the implementation of forest-based climate solutions (UNEP, 2022).

This primer is a part of the '[Investing with Nature: Exploring Investment Opportunities Across Ecosystems](#)' series, born with funding from the German Federal Ministry for Economic Cooperation and Development (BMZ) and with support from the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. It is preceded by the primer introducing *Nature-based Solutions (NbS) in Oceans & Coastal Ecosystems*, which can be found [here](#). These primers accompany a webinar series, and the webinar for Forest Ecosystems can be found [here](#).

¹ The Bonn Challenge is a global effort to restore 150 million hectares of the world's degraded and deforested lands by 2020 and 350 million hectares by 2030.





Nature Based Solutions in Forest Ecosystems

SERVICES PROVIDED by the ecosystem

Forest ecosystems

HOLD 80%
OF TERRESTRIAL
BIODIVERSITY

Approximately

1.6 BILLION PEOPLE

depend directly on forests for food, water, wood and employment and have an estimated economic value of

USD 150 TN

~ 2.6 BN TONNES

of carbon dioxide, equivalent to one third of the CO₂ released from burning fossil fuels, is

**ABSORBED BY FORESTS
EVERY YEAR**

Relevance to FINANCIAL INSTITUTIONS

The estimated total value of the world's forests is as much as

USD 150 TN
—NEARLY DOUBLE THE
VALUE OF GLOBAL STOCK
MARKETS

At COP26,

USD 19.2 BN
OF PUBLIC AND PRIVATE
FUNDS

were pledged to restoring damaged land and tackling wildfires

Investing and lending to companies that are exposed to deforestation creates significant

RISK
FOR FINANCIAL
INSTITUTIONS

BENEFITS OF INVESTING in this ecosystem

Investing in Forest based NbS, financial institutions can reach their targets for

NET-ZERO

whilst providing long-lasting ecological restoration

Mangrove forests currently reduce annual expected flood damages from tropical cyclones by

USD 60BN

and protect 14 million people

Forest NbS enhance resilience to ecosystems and their services and

**SAFEGUARD INDIGENOUS
PEOPLES AND LOCAL
COMMUNITIES**

Why are NbS in forest ecosystems important?

The pressures on natural capital and therefore nature’s ability to provide key ecosystem services bear risks to our economies and financial systems. Nature-based solutions play a critical role in maintaining and enhancing the stock of natural capital, ecosystem services and biodiversity. They have the objective of safeguarding, regulating, and rejuvenating natural and altered ecosystems, while addressing key challenges faced by society. For example, the restoration of forests improves their carbon removal capacity, thereby contributing to climate change mitigation and reducing nature-related financial risks (Figure 1). A plethora of NbS can be implemented in forests. Table 1 shows examples of these and the co-benefits they can provide.

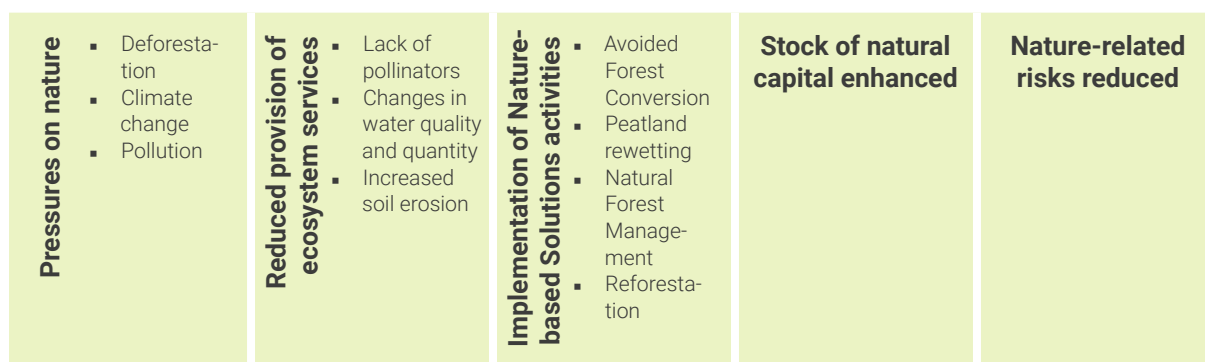


Figure 1: NbS can enhance the stock of natural capital and ecosystems services (GGP, 2022)

