MOBILIZING PRIVATE FINANCE FOR NATURE

A World Bank Group paper on private finance for biodiversity and ecosystem services

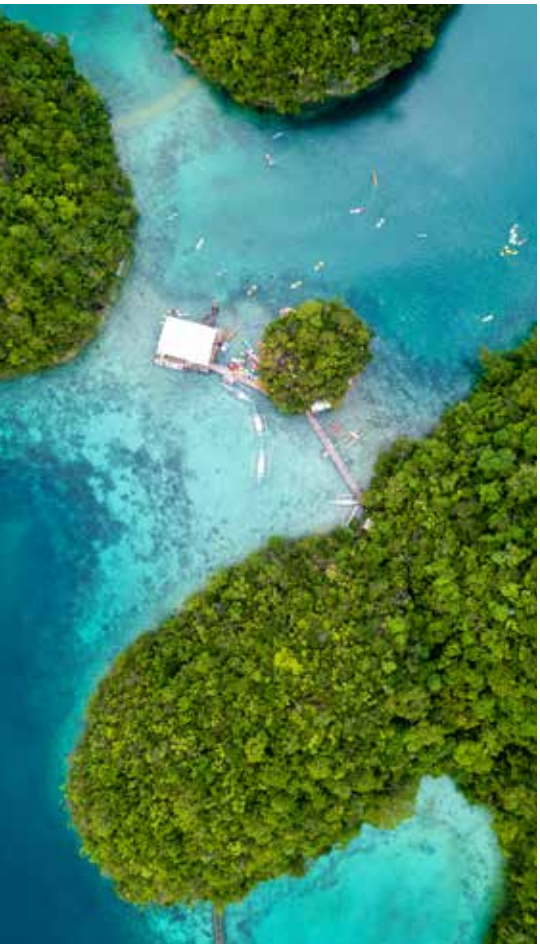

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Table of Contents

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Abstract

Biodiversity and ecosystem services, or nature for short, underpin many aspects of economic activity and are deteriorating at an unprecedented level, with potentially far-reaching implications for economies worldwide. Sustained ecosystem damage can trigger regime shifts and generate systemic impacts on human well-being and economies. For example, the degradation of natural ecosystems has been associated with an increase in the probability of emerging infectious diseases. The COVID-19 pandemic is likely an example of how the disturbance of ecosystems can have systemic consequences. As biodiversity is often seen as a public and therefore open access good, its conservation, restoration, and sustainable use rely heavily on scarce public sector finance. Simultaneously, governments are spending vast amounts to promote economic activities that are potentially harmful to biodiversity.

This paper argues that governments and regulators, supported by financial institutions and multilateral development banks (MDBs), hold the key to mobilizing private finance at the scale needed to transform the way we build, produce, and consume in order to protect nature while fostering sustainable poverty reduction. The analysis looks at two key approaches to mobilizing private finance for biodiversity. First, it assesses opportunities for 'financing green,' that is, the financing of projects that contribute—or intend to contribute—to the conservation, restoration, and sustainable use of biodiversity and its services to people. Second, it looks at 'greening finance,' that is, directing financial flows away from projects with negative impact on biodiversity and ecosystems to projects that mitigate negative impact, or pursue positive environmental impact as a co-benefit. Despite growing innovation in both categories, significant challenges to scaling up private finance remain. These include policies that exacerbate the underpricing of biodiversity; lack of data, measurement, and reporting standards; and issues with biodiversity investment opportunities, which tend to be small scale and noncommercial—making private sector financing a challenge.

The paper provides a set of recommendations for governments, regulators, companies, financial institutions, and MDBs. These are synthesized into a set of "big five" approaches to mobilize private finance for biodiversity: environmental fiscal reforms to realign incentives with sustainable practices; national biodiversity data provision and planning; the establishment of a Taskforce on Nature-related Financial Disclosures (TNFD) to support biodiversity reporting; the establishment of a 'Nature Action 100' to drive change in the companies whose activities most threaten biodiversity; and the provision of catalytic, concessional capital for biodiversity funds and projects.

Above and below water surface, Caribbean sea, Panama. © Damsea/Shutterstock

Executive Summary

Private finance can and must be harnessed to drive critical protection and management of biodiversity and ecosystem services. Governments and regulators, supported by financial institutions and multilateral banks, hold the key to mobilizing private finance at the scale needed to transform the way we build, produce, and consume, in order to protect nature while fostering sustainable poverty reduction. The report examines the current state of private finance for biodiversity as well as the barriers to its growth. It identifies the way forward and highlights a set of 'Big Five' ideas for actions that can be taken in the short term to better integrate biodiversity risks and opportunities into private sector decisions.

Why is nature important?

Biodiversity and ecosystem services, which are often referred to as nature, are the foundation of human well-being and economic activity. Biodiversity[1] is the attribute that makes nature resilient to change and allows it to thrive. Nature is an asset—albeit often unpriced—and it underpins many economic sectors in tangible, measurable ways. The World Economic Forum (2020a) estimates that $44 trillion of global value added, corresponding to over half of the world's GDP, is generated in industries like construction, agriculture, and tourism that depend moderately to highly on nature and its services, particularly in certain developing economies.

Nature is deteriorating at an unprecedented level, with potentially far-reaching implications for economies. A recent report from WWF reveals an average decline of 68 percent in vertebrate species numbers between 1970 and 2016 (WWF, 2020). The Global Futures Project estimates that under a business-as-usual scenario, the costs of biodiversity loss in some countries could be as high as 4 percent of their GDP per year by 2050 (Johnson et al., 2020). These trends are further exacerbated by the changing climate and its interaction with nature, which can trigger important feedback effects and 'tipping points.' Nature risks can also be systemic. The COVID-19 pandemic, which is causing far-

1 Biodiversity is the variability among living organisms from all sources including, inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems (Convention on Biological Diversity).

reaching economic impacts, is a powerful reminder of the link between human health and planetary health: an estimated 60 percent of all known human infectious diseases are zoonotic (Taylor et al., 2001).

The 2019 landmark report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services *(IPBES)* identifies five key direct drivers behind the unprecedented decline in biodiversity: *land use and sea use change, overexploitation, pollution, climate change, and invasive species.* All these drivers stem from human activity. In the past 50 years, the human population has doubled, the global economy has grown fourfold, and global trade has grown tenfold. Insufficient attention has been paid to the impact of this development on the environment.

This unsustainable use of natural resources is underpinned by economic policies, consumption, and production practices that are not aligned with sustainable development objectives. The record economic development and poverty reduction of the last 50 years has been made possible by an extractive approach to renewable natural capital and nature services. Many value chains rely heavily on the harvesting of resources such as crops, fish, and timber, but fail to account for the negative impact that these economic activities have on the ecosystems providing these services, or their reliance on the services. The cost of environmental degradation is only partially felt by the actors driving it. Economic incentive structures, by and large, continue to support the unsustainable management of nature, resulting in distortions such as the underpricing of biodiversity risk and value in private investment decisions.

The state of private finance for biodiversity and ecosystem services

While biodiversity finance is still in the early stages of development, it is growing, and there are key financial instruments and financing approaches that have been tested and have the potential to be scaled up. Businesses are starting to consider biodiversity and ecosystem services in their production and investment practices in response to the loss of nature affecting their bottom lines. The financial materially of biodiversity loss is becoming increasingly clear. For example, deforestation and related fires in Indonesia have led to significant market pressure to end the use of uncertified palm oil in consumer goods and biofuels (Steinweg et al., 2019). However, integration of biodiversity risk into corporate decision making is still incipient, as the understanding and the measurement of impacts are still developing.

The financial sector is also increasingly recognizing the risks posed by loss of biodiversity and ecosystem services to the real sector projects and companies in which they invest. Given the financial materiality of biodiversity loss, financial institutions are starting to use their leverage to push for faster change in the real sector through engagement and capital allocation. For example, Norway's $1 trillion sovereign wealth fund has divested from 60 investments due to deforestation risk, including 33 investments in palm oil plantations (Norges Bank, 2018). This trend is expected to strengthen as the new generations of investors, increasingly aware of environment, social, and governance (ESG) issues, seek investments aligned with their values.

This report details two channels through which private finance can be mobilized: by monetizing cashflows from the provision of ecosystem services (financing green) and by driving better management of biodiversity risks (greening finance). The real and financial sectors are looking for investment opportunities arising from the conservation, restoration, and sustainable use of nature—'to finance green,' using the language of climate finance. Investors are also trying to avoid or limit biodiversity risk associated with investments—seeking 'to green finance.' Investment in this category aims to direct financial flows away from projects with negative impacts on biodiversity and ecosystem services to projects that mitigate negative impacts or pursue positive environmental impacts as a co-benefit. Biodiversity offsets—

one of the larger components of private finance for biodiversity—doubled in volume transacted between 2011 and 2016 (Bennett and Galland, 2017). The sources of private capital are also broadening and include foundations, impact investors, large asset owners, corporations, and retail investors.

Financing green: harnessing biodiversity and ecosystem services

Biodiversity and ecosystem services have economic value which, if internalized by economic agents, has the potential to attract private finance. As they seek business opportunities that are economically viable, the real and financial sectors are increasingly identifying projects that protect and manage ecosystem services. These services, which can be divided into the three categories below, have traditionally been underprovided, owing to their public good nature. However, there are informative examples of financial instruments and approaches being explored to encourage private sector financing for each:

- *Cultural or nonmaterial services:* Aesthetic inspiration, cultural identity, sense of home, and spiritual experience that originates in the existence of wildlife and ecosystems have to date been largely supported by often insufficient public sector funds and philanthropy. This has led to clear limitations, including that biodiversity outside of public land or some community-managed conservancies is generally not well protected. Protected areas are often underfunded as limited resources are channeled to other development activities. Direct species conservation is beginning to seek access to new types of capital—as represented by the World Bank Wildlife Conservation Bond project (see Box 4 for more details).
- *Regulating services:* Investments in 'green infrastructure' harness biodiversity and the natural functions of healthy ecosystems to complement, replace, or enhance 'grey' infrastructure solutions. Payments for ecosystem services (PES) help provide economic support to the provision of nature's regulating services. The largest market for ecosystem services is for watershed conservation, followed by forest and land use carbon (Salzman et al., 2018). Investments from the private sector in PES are growing, but are still dominated by the public sector (Bennett and Ruef, 2016). Aligning nature-based solutions structures with investor needs requires further development. For example, capturing revenues from carbon offsets still faces significant barriers in the form of verification and other policy challenges, like the low level of carbon pricing.
- *Provisioning or material services:* Ecosystems provide material goods that contribute to everyday life and which are often traded on markets. These include food, water, raw materials, energy, and genetic resources. The private sector is involved in the management and production of these goods. Often, however, the original resource is an open access or public good. The role of green finance, with the necessary support of enabling public policies, is to identify mechanisms to direct capital toward management, reporting, and verification methods that allow for the sustainable provision of goods. Instruments like labeled bonds and transition bonds can support sustainable forestry and fishing; the Seychelles, for example, has issued the world's first sovereign blue bond to support sustainable marine and fisheries projects.

Greening finance: reducing loss of biodiversity and nature's contributions to people

Financing tools which link the cost of capital to the achievement of sustainability objectives are starting to be used to incentivize changes in corporate behavior. Instruments such as sustainability-linked loans, which link interest rates to key sustainability performance indicators, are starting to be applied to incentivize companies to meet biodiversity targets. These products saw a 168 percent jump in 2019 to a total volume of $122 billion (Bloomberg, 2020). For example, in early 2020, the Finnish forest-based bioindustry company, UPM, became one of the first companies to link a revolving credit

facility (RCF) to a biodiversity target. The interest on the €750 million RCF is tied to UPM meeting its goal of having a net positive impact on biodiversity in the company's forests in Finland, and a separate carbon reduction target (BNP Paribas, 2020).

Where the biodiversity impact of projects cannot be avoided, biodiversity offsets are increasingly being used. Biodiversity offsetting involves investing in a biodiversity conservation project to offset the unavoidable impact of a development project. Large mining and energy companies voluntarily adopt offset standards to guide their risk management decisions. In the land use sector, mitigation banking is a way to facilitate the scaling of private investments, that is generating financial returns through the sale of biodiversity offsets to real estate developers. These funds represent a significant source of potential conservation financing, but can be difficult to implement in practice, requiring international standards to be strengthened and applied. Local poverty alleviation, equity, and cultural heritage factors also must be integrated.

What are the barriers to scaling up private biodiversity financing?

Efforts to engage the private sector in conserving and sustainably using nature are still insufficient, and biodiversity faces a large financing gap as a result. The Convention on Biological Diversity's Aichi target on mobilizing resources for biodiversity is still unmet (IPBES, 2019). Financing for biodiversity is still poorly tracked, as it focuses mainly on direct finance for conservation activities and not so much on finance to avoid negative impacts of biodiversity loss. The public sector provides more than two-thirds of the $78–91 billion in annual global finance labelled as 'biodiversity finance' (OECD, 2020a).[2] Private financing for biodiversity remains niched. In 2018, 'conservation' represented just 3 percent of the investment portfolio of impact investors (GIIN, 2018).

Challenges to scaling up biodiversity financing fall into three categories:

- *Perverse economic incentives:* Governments spend about $500 billion per year in economic support that is potentially harmful to biodiversity—five to six times more than the total spending on biodiversity (OECD, 2020b). This type of economic incentive generally favors expansion of economic activity, and often environmental harm, over conservation, restoration, and sustainable use of nature (IPBES, 2019).
- *Paucity of data, measurement, and standards:* Progress has been made in measuring and monitoring climate risks and benefits—but biodiversity measurements are more complex. For example, there is no single, high-level policy goal for biodiversity conservation to work toward, similar to the 1.5°C temperature increase ceiling established by the Paris Agreement. Conserving biodiversity is a much more complex problem from a financial stability perspective than climate change, because among other reasons it is highly dependent on local factors, despite having global implications (Chenet, 2019). Data on biodiversity upon which companies can base impact assessments is still lacking at a national level. Additionally, data on the complex relationship between companies and biodiversity through operations and supply chains is limited. This is exacerbated by a lack of a clear taxonomy of biodiversity investments and definitions, or widely accepted risk assessment and reporting frameworks.
- *Scale and localized nature of biodiversity projects:* A key challenge with biodiversity projects is their often small scale and localized nature, so they will need to be aggregated in many cases. In addition, biodiversity projects frequently involve no cashflow, making it difficult to attract private sector financing. Biodiversity and ecosystem services are public goods whose true value is not reflected in economic transactions. Even where projects do generate some cashflow, the financial

2 Data from 2015–2017; includes domestic public expenditure, international public finance (ODA), and private expenditure.

returns are often below market return hurdles. Therefore, 'blended finance' is needed—mixing concessional and commercial returns. Many biodiversity venture business models would still be classified as early stage, making it difficult to attract a broader range of investors and to scale up.

Mobilizing resources at scale for biodiversity requires a composite set of solutions involving different players. The public sector needs to create a supportive enabling environment with efficient and effective incentives, standards, and regulations, and to provide data and concessional finance. On the private sector side, biodiversity risk, stemming from both impact on and dependency on nature, can be incorporated into investment decisions via risk measurement and reporting. This will encourage businesses to operate more sustainably and prevent biodiversity loss (*greening finance*). In addition, more innovation in developing projects with sufficient cashflow and returns, as well as financial instruments with an attractive risk-return profile, is needed (*financing green*). Multilateral development banks (such as the World Bank Group) can play an important role in bringing the public and private sectors together—including through de-risking and scaling projects.

Leopard closeup: © Raghav Kabra/Unsplash

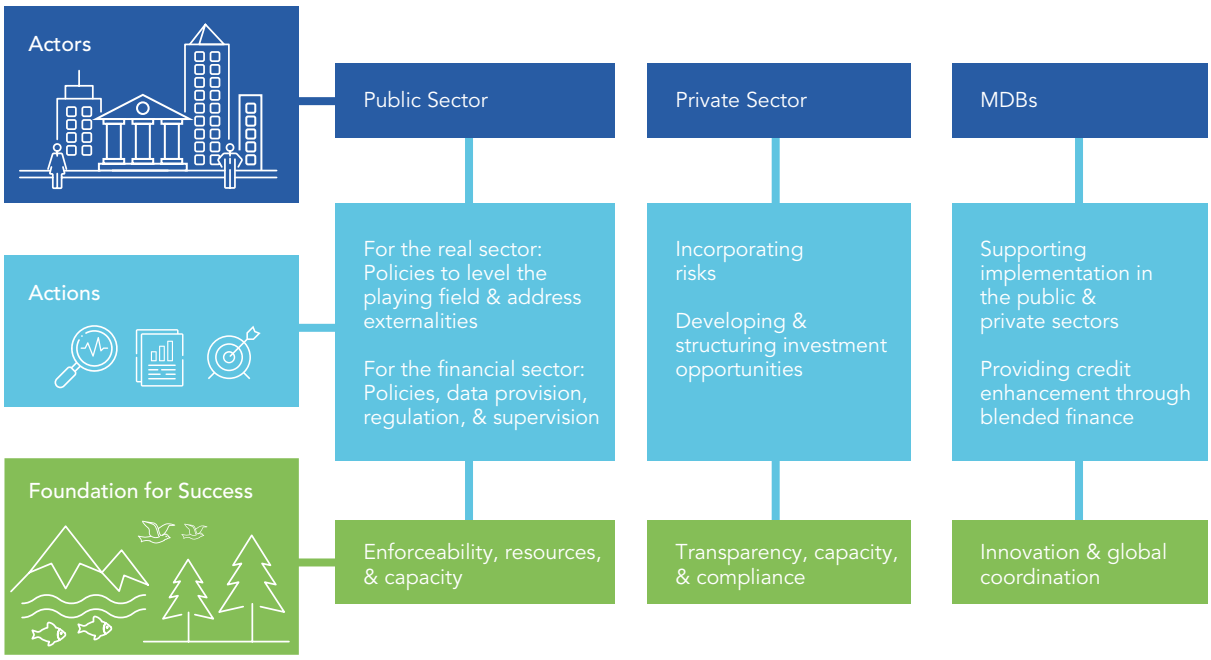
The Way Forward

Mobilizing private finance for biodiversity and ecosystem services involves the dual task of developing mechanisms to increase the return or cashflow of investments and integrating biodiversity risks into financial decisions. The stylized framework (Figure 2) presents these two dimensions, which underpin the recommendations provided in this report. To scale up financing green, the ability of projects to generate cash flows needs to be improved and track records for new business models need to be established. Governments can support the development, scaling, and innovative application of financial instruments which blend commercial and concessional finance and create investment opportunities. This will involve improving the financial returns and biodiversity impact of projects. For greening finance, governments can drive better measurement and management of biodiversity risk so that it is integrated into business and investing decisions, particularly in the financial sector. This requires improving the recognition of the link between financially material risks and biodiversity degradation, as well as removing regulatory barriers for companies and investors to take biodiversity risk into account in their investment decisions.

Role of public policy and financial regulation

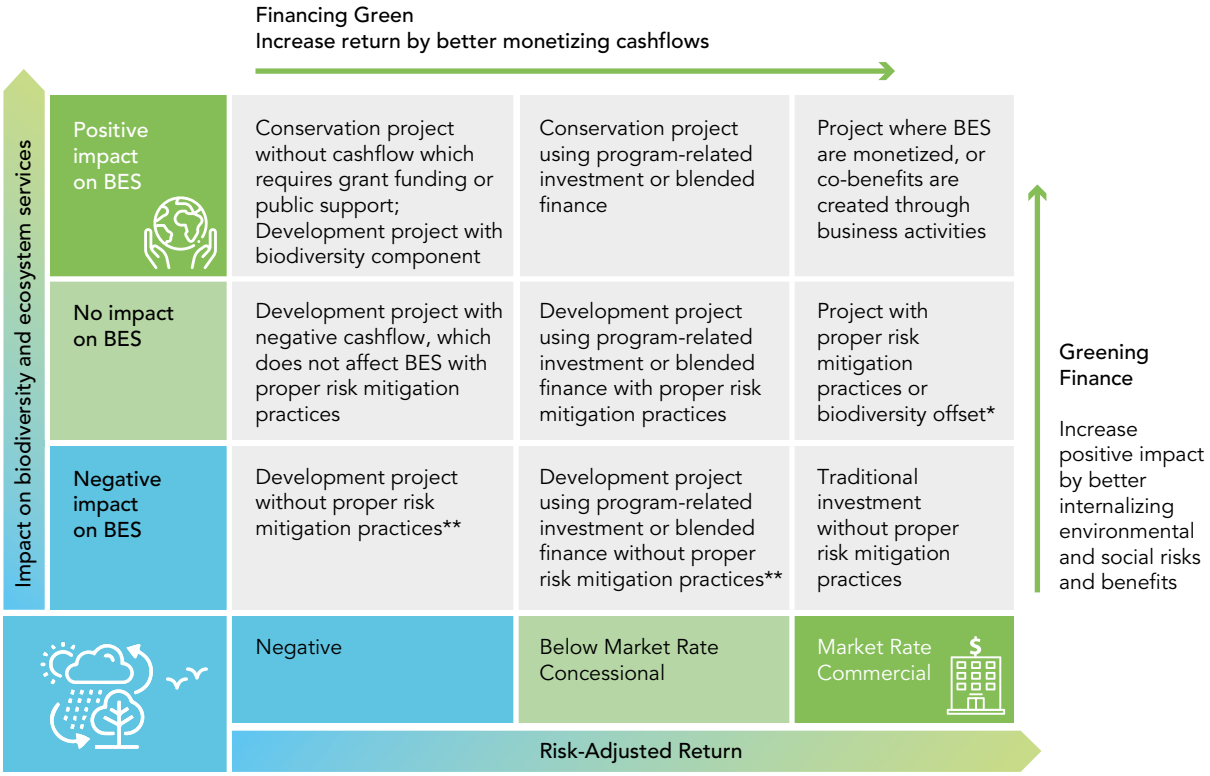
Through planning and policy development, governments drive the way economies build infrastructure, and produce and consume goods and services—this power can be harnessed in the stimulus plans being crafted in response to the pandemic-induced global economic downturn. Transformative change can be best achieved by mainstreaming biodiversity considerations at the strategic level in sector-wide planning and stimulus development. To ensure recovery efforts are inclusive, sustainable, and resilient, it is important that projects supported by stimulus packages are assessed not only on their short-term stimulus and job creation contributions, but also their long-term sustainability—including contributions to decarbonization and the protection of biodiversity

Figure 1. Key Actions by Stakeholder Group



Source: Authors.

Figure 2. The Two Dimensions of Mobilizing Private Sector Finance for Biodiversity and Ecosystem Services (BES)



Source: Authors.
Notes: The figure assumes that projects comply with national environmental regulations. Standards refer to IFC Performance Standards or other widely accepted market standards. *The creation of an offset should compensate for any negative/residual impacts on biodiversity generated by the project. **Negative impacts on BES are commonly addressed by projects financed by MDBs through their own compliance mechanisms and compliance with national regulations.

and ecosystem services. Many programs—such as land restoration—can score high on all dimensions, with the achievement of climate and biodiversity goals increasingly recognized as interlinked. Reforming harmful incentives through stimulus packages has the potential to create significant biodiversity impact—for example, by repurposing unsustainable subsidies. While politically challenging, the current 'reform window' may provide opportunities, particularly if savings are used to fund a 'just transition'. In addition, stimulus packages can include the financing of new investments, for example in 'green' infrastructure. Debt for nature swaps are one instrument which could help countries fund economic and conservation projects, blending finance to mobilize domestic real sector investment in conservation and sustainable industry.

To address the double materiality[3] of nature loss and degradation, government response needs to cover both the real and financial sectors. Recommendations for governments, financial regulators, and supervisors can be organized into two key areas of intervention: (i) policies and regulations to level the playing field in the real sector, and (ii) policies, data provision, regulation, and supervision to drive integration of biodiversity criteria in financial decision making and market development. These two sets of policies work together to help a country transition to a nature-smart economy.

3 See double materiality definition in glossary.

Real sector policies drive the behavior of firms operating in sectors such as agriculture, food and beverages, textiles, construction, energy, and mining, and their success depends on how well the political economy is managed. Environmental Fiscal Reform (EFR) has so far focused predominantly on climate change, but can also be applied to biodiversity and ecosystem services. Reforming perverse subsidies in agriculture, forestry, fisheries, energy, and mining (OECD, 2020a) would reorient incentives, increase efficiency, and effectively conserve the natural asset base on which production relies. It would also produce impact at scale by leveraging private sector resources, as shown by Brazil's Low-Carbon Agriculture (ABC) Plan (Lopes and Lowery, 2015). Taxation is another important component of fiscal reforms. Real sector policies can have adverse impacts on the welfare of powerful lobbies, farmers, or low-income populations, so the design of reforms needs to be mindful of the winners and losers, and be implemented through smooth transitions that use the resources freed up by the reform intelligently, inclusively, and equitably (OECD, 2017).

Green financial sector policies can focus on expanding national planning to include biodiversity issues. National roadmaps or strategies for greening the financial sector can help set an overarching framework. Several countries, including the UK, have implemented strategies, policies, and instruments with this aim (Van Ackerand Mancini, 2020). While several of these strategies include biodiversity criteria, it is crucial that biodiversity considerations are central to the strategy, on par with climate. Governments can further mobilize private finance for biodiversity through including a role for the private sector in their National Biodiversity Strategies and Action Plans (NBSAPs).

Beyond ensuring that policies and incentives are aligned with biodiversity goals, governments can provide knowledge and data that real and financial sector firms will need to build biodiversity into their risk analysis and investment decisions. For governments, this means implementing natural capital accounting (NCA) practices at the highest level. Eighty countries are already implementing the UN's System of Environmental Economic Accounting (SEEA). COVID-19 has revealed the need for coordinated monitoring of planetary health metrics alongside measures such as GDP—one example is China's Gross Ecosystem Product (GEP), currently being tested.[4] Governments can also invest in technology that can improve data quality and availability.