Table 1: Illustrative co-benefits and activities associated with NbS in forest ecosystems (adapted from FAO & The Nature Conservancy, 2021)

| NbS | Activities | Co-benefits |
|--|---|---|
| Avoided forest conversion (LUC) | Implementing strong regulatory frameworks; accurate and transparent monitoring; and supply chain interventions | Improved land tenure; zero-deforestation commitments; avoided loss of high-carbon forests; biodiversity conservation; climate change mitigation |
| Reforestation | Agricultural certification programs prioritizing restoration; divestment of land-extensive food types (e.g. beef) | Habitat restoration; carbon sequestration; soil quality protection and restoration; water-cycle regulation; disaster resilience. |
| Natural forest management | Reduced-impact logging practices; improved land tenure | Natural habitat and biodiversity preservation; ecosystem stabilisation and regulation; disaster resilience. |
| Fire management | Utilize prescribed burns, management of invasive species (such as flammable grasses), avoid mature forest deforestation | Reduce the likelihood of intense wildfire; improved resiliency to natural disturbances; protection of local communities and infrastructure |
| Improved plantations | Extension of logging rotation lengths to achieve maximum yield while increasing average landscape carbon stocks; multi-species plantation systems | Increased crop security and resource/energy efficiency; increased soil health and quality; maintain nutrient cycling; longer-term farming potential |
| Avoided wood fuel harvest | Reduce wood fuel harvest levels by investing in alternative fuels (e.g. solar, methane from agricultural waste) | Reduced air pollution in combustion; prevention of deforestation; habitat loss, and LUC |

Forest ecosystems exist in different biomes, tropical, temperate and boreal. NbS vary for each biome of forest ecosystem due to their different biological and environmental characteristics and services they provide (Table 2).

Table 2: Definitions and examples of NbS for different forest biomes

| | Tropical | Temperate | Boreal |
|---------------------|---|---|--|
| Definition | Found in ecosystems near the equator, characterized by high temperatures and high levels of precipitation. Tropical forests account for 45% of global forest cover and are valued at up to USD 9,000 per hectare per year (Carrasco <i>et al.</i> , 2014). | Found in regions with moderate climates, characterized by distinct seasons including warm summers and cold winters. | Typically found in high-latitude regions with cold climates, primarily in the northern hemisphere. |
| Example | Amazon Rainforest | German Black Forest | Taiga of Siberia |
| NbS Project Example | Forest landscape restoration through a community-based approach in the Congo Basin. The project aims to improve livelihoods of local communities through sustainable forest management and restoration, carbon sequestration, and biodiversity conservation. The restoration approach involves a mix of planting, natural regeneration, and agroforestry practices. | Collaborative Forest Landscape Restoration Program (CFLRP), specifically the one in the Deschutes National Forest in Oregon, USA. The project includes a range of NbS, such as prescribed burns, thinning, and tree planting, to improve forest health and reduce the risk of catastrophic wildfires. | Forest conservation and restoration through the protection of critical habitat for the endangered boreal Woodland Caribou in Ontario. This includes the restoration of wetlands, planting of native tree species, and control of invasive species. The project also involves collaboration with Indigenous Peoples and Local Communities to promote the long-term sustainability of the ecosystem. |
| Project Source | Global Environment Facility | Collaborative Forest Landscape Restoration Program | Ontario Ministry of Natural Resources and Forestry |

The degradation of forest ecosystems carries substantial economic consequences for financial institutions, including financial losses tied to investments in forest-related ventures, amplified insurance costs and claims, depletion of the vital resources the ecosystems hold and regulate that affect industries such as paper and wood products, agriculture, and pharmaceuticals, and reduced profitability for businesses engaged in these sectors. Financial risks not only arise from a company’s dependence on forest ecosystems but also through their impact on it. As policies to protect forest ecosystems are implemented (such as the EU Regulation on deforestation-free products) or consumer preferences change, negative impacts on ecosystems may prove a risk for companies. These can include operational, reputational, legal, regulatory and market risks. They can translate to risks for financial institutions through non-performing loans, a higher potential for default, diminished asset values (i.e., stranded assets), and lower revenue and profitability (see Figure 2).