Supervisors and regulators have a major role in supporting better management of biodiversity-related risks across the financial sector through risk assessment, standards, and reporting. For financial institutions to fulfill their role of effectively managing and distributing risks and allocating resources to productive uses, governments and financial sector regulators will need to take steps to better enable the integration of biodiversity criteria into economic and financial decisions. A list of recommended regulatory and supervisory tools is provided in Table 1.

Table 1. Regulatory and Supervisory Tools and Approaches

- Taxonomies
- Labeling
- Supervisory risk assessment
- Regulatory risk assessment
- Disclosure
- Solvency and capital regulations
- International networks

4 IUCN. 2020. Gross Ecosystem Product (GEP). Accessed on May 19, 2020. Available at: www.IUCN.org

Risk management and financial instruments

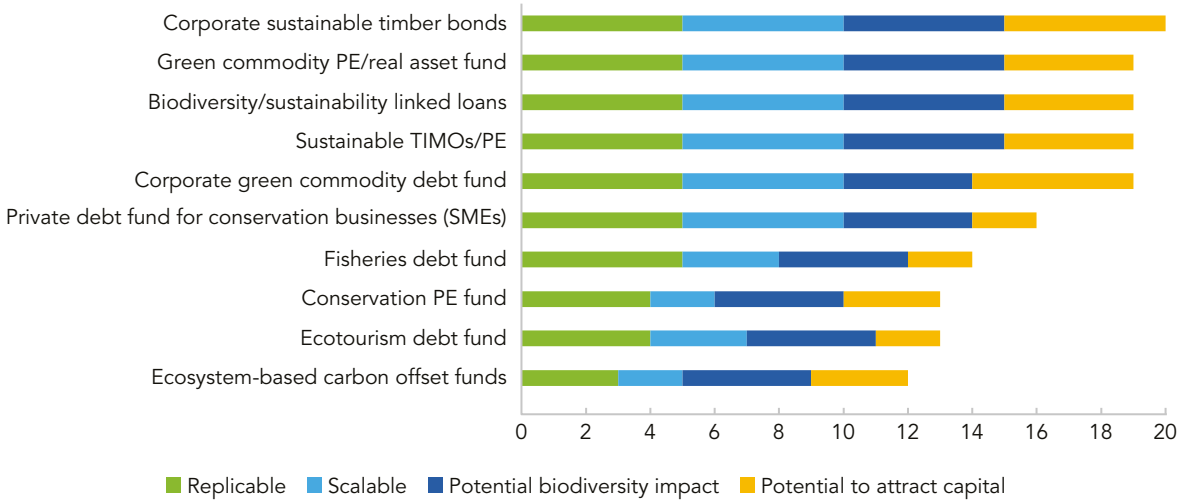
The financial sector does not have to wait for regulation and can continue to develop its own standards and good practices for incorporating biodiversity risk into investment decisions. The financial sector can support and coordinate current industry initiatives and provide capacity building for implementation. As the Bank of International Settlements' 'Green Swan' report (Bolton et al., 2020) points out, risk assessment techniques have been largely backward looking, with forward looking scenario-based analyses requiring further development by the financial sector and by governments and regulators. As with climate change, engagement has the potential to be an impactful tool for investors in pushing the real sector to better manage biodiversity risk. The Climate Action 100+ initiative, which targets systemically important greenhouse gas emitters, offers a template for broader, more strategic engagement with key companies on biodiversity risk. This model could be replicated via a 'Nature Action 100' approach.

Though innovative biodiversity financing tools are being developed, the outstanding question is how many of these are scalable? Financial innovation in the biodiversity financing field is being activated to crowd in more private financing into this space. Innovative business models and project structures can be standardized which can help replicate and expand pilots—a service the Coalition for Private Investment in Conservation (CPIC) blueprints aim to provide. While many of these instruments are replicable, they are applicable mostly to smaller, local projects, making it difficult for them to be scaled up to shift significant amounts of capital. As a result, aggregation will be key. Figure 3 provides a qualitative assessment of the potential feasibility and scalability of instruments reviewed, for which feasibility in emerging markets was scored as high.

Supporting implementation: the role of multilateral development banks

Multilateral Development Banks (MDBs) have a key role to play in helping bridge the gap between the public and private sectors in biodiversity financing. MDBs can apply instruments such as concessionary finance, loan guarantees, policy insurance, foreign exchange liquidity facilities, pledge funds, and subordinated equity to reduce the risk to the private sector of investing in nature. While new tools and blending approaches have been used extensively to mobilize climate finance, many could be similarly applied to biodiversity

Figure 3. Top 10 Investment Instruments with High Feasibility in Emerging Markets Scored According to Potential



From 1 (very low) to 5 (very high) in each category (qualitative analysis); Source: Authors.

investments. To meet biodiversity targets, donors and multilateral institutions could increase the use of Overseas Development Assistance (ODA) funds to jointly target poverty reduction and long-term management of biodiversity and reprioritize how the funds are granted and utilized. Finally, MDBs can support governments to improve their enabling environments for biodiversity financing.

Conclusions

Although awareness of the importance of biodiversity and nature is growing, pervasive market and policy failures create hurdles to this awareness becoming action. Failure to account for the social and environmental externalities associated with biodiversity loss results in underpricing of biodiversity risk and misinformed investment and policy decisions. Biodiversity and ecosystem services are public goods whose true value is not reflected in economic transactions. Nature has a value but not a price, and as a result, the implied price is zero.[5] Until policies are aligned with biodiversity goals and economic incentives are redirected for positive, rather than negative impact, markets will not efficiently distribute risks and allocate resources.

Many lessons learned in climate finance can inform biodiversity finance, including the importance of the use of blended finance approaches and disclosure of physical and transition risks. Climate finance has benefited from substantial sums of dedicated concessional finance, which has helped to scale renewable energy technologies and allow them to compete with fossil fuels.[6] Networks of regulators, alongside private sector initiatives, have begun to mainstream climate risk analysis into corporate reporting and financial sector risk analysis. Global commitments and measurable targets have provided an overall framework. There are important similarities between climate and biodiversity risk—notably the systemic risk they represent; and the management, mitigation, and analytical tools and policy instruments that could be used in response. Many lessons learned in climate finance can inform biodiversity financing. It is also increasingly recognized that these risks are linked and that climate and biodiversity goals must be pursued in coordination.

Yet biodiversity financing has important differences from climate, requiring a different approach and emphasis. While climate finance has made great progress through 'financing green'—i.e., investment opportunities, particularly in renewable energy, and incorporating climate risk into financial balance sheets—'greening finance' has been slower. Biodiversity financing is likely to take the opposite route. Financing biodiversity projects is difficult because of their local nature, small scale, and lack of monetizable cashflows. Putting a price on something historically seen as a public good is challenging. Given these circumstances, integrating biodiversity risk into risk management more broadly (including through greening supply chains) is likely to have a larger impact.

The COVID-19 pandemic is a stark reminder that planetary health and human health are deeply intertwined. Stimulus plans being developed in response to the global economic downturn caused by the pandemic should include nature-smart economic activities, recognizing that economies can only thrive on a healthy planet. These plans provide an opportunity for governments to transform the way economies build infrastructure and produce and consume goods and services.

Of the many policy ideas and innovative applications of financing mechanisms showcased in this paper, the following 'Big Five' (Box 1) offer the greatest potential in meeting the urgent challenges of biodiversity loss.

5 "When people talk about natural capital not being assigned a value, it's not true. We have put a price on nature. And that price is zero," Ed Barbier, Colorado State University (Avery, 2019a).

6 According to Bloomberg New Energy Finance, "more than two-thirds of the global population today live in countries where solar or wind, if not both, are the cheapest source of new electricity generation. Just five years ago, coal and gas dominated that picture. By 2030, new wind and solar ultimately get cheaper than running existing coal or gas plants almost everywhere" (BNEF 2019).

BOX 1

Five Big Ideas to Mobilize Private Finance for Biodiversity

1. Environmental Fiscal Reforms (EFR)

Governments could include EFR as part of crisis recovery plans. The current design of stimulus plans opens a potential 'reform window' in which to tackle these difficult issues. Reforming agricultural subsidies and land ownership has the largest potential impact of the recommendations in this paper, and can be complemented with investment in social, development, and job creation programs.

2. National Data Provision and Planning

Governments can support the integration of biodiversity criteria in financial sector decision making by adopting natural capital accounting (NCA) practices and providing relevant data as a public good. Governments can also mobilize private investment for biodiversity by including a role for the private sector in their National Biodiversity Strategies and Action Plans (NBSAPs).

3. Establishment of a Taskforce on Nature-related Financial Disclosures (TNFD)

The initiative to establish a Taskforce for Nature-related Financial Disclosure (TNFD) can be supported by both private and public sector stakeholders. The initiative, which can be built on or be part of the Taskforce on Climate-related Financial Disclosures (TCFD), will provide a framework and guidance for regulating and supporting biodiversity reporting and risk assessment by real and financial sector firms. A TNFD framework can help avoid excessive additional requirements for real and financial sector firms and fragmentation of reporting standards.

4. Establishment of a 'Nature Action 100'

Investors could come together to identify the top 100 companies with the greatest negative impact on nature and establish an equivalent of the 'Climate 100', to drive changes in real sector corporate behavior—including greening of supply chains.

5. Providing catalytical capital

MDBs and governments can mobilize private investment for biodiversity goals by serving as cornerstone investors and providing catalytic capital to funds and other financial instruments that aggregate projects.

Glossary

Biodiversity is the variability among living organisms from all sources including, inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems. (Convention on Biological Diversity)

Biodiversity finance is finance that contributes - or intends to contribute to, activities that conserve, restore, or avoid a negative footprint on biodiversity and ecosystem services. (adapted from OECD)

Biodiversity loss is the reduction of any aspect of biological diversity (i.e., diversity at the genetic, species, and ecosystem levels) that is lost in a particular area through death (including extinction), destruction, or manual removal; it can refer to many scales, from global extinctions to population extinctions, resulting in decreased total diversity at the same scale. (IPBES)

Biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development and persisting after appropriate avoidance, minimization, and restoration measures have been taken. (International Finance Corporation)

Biosphere is the sum of all the ecosystems of the world. It is both the collection of organisms living on the Earth and the space that they occupy on part of the Earth's crust (the lithosphere), in the oceans (the hydrosphere), and in the atmosphere. The biosphere is all the planet's ecosystems. (IPBES)

Blended finance is the use of catalytic capital from public or philanthropic sources to increase private sector investment in sustainable development. (Convergence) More specifically, it is the use of concessional donor funds to mitigate specific investment risks and help rebalance risk-reward profiles of pioneering, high-impact investments so that they have the potential to become commercially viable over time. (International Finance Corporation)

Brown finance is the financing of activities that do not sufficiently consider biodiversity risk or impact.

Carbon sequestration is the long-term storage of carbon in plants, soils, geologic formations, and the ocean. Carbon sequestration occurs both naturally and as a result of anthropogenic activities and typically refers to the storage of carbon that has the immediate potential to become carbon dioxide gas. (IPBES)

Catalytic/concessional capital accepts disproportionate risk and/or concessionary return to generate positive impact and enable third-party investment that otherwise would not be possible. (Convergence)

Climate change is change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is, in addition to natural climate variability, observed over comparable time periods. (UNFCCC)

Climate finance is the local, national or transnational financing—drawn from public, private, and alternative sources of financing—that seeks to support mitigation and adaptation actions that will address climate change. (UNFCCC)

Drivers of change, in the context of IPBES and this report, are all the factors that, directly or indirectly, cause changes in nature, anthropogenic assets, nature's contributions to people, and a good quality of life. Drivers have direct physical (mechanical, chemical, noise, light, etc.) and behavior-affecting impacts on nature. They include, inter alia, climate change, pollution, different types of land or sea use change, invasive alien species and zoonoses, and exploitation. Indirect drivers are drivers that operate diffusely by altering and influencing direct drivers, as well as other indirect drivers. They do not impact nature directly. Rather, they do it by affecting the level, direction, or rate of direct drivers. Global indirect drivers include economic, demographic, governance, technological, and cultural ones. (adapted from IPBES)

Double materiality is a two-dimensional perspective on materiality (see below) adopted by the Non-Financial Reporting Directive of the European Commission in the context of climate change. It involves: (i) The reference to the company's "development, performance [and] position" indicates financial materiality, in the broad sense of affecting the value of the company. Climate-related information should be reported if it is necessary for an understanding of the development, performance and position of the company. This perspective is typically of most interest to investors," and (ii) The reference to "impact of [the company's] activities" indicates environmental and social materiality. Climate-related information should be reported if it is necessary for an understanding of the external impacts of the company. This perspective is typically of most interest to citizens, consumers, employees, business partners, communities, and civil society organizations. However, an increasing number of investors also need to know about the climate impacts of investee companies in order to better understand and measure the climate impacts of their investment portfolios. (European Commission)

Ecosystem is a dynamic complex of plant, animal, and micro-organism communities and their non-living environment interacting as a functional unit. (IPBES)

Ecosystem services (also referred to as nature's contributions to people) are the benefits people obtain from nature (Millennium Ecosystem Assessment). Ecosystem services are organized into four types: (i) provisioning services, which are the products people obtain from ecosystems and which may include food, freshwater, timbers, fibers, and medicinal plants; (ii) regulating services, which are the benefits people obtain from the regulation of ecosystem processes and which may include surface water purification, carbon storage and sequestration, climate regulation, and protection from natural hazards; (iii) cultural services, which are the nonmaterial benefits people obtain from ecosystems and which may include natural areas that are sacred sites and areas of importance for recreations and aesthetic enjoyment; and (iv) supporting services, which are the natural processes that maintain the other services and which may include soil formation, nutrient cycling, and primary production. (World Bank)

Note: The paper focuses on the three categories of ecosystem services that people derive measurable benefits from—provisioning, regulating and cultural services—and which tend to attract investment and generate cashflows in projects. In contrast, the fourth category, the supporting ecosystem services, is of less relevance in the context of private finance for biodiversity and thus will not be the focus of the paper.

Financial sector is the set of institutions, instruments, and the regulatory framework that permit transactions to be made by incurring and settling debts; that is, by extending credit. (OECD)

Financing green is increasing financial flows to projects that contribute—or intend to contribute—to the conservation, sustainable use, and restoration of biodiversity and ecosystems and their services to people.

Greening Finance is directing financial flows away from projects with negative impacts on biodiversity and ecosystems to projects that mitigate negative impact and/or pursue positive environmental impacts as a co-benefit.

Green Swans, inspired by the concept of the 'black swan', are potentially extremely financially disruptive events, attributable to environmental crises, that could be behind the next systemic financial crisis. Namely, climate-or biodiversity-related physical and transition risks involve interacting, nonlinear and fundamentally unpredictable environmental, social, economic, and geopolitical dynamics that can be irreversibly transformed by the growing concentration of greenhouse gases in the atmosphere and large-scale loss of biodiversity and ecosystem services. (adapted from Bolton et al., 2020)

Impact assessment is a formal, evidence-based procedure that assesses the economic, social, and environmental effects of public policy or of any human activity. (IPBES)

Impact investments are investments that seek to generate positive social and environmental outcomes, alongside financial returns. (Global Impact Investing Network)

Land use is the human use of a specific area for a certain purpose (such as residential, agricultural, recreational, industrial, etc.), influenced by, but not synonymous with, land cover. Land use change refers to a change in the use or management of land by humans, which may lead to a change in land cover. (IPBES)

Mainstreaming, in the context of biodiversity, means integrating actions or policies related to biodiversity into broader development processes or policies, such as those aimed at poverty reduction or tackling climate change. (IPBES)

Market return is the return on the market portfolio, a portfolio consisting of all assets available to investors, with each asset held in proportion to its market value relative to the total market value of all assets. (NASDAQ)

Materiality refers to the significance of a matter in relation to a set of financial or performance information. If a matter is material to the set of information, then it is likely to be of significance to a user of that information. (OECD) Materiality is rarely determinable by a bare quantitative equation; rather, it requires an assessment of whether a reasonable investor would consider the information relevant to its decision of whether or not to invest in a company. That assessment may require consideration of both quantitative and qualitative factors. (Commonwealth Climate and Law Initiative)

Mitigation hierarchy is a tool that guides users toward limiting as far as possible the negative impacts on biodiversity from development projects (The Biodiversity Consultancy). It consists of four sequential steps that must be taken throughout the project's life cycle to limit any negative impact on biodiversity: (a) anticipate and avoid risks and impacts; (b) where avoidance is not possible, minimize or reduce risks and impacts to acceptable levels; (c) once risks and impacts have been minimized or reduced, mitigate; and (d) where significant residual impacts remain, compensate for or offset them, where technically and financially feasible. (World Bank)

National Biodiversity Strategy and Action Plan (NBSAP) is a policy document, developed and adopted by Parties to the Convention on Biological Diversity, in line with the requirements of the Aichi Biodiversity Target 17. (Convention on Biological Diversity)

Nature, in the context of this report, refers to the natural world, with an emphasis on biodiversity. Within the context of science, it includes categories such as biodiversity, ecosystems, ecosystem functioning, evolution, the biosphere, humankind's shared evolutionary heritage, and biocultural diversity. Within the context of other knowledge systems, it includes categories such as Mother Earth and systems of life. Other components of nature, such as deep aquifers, mineral and fossil reserves, and wind, solar, geothermal and wave power, are not the focus of the report. Nature contributes to societies through the provision of contributions to people. (adapted from IPBES)

Nature-based solutions (NBS) are actions to protect, sustainably manage, and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits. (IUCN)

Nature's contributions to people (please see '*Ecosystem services*')

Paris Agreement or, in full, the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC), was adopted on December 2015 in Paris, France, at the 21st session of the Conference of Parties (COP) to the UNFCCC. One of the goals of the Paris Agreement is 'Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels', recognizing that this would significantly reduce the risks and impacts of climate change. Additionally, the Agreement aims to strengthen the ability of countries to deal with the impacts of climate change. (adapted from IPCC)

Private sector is the part of the national economy that is not under direct government control. This includes both the real and financial sectors.

Real economy/sector is the part of the economy that produces goods and services, rather than the part that consists of financial institutions and services.

Taxonomy refers to a classification system for investments, particularly as they relate to a government's environmental goals (scientific taxonomies are not discussed in this paper).

Tipping point is a set of conditions of an ecological or social system where further perturbation will cause rapid change and prevent the system from returning to its former state. (IPBES)

Zoonotic diseases (or zoonosis) is any disease or infection that is naturally transmissible from vertebrate animals to humans. (WHO)

Acronyms

Assets Under Management	AUM
German Federal Financial Supervisory Authority	BaFin
Business and Biodiversity Offset Program	BBOP
Biodiversity and Ecosystem Services	BES
British Petroleum	BP
Convention on Biological Diversity	CBD
Caisse des Depots et Consignations	CDC
Carbon Disclosure Project	CDP
Conference of Parties	COP
Coalition for Private Investment in Conservation	CPIC
Coastal Zone Management Trust	CZMT
District of Columbia	DC
Environmental & Social	E&S
Ecotrust Forest Management	EFM
Environmental Fiscal Reform	EFR
European Investment Bank	EIB
Exploring Natural Capital Opportunities, Risks, and Exposure	ENCORE
Environmental, Social, & Governance	ESG
Environmental and Social Impact Assessment	ESIA
Exchange Traded Fund	ETF
European Union	EU
Food and Agriculture Organization	FAO
Financial Stability Board	FSB
Group of 20	G20
Gross Domestic Product	GDP
Global Environment Facility	GEF
Gross Ecosystem Product	GEP
Greenhouse Gas	GHG
Global Impact Investing Network	GIIN
World Bank Global Program on Sustainability	GPS
Her Majesty's Treasury (UK)	HMT
High Net Worth Individual	HWNI
Integrated Biodiversity Assessment Tool	IBAT
International Bank for Reconstruction and Development	IBRD
International Capital Markets Association	ICMA
International Energy Agency	IEA
International Financial Corporation	IFC

International Financial Institution	IFI
International Monetary Fund	IMF
Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services	IPBES
Independent Power Producers	IPPs
International Union for the Conservation of Nature	IUCN
German Development Bank (Kreditanstalt für Wiederaufbau)	KfW
Kolberg, Kravis, and Roberts	KKR
Louis Dreyfus Company	LDC
Multilateral Development Bank	MDB
Middle East Respiratory Syndrome	MERS
Marine Protected Area	MPA
Mongolian Sustainable Finance Association	MSFA
Nature-Based Solutions	NBS
National Biodiversity Strategies and Action Plans	NBSAPs
Natural Capital Accounting	NCA
Network for Greening the Financial System	NGFS
Overseas Development Assistance	ODA
Organisation for Economic Co-operation and Development	OECD
World Organization for Animal Health	OIE
Partnership for Biodiversity Accounting Financials	PBAF
Payments for Ecosystem Services	PES
Public-Private Partnership	PPP
Price Waterhouse Coopers	PwC
Revolving Credit Facility	RCF
Real Estate Investment Trust	REIT
Reef Rescue Initiative	RRI
Severe Acute Respiratory Syndrome	SARS
Sustainable Development Goals	SDGs
Seychelles Conservation and Climate Adaptation Trust	SeyCCAT
Taskforce on Climate-related Financial Disclosure	TCFD
Timberland Investment Management Organization	TIMO
The Nature Conservancy	TNC
Taskforce on Nature-related Financial Disclosure	TNFD
United Kingdom	UK
United Nations Conference on Trade and Development	UNCTAD
United Nations Development Program	UNDP
United Nations Environment Program	UNEP
United Nations Framework Convention on Climate Change	UNFCCC
United States	US
US Agency for International Development	USAID
World Business Council on Sustainable Development	WBCSD
World Bank Group	WBG
Wildlife Conservation Bond	WCB
World Economic Forum	WEF
World Health Organization	WHO
World Wildlife Fund	WWF

Aerial view of Okavango delta river. © Ingrid Heres/Shutterstock

Chapter 1
Context

The loss and fragmentation of ecosystems represent an unrecognized risk for business, financial systems, and people worldwide. Our economies are embedded in the natural world and constantly rely on the services provided by ecosystems. Yet, the world is experiencing levels of biodiversity loss that are unprecedented in human history. Meanwhile, efforts to conserve, sustainably use, restore, and avoid irreversible damages to nature, including finance, are still very small.

The objective of this World Bank Group (WBG) paper is to contribute to the current debate on mobilizing private finance for biodiversity and ecosystem services. The paper examines the obstacles to scaling private finance for biodiversity and ecosystem services—the market failures and lack of an enabling environment for greater private sector engagement,—and assesses the steps that governments and financial regulators could take to facilitate financing. In doing so, the paper seeks to contribute to the policy dialogue on resource mobilization, particularly in the context of the preparation for the 15th Conference of the Parties (COP-15) of the Convention on Biological Diversity (CBD), and the post-2020 global biodiversity framework. It also seeks to provide the analytical underpinnings to support national development strategies, including the National Biodiversity Strategies and Action Plans (NBSAPs), which are the key implementation mechanism of the CBD.[7]

Changing the course of action hinges on policy making, with governments and financial regulators holding the key to 'moving the needle' of private finance. Finance for biodiversity and ecosystem services, that is, finance that contributes—or intends to contribute—to activities that conserve,

7 This piece fits into broader work of the WBG on the road to COP-15 in Kunming, China. The paper is part of a series of WBG knowledge and analytical products, which includes a WBG position paper on biodiversity and ecosystem services that identifies the relevance of sustainable management of biodiversity and ecosystems for development and the role the WBG can play in supporting its member countries to pursue the goals of ending extreme poverty and promoting shared prosperity in a sustainable way. It also includes the ongoing integrated ecosystem and macroeconomic modeling work that will estimate the impact that ecosystem services loss could have on the global economic outlook and assess the potential effectiveness of alternative policy responses. This paper also builds on the outcomes of the workshop on private finance for biodiversity that was held in Beijing in 2019, organized by the China's Ministry of Ecology and Environment (MEE) and the Foreign Environmental Cooperation Center (FECO)and the World Bank, to examine the key obstacles to and the enabling environment required for, private sector investment, and showcase innovative solutions.

sustainably use, restore, or avoid a negative footprint on biodiversity and ecosystem services, continues to be dominated by the public sector, while private finance remains niche. Multiple entry points for private investment in nature are emerging, including impact investing, thematic bonds (e.g., green blue, and conservation bonds), and voluntary standards and initiatives such as the Equator Principles and corporate sustainability commitments. This is a new frontier in the financial markets, however, and it represents only a small portion of green finance, which continues to be focused on climate finance. While progress has been made in understanding the financial risks related to climate change and aligning global financial flows with the climate change mitigation objectives in the past decade, the same cannot be said about biodiversity and ecosystem services loss, and this is the space the paper seeks to contribute to.

The paper is organized into four parts. Section 2 provides the context and the justification for mobilizing greater private sector investment in the conservation and sustainable use of nature. Section 3 gives an overview of the current status of finance for biodiversity and ecosystem services, and identifies the motives for the private sector to engage, namely risk management and opportunity, and the obstacles to overcome. In turn, Section 4 discusses the role of governments and regulators, private sector and multilateral development banks going forward: the levers and policy options that could help real and financial sector actors better integrate biodiversity risk and opportunities into decision making. Please note that unless otherwise stated, all currency amounts in this report are provided in US dollars ($).

Asia Fishermen on boat fishing at lake: © SantiPhotoSS/Shutterstock

Chapter 2
Why Is Nature Important?

The economic importance of biodiversity and ecosystem services

Nature's health and human prosperity follow the same path. Nature—the ensemble of living organisms, ecosystems, and biomes on Earth, also known as the biosphere—is the foundation of economic activity and human well-being. The symbiosis between living organisms and the physical and chemical environment gives rise to ecosystems that control fluxes of energy, nutrients, and organic matter on Earth. These services in turn support every aspect of our existence and economic activity (see Figure 4). *Ecosystem services*, also referred to as *Nature's contributions to people*, include the provision of food, fresh water, timber, and fuelwood (*provisioning/'material' services*); the regulation of climate and extreme weather; control of diseases and removal of toxic pollution (*regulating services*); and a basis for spirituality, personal enjoyment, and inspiration (*cultural/'non-material' services*). Underpinning these are the *supporting* natural processes such as soil formation, nutrient cycling, and primary production.