Figure 2: How Natural Capital risks translate to financial risks for a bank (CISL, 2021)

Role of financial institutions in scaling NbS

Investments in NbS are currently USD 154 billion per year, which is less than half of the USD 384 billion per year needed by 2025, and only a third of the investment needed by 2030 (USD 484 billion per year) to limit climate change to below 1.5°C, halt biodiversity loss and achieve land degradation neutrality (UNEP, 2022). Figure 3 presents NbS that can most cost-effectively help achieve these goals, grouping them into restoration, protection and sustainable land management. Restoration can absorb over half of investment in 2025, with reforestation as well as seagrass and peatland restoration providing the bulk of investment opportunities. By 2050, although the relative importance of sustainable land management (e.g., agroforestry, cover crops) has risen to meet food production needs, restoration remains crucial. The chart illustrates the potential of forest based NbS. These, for example reforestation and avoided deforestation, can absorb one-third of total annual investment in 2025. These, for example reforestation and avoided deforestation, can absorb one-third of total annual investment in 2025.

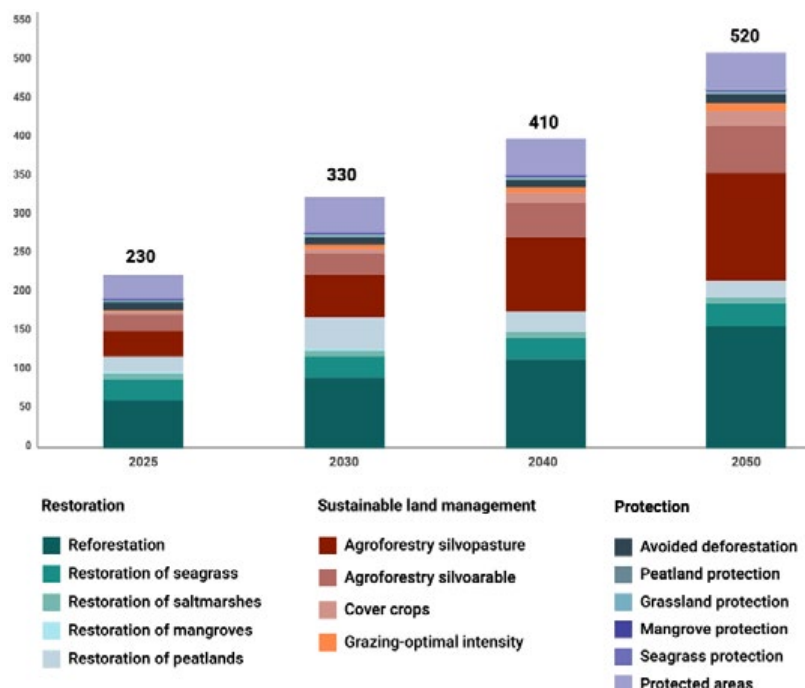


Figure 3: NbS activities included in the estimation of investment needs.

Source: [UNEP, 2022](#)

For these investments to occur, financial institutions must be convinced of the business case. More than 30 leading financial institutions, collectively with over USD 8.7 trillion in assets under management, have already committed to tackle agricultural commodity-driven deforestation as part of broader efforts to drive the global shift towards sustainable production and NbS ([UNFCCC, 2021](#)). As their clients and investee companies transition their businesses to meet the climate targets and contribute to the net-zero pathway of development, they will require additional capital and new products to de-risk and enable this transition. Financial institutions can play a dual role in providing the necessary capital to catalyse these innovations and in actively engaging with their clients to explore more sustainable practices.