At the foundation of ecosystem services is biodiversity.[8] This basic building block, an essential attribute of nature, may be understood as the variability of *genes, species,* and *ecosystems* that exist in the biosphere. Biodiversity supports the provision of vital services as detailed above, and it makes ecosystems more productive and more resilient to shocks, thus sustaining and maximizing these services. Ecosystems that are more biodiverse have a greater capacity to regenerate and respond to change such as extreme events, climate change, and degradation (Dasgupta, 2020). Put simply, biodiversity allows nature to thrive and creates an environment in which people, communities, firms, and economies can be productive, and can prosper. For this reason, the paper talks about finance for biodiversity and ecosystem services, and finance for nature in an interchangeable way.

8 The Convention on Biological Diversity defines biodiversity as the variability among living organisms from all sources including, inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems. (Convention on Biological Diversity).

Figure 4. Biodiversity and Ecosystem Services are the Foundations of Economies

Source: Stockholm Resilience Centre, Stockholm University.

Biodiversity and ecosystem services underpin many economic sectors in tangible, measurable ways. The World Economic Forum (2020a) estimates that $44 trillion of global value added (corresponding to over half of the world's GDP) is generated in industries that are either highly dependent ($13 trillion) or moderately dependent ($31 trillion) on nature and its services.[9] Among the highly dependent sectors are construction, agriculture, and the food and beverage industries. These sectors rely both on the direct extraction of resources from forests or oceans, and on supporting ecosystem services such as soil productivity, clean water, stable climate, and animal pollination. For example, pollination supports 75 percent of global food crop types, including fruits and vegetables, and some of the most important cash crops such as coffee, cocoa, and almonds. The annual market value of crops dependent on animal pollination ranges from $235 billion to $577 billion (IPBES, 2016). Another example is the tourism sector that with all its linkages to the services and primary industries generates one in ten jobs worldwide. Natural landscapes and biodiversity are what makes many tourism destinations attractive. Coral reefs alone, for example, provide $36 billion a year in economic value through tourism, generated directly through 'on-reef' activities such as diving and wildlife watching or tourism in reef-related areas, which attract visitors with their ocean views, beaches, and local seafood (Spalding, 2017).

In some countries and regions, the dependence of economies on nature is especially pronounced. The World Bank's comprehensive wealth estimates show that natural capital makes up nearly half of the wealth in low-income countries. This suggests that more efficient, long-term management of natural

9 The WEF has analyzed the nature dependency of 163 sectors and their supply chains across a range of ecosystem services, which include, inter alia, bioremediation, climate regulation, disease control, fibers and other materials, filtration, flood and storm protection, mass stabilization and erosion control, genetic materials, soil quality, and pollination. Source: WEF, 2020a (please see Appendix A).

resources is key to sustainable development (Lange et al., 2018). The agriculture, food and beverage, and construction sectors all rely very heavily on nature services; some countries, in turn, rely on such sectors for employment and value added. For example, one-third of the GDP of India and Indonesia is generated in sectors that are highly dependent on nature. In absolute terms, China, the EU, and the US head the list of countries with the highest absolute amount of GDP derived from sectors dependent on nature, at over $7 trillion (World Economic Forum, 2020a). The greater the dependencies, the greater the exposure to risks related to environmental degradation.

Biodiversity is deteriorating at an unprecedented rate, with potentially far-reaching implications for economies. Both the indicators of nature's health and the indicators of the services it provides to people are showing negative trends. Biodiversity across marine, freshwater, and terrestrial ecosystems is diminishing at a rate previously unrecorded in human history. A recent report from WWF reveals an average decline of 68 percent in vertebrate species numbers between 1970 and 2016 (WWF, 2020). One million of the estimated 8 million plant and animal species on the planet are now threatened with extinction (IPBES, 2019). Unsurprisingly, 14 of the 18 categories of nature's services that were assessed in 2019 have also deteriorated since 1970 (IPBES, 2019). The increased consumption of provisioning services—including the harvesting of fish, bioenergy, and agricultural production—has pushed some of these resources to the limits and coincided with a decline in critical regulating ecosystem services that support economies, such as pollination, control of diseases, coastal protection, and climate regulation.

Biodiversity loss and climate change are two sides of the same coin, and their interactions can drive the Earth to dangerous feedback loops and 'tipping points'[10] (IPCC, 2018). The ~1.0°C rise in global temperatures over the past 30 years has increased the intensity and frequency of extreme weather events, such as floods, droughts, and fires, and is having widespread impacts on species and ecosystems, affecting species distribution, phenology, population dynamics, and ecosystem function. Even under a 1.5–2°C global warming scenario, the majority of terrestrial species ranges are projected to shrink profoundly (IPBES, 2019). Conversely, the loss of nature contributes to climate change. Terrestrial and marine ecosystems sequester 60 percent of gross annual anthropogenic carbon emissions (IPBES, 2019); their degradation results in the release of carbon and a reduction of their capacity to sequester carbon. This can trigger potentially disruptive and irreversible 'tipping points'—from the collapse of ice sheets that can unleash self-reinforcing global warming, to the disappearance of coral reefs, and to self-amplified forest loss in the Amazon (Zemp et al., 2017). While there is uncertainty about the critical thresholds beyond which such large-scale degradation can unravel, it is clear that under the current trends, the continued stability and resilience of nature and the climate system are threatened.

As the physical risks of biodiversity loss materialize, they affect the relative productivity of economic activities, sectors, and geographic areas. The Global Futures Project by WWF-UK and the University of Minnesota estimates that under a business-as-usual scenario, the costs of biodiversity loss in some countries, notably in East and West Africa, Central Asia, and parts of South America, could be in the order of 4 percent of GDP per year by 2050 (Johnson et al., 2020).[11] Some of these are export-oriented economies that are highly dependent on sectors such as agriculture and fishing, or sensitive to changes in commodity prices, making them vulnerable to the degradation of ecosystems that underpin the productivity of key sectors and value chains. This is just the tip of the iceberg. The case will be made in subsequent sections that no economy is immune to the systemic risks that nature loss and its interactions

10 Tipping points refer to critical thresholds in a system that, when exceeded, can lead to a significant change in the state of the system, often with an understanding that the change is irreversible (IPCC, 2018).

11 It is worth noting that this is a permanent decline in GDP, hence capable of cumulating to much higher numbers over time. The estimate is conservative in that only six ecosystem services are considered, that is, pollination, water yield, timber provision, coastal protection, fishery production, and carbon sequestration. It is assumed that no tipping points or regime shifts are reached.

BOX 2

A Case in Point: COVID-19 and the Global Pandemic

The COVID-19 pandemic, which is producing far-reaching economic impacts, is a powerful reminder of the link between human health and planetary health. An estimated 60 percent of all known human infectious diseases, and 75 percent of emerging infectious diseases, are zoonotic (Taylor et al., 2001). In the past half century, we have faced several deadly disease outbreaks caused by novel viruses of animal origin, such as COVID-19, Ebola, HIV, avian influenza, West Nile virus, Rift Valley fever, and the SARS and MERS coronaviruses (WHO, FAO and OIE, 2004; Gebreyes et al., 2014). The rate of zoonotic disease emergence has increased markedly since the 1940s (Jones et al., 2008).

Science suggests that habitat loss is a key trigger of the spillover of zoonotic diseases to humans. The pathogens behind such outbreaks have wildlife "reservoirs," with natural habitats acting as natural barriers, limiting human exposure to and the impact of many pathogens through a buffering effect (Cunningham et al., 2017). However, the ability of nature to act as a shield is compromised by habitat destruction, unregulated wildlife trade, and climate change. Almost half of the new zoonotic diseases after 1940 resulted from land use change, agricultural intensification, and other food production practices or wildlife "bushmeat" hunting (Johnson et al., 2020; Keesing et al., 2010). Illegal wildlife trade is also fueling cross-species transmission (Karesh et al., 2005), and climate change is further accelerating nature's degradation and modifying the patterns of infectious diseases.

The cost of such outbreaks to human lives and economies can be devastating. In a recent example, the economic cost of the 2002 SARS outbreak was estimated at $41.5 billion, with 8,000 confirmed infections (UNEP, 2016). The West Africa Ebola epidemic of 2014–16 claimed over 11,000 lives and had pronounced socioeconomic impacts, including substantial losses in investment, private sector growth, agricultural production, and cross-border trade. In 2015 alone, it cost Guinea, Liberia, and Sierra Leone an estimated $2.8 billion in GDP or $125 in GDP per capita (GPMB, 2019). In Sierra Leone, the 20 percent drop in GDP that year wiped out five years of development. The current COVID-19 crisis is overwhelming even these numbers, and is doing so on a global scale. It has already shut down large swathes of the global economy and may deeply affect certain sectors such as travel and tourism for years to come. The baseline forecast envisions a 5.2 percent contraction in global GDP in 2020, the deepest recession in decades, and longer-lasting impacts such as lower investment, an erosion of human capital through lost work and schooling, and potential ruptures of global trade and supply linkages may be expected (World Bank, 2020b).

with climate change represent. An immediate example of the close links between planetary health and human prosperity is provided by the COVID-19 pandemic (see Box 2).

Why is biodiversity under threat?

Development over the past five decades has been associated with rapid transformation of the natural world and insufficient investment in its conservation and sustainable use. In the past 50 years, human population has doubled, the global economy has grown fourfold, and global trade has grown tenfold. Insufficient attention has been paid to the impact of this development on the environment: the record growth coincided with a loss of 85 percent of wetlands, alteration of 75 percent of land surface, and some degree of impact on 66 percent of ocean area (Table 2). Taking land use as an example, over 100 million hectares of tropical forests were lost from 1980–2000, mostly as a result of the expansion of cattle

ranching in Latin America and plantations in South-East Asia (IPBES, 2019). Human activity is also using the biosphere as a sink for unprecedented amounts of waste, including toxic waste, which becomes air, soil, and water pollution that damages and reduces biodiversity (Dasgupta, 2020). The 2019 landmark report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) identifies five key direct drivers behind the unprecedented decline in biodiversity: *land use, and sea use change, overexploitation, pollution, climate change, and invasive species* (Table 3).

The unsustainable use of natural resources is underpinned by market failures, governance failures, economic policies, and consumption and production practices that are not aligned with sustainable development goals. The record economic development and poverty reduction of the last 50 years has been made possible by a heavy reliance on an extractive approach to renewable natural capital and nature services. Many value chains depend on the exploitation of resources such as crops, fish, and timber, but fail to account for this reliance or their impact on the ecosystems providing these services. The cost of environmental degradation is only partially felt by the actors driving it. Firstly, much of biodiversity and most ecosystem services are a public good and are free or virtually so, accessible, and open to all. Externalities, information asymmetries and public goods are some of the market failures that misalign the private and social costs, and benefits of the use of nature, encouraging its use beyond a level that is socially optimal. Secondly, certain policies, such as agricultural policies that subsidize unsustainable farming practices, also aggravate the problem. At many levels, policy has moved slowly to better incorporate the values of biodiversity and ecosystem services into policies and incentives. Finally, economic incentive structures continue by and large to support the unsustainable management of nature, resulting in distortions—including underpricing of biodiversity risk and value in private investment decisions.

The financial materiality of biodiversity loss on the real and financial sectors

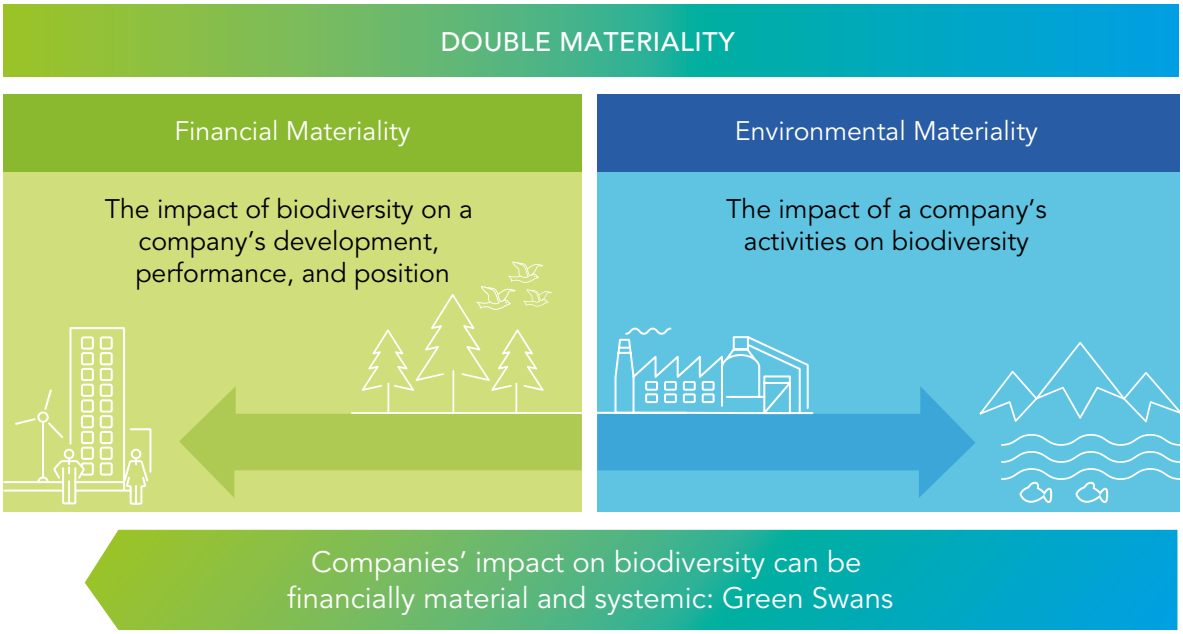
The existence of direct and indirect drivers of nature loss gives rise to a double materiality issue that can only be resolved by aligning incentives for

Table 2. The Direct Drivers of Biodiversity Loss: an Assessment by IPBES

Land use change	Over-exploitation	Pollution	Climate	Invasive species
75 percent of land surface altered 85 percent of wetlands lost Urban areas doubled since 1992 100 million hectares of tropical forest lost from 1980–2000	33 percent of marine fish stocks harvested unsustainably; 60 percent maximally sustainably fished 37 countries currently facing "extremely high" levels of water stress Land degradation; lost productivity of 23 percent of terrestrial areas	Marine plastic pollution up tenfold since 1980 80 percent of wastewater discharged untreated 115 million tons of mineral nitrogen fertilizers applied each year to crops 300–400 million tons of industrial toxic waste, heavy metals are discharged into waterways annually	GHG emissions doubled since 1980 Average global temperatures raised by ~1 degree Celsius by 2017 relative to preindustrial levels	Cumulative records of alien species increased by 40 percent since 1980

Sources: IPBES (2019); Gassert et al. (2013).

Figure 5. Representation of Double Materiality



Source: Figure adapted from EU Non-Financial Reporting Directive, European Commission, 2019.

the private sector with environmental objectives. The concept of double materiality,[12] introduced by the European Commission in the context of climate change, stresses two major perspectives on the importance of environmental sustainability issues for companies and the business sector. The first perspective is predominantly financial in nature, and it encompasses the possible impacts of environmental risks and opportunities on the performance and financial position of a company. The second perspective is biophysical or environmental in nature, and it encompasses the impacts a company has on the environment and through that on society, including consumers, civil society, citizens, and even investors. Environmentally material risks can be financially material; in the worst cases compounding risks become systemic and affect an entire value chain or even economy (Figure 5). This can be the case when unlikely but large-scale events, termed Green Swans by Bolton et al. (2020), occur. Dealing with double materiality issues can be challenging unless various instruments are combined and used in concert.

Due to these double materiality impacts, real sector firms are starting to consider biodiversity in their business practices. For example, deforestation and related fires in Indonesia have led to significant pressure to end the use of uncertified palm oil in consumer goods and biofuels (Steinweg et al., 2019). In the case of the BP Deepwater Horizon oil spill, the direct damages sustained by BP and its partners—such as the loss of the platform and the loss in production—were dwarfed by the costs of the environmental cleanup and the subsequent legal settlement with the US federal and state governments, amounting to more than $67 billion as of 2019 (Ward, 2018).

Drivers for firms to recognize the financial materiality of biodiversity and ecosystem services loss include:

- *Regulations and incentives.* Changes in the regulatory environment are forcing firms to consider the negative impact their business can have on nature, and to adjust their practices

12 An issue is material when it can have a substantial impact on the economic, financial, reputational, and legal position of a firm or business, as well as on its network of stakeholders.

accordingly. Additionally, market instruments—such as taxes and subsidies—can incentivize firms to change their practices, by raising the cost of doing business as usual, or lowering the cost of the transition to more sustainable practices.

- *Productivity gains.* Factors such as changes in the quality and quantity of key inputs, or supply chain disruptions, could force companies to change their production practices and re-design their supply chains. Firms can also be proactive by implementing sustainable practices encompassing custodianship of nature in order to realize productivity gains and market opportunities—for example, by charging a premium for sustainable products. The most advanced companies in this respect incorporate natural capital into their strategy and operations, through the use of environmental profit and loss statements.[13] Others choose to certify their products and supply chains through organizations such as the Rain Forest Alliance[14] or the Wildlife Friendly Enterprise Network.[15]
- *Corporate sustainability.* Firms seeking to conserve and restore nature—and their corporate reputation—are responding to increasing consumer and public pressure to consider their broader environmental impact, looking beyond their financial bottom line.[16]
- *Cost of capital.* International financial institutions and many commercial banks have explicit standards addressing risk mitigation and management for biodiversity and ecosystem services. To access finance at a viable cost, companies working in emerging markets are increasingly considering biodiversity in risk assessment and management.
- *Insurance.* Companies may face higher insurance costs, and certain risks or even entire operations may become uninsurable.

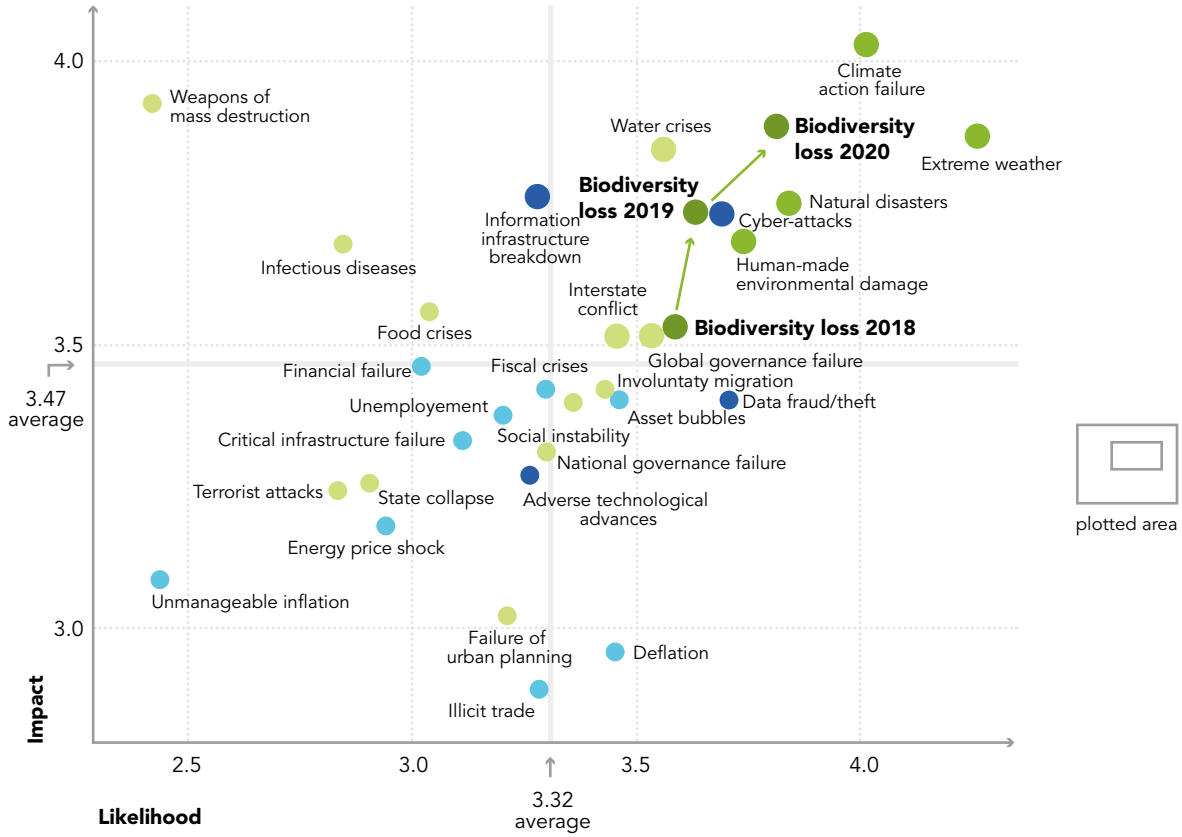
However, the management of the financially material impacts of biodiversity loss is still incipient, as the understanding and the measurement of impacts are still being developed. Opportunities exist for businesses to participate in biodiversity conservation, sustainable use, and restoration, and potentially improve their financial bottom line by doing so. Some companies are able to directly point to key benefits that they derive from biodiversity and without which their business operations would be impacted.[17] However, in most cases, dependencies on biodiversity are more difficult to identify, either because they are hidden within the supply chain, or because they are linked to emergent risks that are not well understood or studied—an example of this is the link between global pandemics and deforestation or poaching.

The financial sector is also increasingly recognizing the risks posed by the loss of natural biodiversity and ecosystem services to the real sector projects and companies in which they invest. Over the past several years, the awareness of biodiversity risk has greatly increased and this trend is expected to continue, especially following the COVID-19 pandemic. In early 2020, more than 750 global experts and decision makers responded to the World Economic Forum's 'Global Risk Perception Survey' (World Economic Forum, 2020b) and ranked the risks related to biodiversity loss higher than cyber-attacks or asset bubbles both in terms of impact and of likelihood (see Figure 6).

Like the real sector, the financial sector is realizing that biodiversity risk is financially material, albeit difficult to measure. The distinction between financial and environmental and social returns is breaking down. Investors are realizing the need to measure and account for the externalities which the loss of biodiversity and ecosystem services

13 One example is the use of Environmental Profit and Loss Accounts by the luxury group Kering (Kering, 2020).
14 Rainforest Alliance. 2020. What Does Rainforest Alliance Certified™ Mean? May 18, 2020. Accessed on May 18, 2020. Available from: https://www.rainforest-alliance.org/faqs/what-does-rainforest-alliance-certified-mean
15 Wildlife Friendly Enterprise Network. c2015. Standards. Accessed on May 18, 2020. Available from: http://wildlifefriendly.org/standards/
16 According to Nielsen, a marketing research firm, nearly half (48 percent) of U.S. consumers say they would definitely or probably change their consumption habits to reduce their impact on the environment. (The Nielsen Company, 2018). https://www.nielsen.com/us/en/insights/article/2018/was-2018-the-year-of-the-influential-sustainable-consumer/
17 For example, growers of fruit tree and nut tree orchards in California have recognized the importance of pollination by bees and other insects. Faced with declining pollinator populations, farmers have to rent the service of apiculturists who travel hundreds of miles to bring their hives to orchards that need pollination. Likewise, cocoa farmers have come to realize that shade makes for a more productive crop and have begun to replant trees on their farms.

Figure 6. The Global Risks Landscape 2020 and the Evolution of Biodiversity Loss Risk in the Past Three Years



Source: World Economic Forum Global Risks Perception Survey 2019–2020 (World Economic Forum, 2020b).

represents. They are also grappling with how to achieve this, and to correct the market failure to include these externalities in financing costs. As with the real sector, the relationship between the financial sector and biodiversity cuts both ways. As laid out in the EU Non-Financial Report Directive and framework, double materiality indicates that "sustainability issues are firstly a risk and/or an opportunity for the financial sector, and, secondly that financial flows either positively or negatively influence climate change and biodiversity" (WWF and PwC, 2020).

While considerable progress has been made, many financial sector actors continue to cite data availability, standardization, comprehension, and quality as barriers to assessing the financial materiality of biodiversity risk. Yet the lack of data need not prevent these actors from recognizing the interdependence of the sustainable management of nature, a healthy human population, and a sustainable global economy. According to the Commonwealth Climate and Law Initiative and the TCFD, "Materiality is rarely determinable by bare quantitative equation: rather, it requires an assessment of whether a reasonable investor would consider the information relevant to its decision whether or not to invest in a company. That assessment may require consideration of both quantitative and qualitative factors." (Staker et al., 2017) (more information on this in Box 3).

As understanding of the financial materiality of biodiversity and ecosystem loss increases, financial institutions are starting to use their leverage to push for change in the real sector. Financial

BOX 3

Definitions of Materiality in the Financial Sector

Two questions often come up when discussing private finance for biodiversity. The first relates to materiality, the second to timeframe.

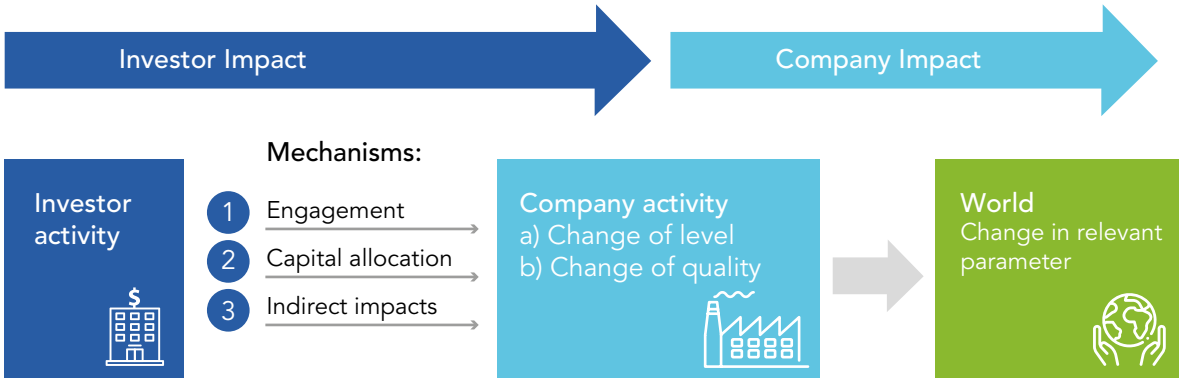
Question 1: Is biodiversity risk financially material? This question has led to an analysis that tries to separate out the contribution of biodiversity to a national economy or a corporation's revenue. In this analysis, the attempt is often then made to quantify the relationship between natural capital management and changes in asset prices, the cost of capital, or credit ratings. The flaw in this analysis is that investors and credit rating agencies have not traditionally included assessments of biodiversity risk in their own analysis. As a result, historical financial markets data are unlikely to show a significant relationship between management of biodiversity and financial indicators. Even climate risk models are limited in their incorporation of biodiversity risk and the feedback loops between climate and biodiversity.