Different options exist for financial institutions to support forest based NbS, depending on their risk appetite, sectoral exposure, existing capacity (dedicated staff and data resources), and broader sustainability strategy. Interventions can include mapping risks, monitoring client progress, divesting from certain companies or sectors, client engagement, piloting NbS investments and sharing learnings, and engaging with relevant stakeholders. The roadmap to support ending commodity-driven deforestation from Global Canopy may serve as further inspiration ([Global Canopy, 2022](#)).

Case study: An example of a bank promoting nature-based solutions: Rabobank financing for forests through Agri3 ([WEF, 2021](#))

Rabobank is a Dutch cooperative bank, with an international focus on food and agriculture.

Approach: In response to the increasing demand from food and agricultural businesses for sustainable agricultural practices, Rabobank and UNEP have established a strategic partnership to introduce the Agri3 Fund, a guarantee fund of USD 150 million. This fund is designed to de-risk loans and investments that financial banking partners plan to make in agricultural value chains to a total amount of USD 1 billion. The fund will facilitate financial institutions in extending loan tenors, larger-size loans, and subordinate loans and delivering technical assistance. Notably, the initiative focuses on supporting transactions that effectively combat deforestation, promote forest restoration, and enhance rural livelihoods. For example, in Brazil, the Agri3 Fund is currently supporting a sugar and ethanol producer to transition to sustainable production of sugar cane. Through a 10-year facility totalling BRL 50 million (USD 8.8 million), the producer will allocate resources towards reforesting approximately 90 hectares of forest around sugar cane production areas and will also maintain a nursery of native seedlings.

Key principles for successfully launching new financial products to support forests:

- Recognise the commercial value of engaging with businesses seeking capital for forest conservation and restoration.
- Recognise the commercial value of developing proof-of-concept financial products now, in preparation for potential longer-term transitions and rapid scale-up in product portfolios.
- Build strong public-private partnerships to enable business to enter new forest financing markets.
- Build internal buy-in within organisation, developing clear ways to explain the similarities and differences between processes for environmental/forest-focused financial products compared to traditional product offerings.

Blended finance, carbon credits, and other financial innovations

Blended finance has proven to be a powerful tool for promoting capital flows and expanding the implementation of solutions. By altering the risk-return profile, development banks and international financial institutions can help unlock commercial capital where persistent market failures exist. Increasingly, investment vehicles which mobilise blended finance for forest NbS are being set up ([Earth Security, 2021](#)). These include Design and Preparation Funds, Technical Assistance Funds, Guarantee and Risk Insurance, and Concessional Finance.

With awareness about the risks of deteriorating forest ecosystems growing, financial innovation is underway to unlock capital for these ecosystems. It includes bonds, insurance products, and payment for ecosystem services funds of various kinds. Most are still at an early stage. One example is the Forest Resilience Bond (FRB) which was created and piloted in California by Blue Forest Conservation. The FRB is a finance instrument that enables the US Forest Service (USFS) to restore forests, minimising the catastrophic risk of wildfires. The transaction incorporates innovative cost sharing among beneficiaries, with the USFS paying for decreased risk of severe fire, electric utilities paying for increased hydroelectricity generation, avoided sedimentation, and protected infrastructure, water utilities paying for protected water quality and improved water volumes, and state and local governments paying for avoided fire suppression costs, avoided carbon emissions,

Protected communities, and job creation. The cashflow that repays the bond for investors is provided by downstream companies that benefit from the steadier supply of cleaner water and save on water treatment costs ([Earth Security, 2021](#)).

Voluntary Carbon Markets (VCMs) are also an important and fast-growing source of financing for forest based NbS, playing a crucial role in funding projects that support sustainable forest management, conservation, and restoration. It has shown tremendous growth in the past few years, and is further expected to grow from around USD 2

billion in 2022 to about USD 100 billion in 2030 and USD 250 billion by 2050 ([Morgan Stanley, 2023](#)). However, concerns regarding low permanence and additionality, where the impact of projects may not be sustained or additional to what would have happened without the incentive created by carbon credit revenue, have led to questions about the long-term effectiveness of these mechanisms. Transparency issues have also been flagged, with difficulties in verifying the true impact of offsetting initiatives. Moreover, some companies have come under scrutiny for merely offsetting emissions without making substantial efforts to decrease their own carbon footprint. Going forward, it is important to address these pitfalls, and move toward a market with carbon credits as part of a holistic approach, with a focus on high quality credits incorporating additionality, permanence, and no harm criterion. Frequent reviews and regulatory oversight to set up guardrails are crucial to strengthen the integrity of VCMs and ensure that forest based NbS funded through these markets contribute significantly to both carbon mitigation and sustainable development.