However, as is being recognized in the field of climate change, risks thought to be financially immaterial in the past are quickly becoming material. Climate change analysis shows that financial markets are not efficient when there are significant externalities, such as the impact of greenhouse gas emissions and biodiversity loss on societies and the global economy. Financial sector actors seeking to get ahead of the curve should consider what they expect to be material in the future, as actors in the public and private sectors work together globally and locally to create more efficient markets for sustainable investment, rather than merely what they can prove to have been financially material under inefficient markets. One category of risks that merits special attention is systemic risk, described by the Green Swan' report (Bolton et al., 2020) as "potentially extremely financially-disruptive events that could be behind the next systemic financial crisis."

Question 2: Is biodiversity risk material in the timeframe that investors care about? Timeframes play an important role in investors' action or inaction on biodiversity risk and opportunities. Investors that are focused on reporting quarterly earnings or demonstrating quarterly performance against a benchmark are much less likely to view the integration of biodiversity criteria into their risk management and decision making as a priority—the so called 'tragedy of the horizon'. Impacts of biodiversity protection or destruction accrue over longer periods of time than many investors are mandated to pay attention to. Incentive structures for investors can be better aligned with the efficient and sustainable allocation of capital. If current timeframes driving investors are incentivizing the disregard of crucially important economic criteria related to climate and biodiversity, then these timeframes are not contributing to efficient markets or healthy economies. Supervisors and regulators thus have a role in lengthening them, when appropriate, especially in the case of public assets.

institutions are increasingly aware of biodiversity risk, and of the risks that mismanagement of biodiversity can pose to the financial performance of their investment portfolios. As illustrated in Figure 7 below, investors have two main channels for influencing the strategies and behavior of companies: engagement (through proxy vote and board member selection), and capital allocation. Recently, investors have taken steps to engage with governments, which is a significant development. A group of 29 leading institutional investors managing $3.7 trillion in assets succeeded in persuading the Brazilian government to commit to implementing a 120-day halt to

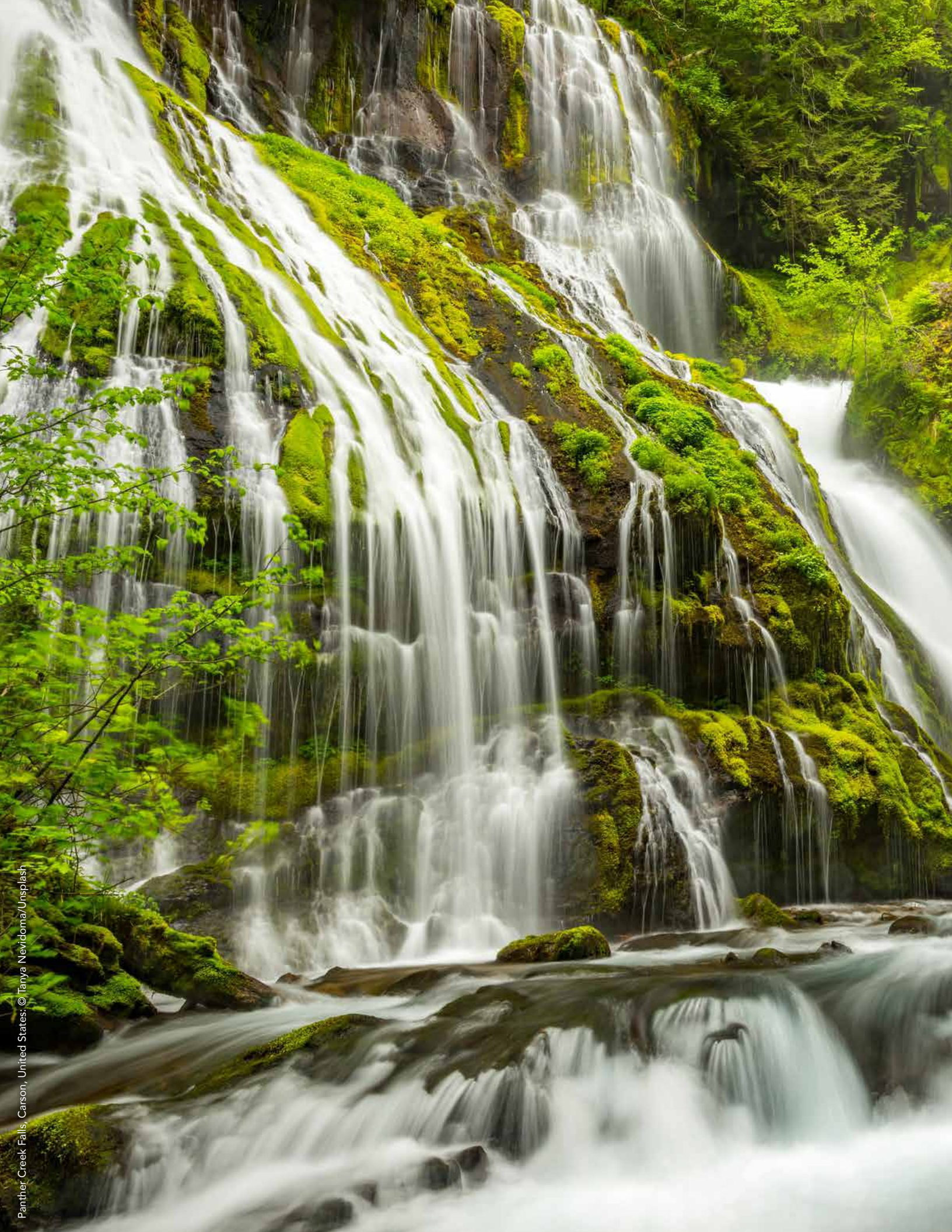
Figure 7. Investor and Company Impact



Source: 2 Degrees Investing Initiative, 2020.

fires in the Amazon in July 2020. Some firms are putting additional investments in Brazil on hold or threatening to divest if the government does not act (Paraguassu and Spring, 2020). In July 2020, Nordea Asset Management, which holds $270 billion of assets under management, committed to divesting $45 million from Brazilian meat producer JBS, over its ties to farms involved in Amazon deforestation (Freitas and Adghirni, 2020). Examples of divestment related to biodiversity or deforestation risk are still rare, however, the Norwegian Government Pension Fund Global (GPFG), valued at more than $1 trillion, has divested from more than 60 companies because of deforestation risk, including 33 companies involved in palm oil production (Rainforest Foundation Norway, 2019).[18] Investor engagement and capital allocation in response to these issues are likely to become more common as new generations of investors seek investments aligned with their values.

18 It is important to note, however, that these decisions are often driven by a variety of factors, of which biodiversity conservation is one among many. For example, this fund is highly dependent on the sale of oil, and therefore depends on forests as carbon sinks. The key point is that investing in nature is often aligned with other financial objectives and this can be used as a channel for leveraging private finance.



Panther Creek Falls, Carson, United States; © Tanya Nevidoma/Unsplash

Chapter 3

The Current State of Private Finance for Biodiversity and Ecosystem Services

What is private finance for biodiversity?

Private finance for biodiversity (or private finance for nature) is the raising, provision, or management of private capital to conserve, restore, sustainably use, or avoid a negative footprint on biodiversity and ecosystem services. Such financing aims to support businesses and projects that have a positive impact or reduce a negative impact on biodiversity and ecosystem services, and sustain the services these systems provide. Given this paper's focus on the private sector, this financing may be deployed in support of businesses and projects that generate a positive financial return and are designed to achieve a biodiversity outcome. There are two dimensions to private finance for biodiversity. Firstly, investors are looking for investment opportunities arising from the conservation, restoration, and sustainable use of nature—to use the language of climate finance, to 'finance green'. Secondly, investors are trying to direct financial flows away from projects with negative impacts on biodiversity and ecosystem services, and towards projects that mitigate negative impact or pursue positive environmental impacts as a co-benefit.

Figure 8. Categories of Sustainable Finance

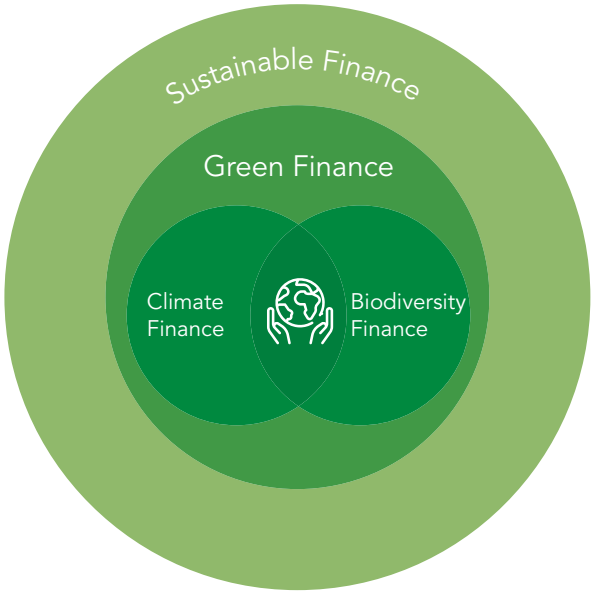


Figure 9. Estimated Finance Flows for Biodiversity (annual average between 2015–2017)

Source	Amount in USD million	Year
Domestic public expenditure	$67,800	Annual average 2015–1017
Bilateral flows	$3,541–8,407	Annual average 2015–1017
Multilateral flows	$327–922	Annual average 2015–1017
Total public flows[i]	**$71,668–77,129**	
Conservation NGOs	$1,200–2,300	2017
Philanthropic foundations	$222–380	2017
Total NGO/philanthropic flows	**$1,422–2,680**	
Biodiversity offsets[ii]	$2,600–7,300	2016
Sustainable commodities	$2,300–2,800	2016
Private finance mobilized by DAC countries' official development finance interventions	$200–510	2018 (proxy for 2017)
Private finance leveraged by GEF	$41–155	Annual average 2015–2017
Forest and land use carbon finance	$30–116	2016
Water quality trading and offsets[iii]	$32	2016
Payments for ecosystem services for watersheds (from the private sector)[iv]	$15	2016
Total private sector flows	**$5,218–10,928**	

Source: OECD. 2020a. A Comprehensive Overview of Global Biodiversity Finance. April 2020.
i. Bilateral estimates cover Development Assistance Committee (DAC) members (including EU Institutions) and other official providers that reported biodiversity-related activities to the Common Reporting Standard. Multilateral estimates include reporting from the Global Environment Facility, Inter-American Development Bank, United Nations Development Program and the World Bank Group. Reporting on biodiversity-related activities by multilateral agencies is not yet comprehensive or consistent across year
ii. There is potentially a small overlap with public expenditure data.
iii. Assumption made that the majority is private sector finance.
iv. The estimate for payments for ecosystem services (PES) includes the value of just 10 large private programs. Several of the public funding categories may include PES.

Efforts to engage the private sector in avoiding negative impacts, and conserving, restoring, and sustainably using nature are falling short of the needs, and this space faces a large financing gap. While a range of efforts aimed at slowing biodiversity loss and ecosystem degradation are underway, transforming the way firms and businesses operate has proven difficult. Global efforts to coordinate conservation, restoration, and sustainable use of biodiversity date back to the 1992 Convention on Biological Diversity—yet only four out of twenty Aichi Targets, under the Strategic Plan for Biodiversity 2011–2020, show significant progress (IPBES, 2019). The target for mobilizing resources for biodiversity is one of the unmet objectives.

Biodiversity finance remains niche, imperfectly tracked, and dominated by public finance. Due to a lack of data and the absence of investment taxonomies, biodiversity finance tracking systems currently mostly track investments in natural assets (i.e., 'financing green' projects or programs). This conceals a greater problem: the lack of alignment of broader financial flows with biodiversity goals and the subsequent lack of private investment in curbing the drivers of nature loss (i.e., 'greening finance'). Figure 9 provides OECD data on the best-available estimates of average annual global finance explicitly labeled 'biodiversity finance'[19] (OECD, 2020a).[20] Domestic public investment is by far the largest source of biodiversity finance that is tracked. Private investment is still limited,

19 Biodiversity finance is defined as "expenditure that contributes—or intends to contribute—to the conservation, sustainable use, and restoration of biodiversity" (OECD, 2020a).
20 OECD cautions that adding these numbers could lead to double counting. Public biodiversity funds are not included in these estimates, nor are private equity or debt for biodiversity.

but interest is growing. Of the private investment tracked, a significant proportion comes from biodiversity offsets—mainly wetland and stream mitigation banks and conservation banks in the United States (OECD, 2020a).