Environmental & social safeguards

Environmental and social safeguards are critical in the implementation of NbS in forests, as they ensure that these solutions do not cause or increase harm to the environment or local communities. It is thereby imperative to address potential risks comprehensively. Instances have arisen where monocultures, including those of non-native timber species, have been promoted under the pretext of afforestation or reforestation. These can have far-reaching consequences, negatively impacting the environment ecosystem integrity, soil quality, and biodiversity, as well as local communities through food insecurity and over-grazing ([German Climate Finance, 2022](#)).

Inclusion and championing the rights of Indigenous Peoples and Local Communities is important to ensure that local traditional knowledge and practices in forest management for hundreds of thousands of years are both respected and incorporated into the design and implementation of forest NbS. However, ensuring land rights within forest-based projects can be intricate due to unclear legal ownership, which has the potential to hinder project progress. To combat this, the rights of local people should be explicitly recognized under restoration processes in a way that is clear under national law, social costs as well as understanding that alternative livelihoods, compensation, or both may be required to ensure that restoration occurs and is sustained, tenure securitization arrangements could be implemented through tree planting activities, and local people should be involved equitably in decision making processes ([Rakotonarivo, et al., 2023](#)). Involving all the stakeholders in this process can not only enhance the effectiveness and sustainability of these solutions, but also help in promoting social equity and human rights. By involving local communities and other stakeholders in the decision-making process, NbS can be designed to meet the needs of all stakeholders and address issues related to power and resource distribution.

Recommendations to scale NbS financing

Scaling the financing of NbS involves overcoming several hurdles, and it is crucial to recognize these obstacles to develop strategic approaches to overcome them. These challenges include the lack of markets to accurately price ecosystem services, concerns surrounding existing markets like the Voluntary Carbon Markets (VCMs), limited project pipelines hindering the availability of viable NbS projects, insufficient in-house capacity and data to comprehensively assess the risk-return profile of NbS investments, complex policy environments, including issues related to collateralizing unproductive land, and complex governance structures which are often required for the successful implementation of NbS initiatives.

While barriers persist to financing NbS, multiple avenues can open the way and accelerate progress towards easier accessibility of finance by clients. New policies that prioritize NbS and integrate them into traditional planning and financing processes can support higher adoption rates. Greater clarity and data around NbS performance, business rationale, and scientific modelling can reduce information asymmetries among NbS project developers, infrastructure service operators, policymakers, development banks, and investors. Blending of public, philanthropic, and private capital can help unlock new sources of finance for NbS.

Financial institutions can play a significant role in helping mainstream NbS, deliver the multitude of co-benefits to communities, businesses, and governments, and usher in a more sustainable, resilient future. The following steps will help increase financial institutions' participation and unlock new and diverse funding streams (WRI, 2021; UNEP, 2022):

1. A bank can direct their clients to other mediums to enhance their understanding and/or implementation of NbS activities. These can include:
 - a. Products such as the [Nature-Based Solutions Evidence Platform](#) – an interactive map linking NbS to climate change adaptation outcomes based on a systematic review of the peer-reviewed literature or the [Nature4Climate](#) map which provides a first glance at projects which protect, restore and improve land management using NbS. The [ecosystem-based adaptation tools navigator](#) is an interactive searchable database of tools and methods relevant to EbA which can be helpful for banks to locate project planners, managers and practitioners. Lastly, the [Investor Framework for Nature-based Solutions](#), provides clarity on the drivers of risk and return when analysing prospects for investing in NbS.
 - b. Funding support (e.g. [RestorationFunders](#))
 - c. Other actors involved with NbS activity implementation (E.g. [WBCSD's Nature Action](#) and service and solution providers)

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