Although the overall sustainable finance market is growing fast, biodiversity finance remains a small percentage of the total—representing a missed opportunity. Sustainable investing[21] assets were estimated at $30.7 trillion in 2018—up 34 percent in just two years—representing 18–63 percent of all professionally managed assets across five major financial markets[22] (GSIA, 2019). However, despite this overall growth and interest in sustainable finance, in the same year, 2018, the Global Survey of Impact Investors found that investments in 'conservation' represented only 3 percent of the investment portfolio of the respondents (GIIN, 2018). Likewise, just 4 percent of green bond proceeds in 2019 went toward funding projects in areas that favor the integration of nature considerations in productive sectors—,such as sustainable agriculture, fisheries, forestry, and ecosystem conservation (CBI, 2020).[23] Part of the explanation for this lies in the fact that the impacts on and risks related to biodiversity and ecosystems are often not explicitly reported on in sustainability reports or included in ESG frameworks (Convention on Biological Diversity, 2018). Unsurprisingly, then, biodiversity is not a prominent theme in green finance and impact investing.

Despite this growing awareness, biodiversity finance continues to be overshadowed by financial flows that are harmful to biodiversity. Governments alone spend five to six times more in economic support that is potentially harmful to biodiversity each year than total spending for biodiversity (OECD, 2020a), and the total volume of 'brown finance' that undermines biodiversity goals is likely to be many times larger.

However, the range of funders and financiers providing biodiversity finance—notably from the private sector—is broadening, increasing the pool of available capital. Traditional sources of philanthropic finance, such as family offices and high net-worth individuals, are being joined by new and growing sources of philanthropic capital, including foundations. Additionally, impact investors are expanding their biodiversity-relevant investments. Large 'universal' asset owners, such as public pension funds and university endowments, are also seeking to deploy capital into investments that combine financial return with measurable social and environmental impact, including through contributions to SDG targets (GIIN, 2020).[24] Corporations are also a potentially major source of private funding for biodiversity investments, which may be deployed for purposes including corporate sustainability or to fulfill carbon offset targets. Finally, retail investors looking for impact investing products have also only just begun to be tapped.

Financing green: harnessing biodiversity and ecosystem services

Over and above physical, traded commodities, the real and financial sectors are financing projects that rely on ecosystem services. The drivers for these investments are the 'services'[25] which biodiversity provides. These are:

21 Sustainable investment is defined by the Global Sustainable Investment Alliance (GSIA) as "investment that considers environmental, social and governance (ESG) factors in portfolio selection and management" (GSIA, 2019).

22 The analysis considers: Europe, United States, Canada, Australian/New Zealand and Japan. Proportion of sustainable investing relative to total managed assets in 2018: (i) Europe—48.8 percent; (ii) United States—25.7 percent; (iii) Canada—50.6 percent; Australia/New Zealand—63.2 percent; (v) Japan—18.3 percent (GSIA, 2019).

23 Even this funding may not have used a biodiversity lens.

24 An estimated 33 percent of the $715 billion impact investing market is willing to accept a below market-rate return for significant impact (GIIN 2020).

25 The paper focuses on the three categories of ecosystem services that people derive direct, measurable benefits from—provisioning, regulating, and cultural services—and which tend to attract investment and generate cashflows in projects. In contrast, the fourth category, the supporting ecosystem services (i.e., the underlying ecosystem functions and biophysical processes that enable the other three types of ecosystem services) is of less relevance in the context of private finance for biodiversity and will not be the focus of this paper as a result.

- *Cultural or nonmaterial services:* Nature conservation provides opportunities for learning and inspiration, and physical and psychological experiences, and supports a sense of identity.
- *Regulating services:* Nature can provide solutions to regulate the climate and absorb carbon, assist in adaptation to the impacts of climate change, and protect against extreme events. It is responsible for the production of pollination services, the regulation of freshwater and coastal water quality, and the control of pathogens.
- *Provisioning or material services:* These are the goods which nature produces, including food and feed, bioenergy resources, construction materials, and medicines.

These different types of services are characterized by varying degrees of market failure. The most important failures are caused by the presence of a public good (e.g., carbon sequestration by natural forests); common access to resources (e.g., fisheries); and externalities (e.g., water pollution). These challenges tend to be most pressing in the case of nonmaterial services (such as the very existence of lemurs) and regulating services (such as 'green' infrastructure), which tend to be more at risk as a result, and less attractive to private finance. These market failures mean that these services often have no price attached to them, and there is no revenue to finance projects. Financial instruments are being applied in innovative ways to overcome these challenges.

Investments in conservation and cultural or nonmaterial services

Nonmaterial services are those provided by the conservation of ecosystems and wildlife, which to date have been largely funded by scarce and often insufficient public and philanthropic funds. Biodiversity conservation has historically mostly been within the purview of the public sector and of philanthropic entities. However, this has led to clear limitations including the fact that that biodiversity outside of public land or some community-managed conservancies is generally not well protected. Protected areas are often underfunded as limited resources are channeled to other development activities. Additionally, governments often face pressure from various stakeholders and political groups whose interests conflict with conservation goals. Consequently, a large funding gap remains.

Conservation and financial markets specialists are currently exploring innovative financial mechanisms to support conservation initiatives. For example, the Global Environment Facility (GEF)-funded Wildlife Conservation Bond (WCB) project, currently under preparation, is exploring the potential to structure a bond for institutional investors to help fund conservation and to transfer the risk of failing to achieve conservation results from traditional donors to investors. The proposed WCB project (see Box 4) builds on the preparatory work done under the Rhino Impact Investment Project (RIIP). The RIIP was a four-year, $4.5 million project funded by the GEF, The Royal Foundation, UK Aid, and the Zoological Society of London (GEF, 2019). The World Bank, as a GEF implementing agency, is currently working with various partners to structure and launch the WCB.[26]

The WCB aims to create an outcome-driven structured bond that channels private sector funds to increase black rhino populations in target protected areas in South Africa. The proposed WCB project integrates three key elements: (i) tapping institutional investors as a new source of funding for conservation; (ii) applying a private sector approach to delivering conservation activities; and (iii) payment by donors for independently verified conservation achievements. Under the WCB structure, the payments to investors would come from the GEF and potentially from another outcome payer. This innovative bond structure could help test investor appetite for a conservation-

26 The WCB financing mechanism uses a World Bank, IBRD AAA-rated bond to channel new financial resources to wildlife conservation. WCB investors forego the bond coupon payments, which are used to fund rhino conservation management at the two project sites. At the conclusion of the project, if the rhino populations at these sites have grown to pre-defined rates, the bond holders receive a conservation success payment paid by the outcome payers. As of August 2020, the WCB project is still under preparation and is subject to changes.

BOX 4

Financing Mechanism 1: Pay for Performance—Conservation Bonds

Environmental Impact Bonds (EIBs) could be used to transition from traditional philanthropy to pay-for-results schemes. Traditional philanthropy is practice-based, meaning that supported organizations receive grants based on their pledge to implement specific activities. These grants are not tied to the achievement of specific outcomes—if outcomes are not achieved, the donors face underperformance. A conservation impact bond allows a donor to target specific conservation outcomes and to pay only if they are achieved (Nicola, 2013).

The Wildlife Conservation Bond (WCB) project is focused on addressing major challenges for financing conservation, and proposes an innovative financial product that combines private, public, and philanthropic resources to unlock private finance for the conservation of the black rhino in South Africa. The project builds on existing conservation efforts in two priority sites and product development under the $4.5 million Rhino Impact Investment Project funded by the GEF, The Royal Foundation, UK Aid, and the Zoological Society of London.

The WBG is considering the issuance of a bond (amount to be determined based on market conditions) where investors—both private and institutional—agree to forego all annual coupon payments, which will be used to finance conservation initiatives in the two identified South African parks. The bond investors hence become direct co-financiers of conservation efforts in the parks, and in return, they can be compensated with a "conservation success payment" if the rhino populations meet specified targets at the two parks, according to independently verified results. GEF Non-Grant Instrument funding will serve as the source of the contingent success payment for the bond holders. The project aims to improve the management of more than 150,000 hectares of terrestrial protected areas for conservation, and increase the black rhino population by a 5 percent average annual growth rate over a five year period in these parks (equivalent to 1.9 percent of the current global black rhino population).

Beyond the project-level results, this pilot conservation bond could pave the way to mobilize institutional investment for financing conservation. A conservation impact bond allows donors to pay for certain pre-agreed conservation outcomes instead of specific conservation activities, as is the case with a typical grant. This shifts the risk of not achieving conservation results to investors who have more experience making risk-adjusted investments. In addition, because the funding is now focused on outcomes rather than input activities, the recipients have more flexibility to experiment with new approaches and to adapt to changing conditions. For these reasons, there is a growing interest in using this model to protect other charismatic species and ecosystems. The model also brings together a range of actors from the finance, conservation, and donor communities. However, in its current design, this model contains an inherent limitation in that in many cases no direct cash flow or revenue generated from the species and habitats protected is used to reward investors. Therefore, this model relies on philanthropy or international donors to compensate investors for the risk they take on, until a market that facilitates compensation for conservation impact is developed, as has been done for carbon.

linked investment that generates a market return. Other similar projects are attempting to improve the connection between the payment source and the species or ecosystems being protected. For example, in the case of The Lion's Share Fund the funding for conservation would come from a share of the budget for advertisement that uses images of endangered wildlife (The Lion's Share Fund, 2019).

Another innovative approach for investing in nonmaterial services is the use of public-private partnerships (PPP) that blend conservation efforts with other commercial nature-based activities. One example is the two-phase World Bank Mozambique Conservation Areas for Biodiversity and Development (MozBio Phase I)[27] project. It has supported five co-management agreements between the government and nonprofits, as well as private organizations, to manage five conservation areas and to finance anti-poaching activities. It also regularized eight private tourism concessions in the Bazaruto Archipelago National Park and facilitated a successful joint venture between a local community and a private operator. The PPP structures applied leveraged significant private and philanthropic investments in excess of $600 million,[28] and Phase I of the project created nearly 1,800 tourism jobs. The model is being replicated across the country—PPPs are at the center of Mozambique's strategy to attract investment in rural areas, develop the tourism sector, and conserve biodiversity and ecosystem services. The financial sector is also stepping up: the country's largest bank, Millenium BIM Bank, has established a $50 million line of credit for investors interested in nature-based tourism, particularly in and around conservation areas.

It is often difficult for conservation and tourism alone to sustain a community, hence investments in other economic activities are crucial to meeting ecological goals. The current pandemic has shown that downturns in tourism can be catastrophic for communities that had fully relied on this revenue. It has also proven detrimental to protected areas that finance their monitoring and enforcement activities with tourism revenue (Lindsay et al., 2020). During the lockdown, local communities were often the only partners available to care for protected areas. Empowering them to sustain themselves while caring for land and wildlife is crucial to successful conservation. An example of an initiative that leverages revenue generation and conservation is the African Parks program, which uses a delegated management PPP model, and has been effective in places where governments have faced limitations in financial resources to achieve conservation outcomes (see Box 5). African Parks depends on income from three sources: gross park revenue; grant funding from donors; and endowment income. In addition to PPPs, private models that are hybrid for-profit/not-for-profit have also demonstrated efficacy in the application of an integrated land management approach to conservation. The Ol Pejeta conservancy in Kenya operates according to such a diversified model, where the commercial part of the organization relies both on tourism and agriculture (Ol Pejeta Conservancy, 2019). Another example is Gorongosa Coffee,[29] a company that invests all profits from the sale of locally produced coffee in the community and in Gorongosa National Park.

Several initiatives have been developed to increase the flow of capital to conservation. These include the Coalition on Private Investment in Conservation and the Conservation Finance Alliance.[30] Such initiatives link conservation with diverse commercial revenue streams, such as tourism projects and sustainable agriculture—often working with local communities. Conservation Capital's Umiliki Investments fund, for example, takes an innovative approach, buying into existing

27 Mozambique Conservation Areas for Biodiversity and Development project page: https://projects.worldbank.org/en/projects-operations/project-detail/P131965?lang=en

28 The amount includes select funding pledges only. (World Bank, 2018.) Leveraging PPPs in Mozambique to scale conservation and promote economic development. Blog. July 18, 2018. Available at: https://blogs.worldbank.org/ppps/leveraging-ppps-mozambique-scale-conservation-and-promote-economic-development

29 Gorongosa Coffee. Accessed on July 6, 2020. Available at: https://gorongosacoffee.com/

30 Coalition for Private Investment in Conservation. Accessed on June 15, 2020. Available at: CPICfinance.org and Conservation Finance Alliance. Accessed on June 15, 2020. Available at: conservationfinancealliance.org

BOX 5

Financing Mechanism 2: Conservation PPPs—African Parks

In 2000, African Parks (AP) pioneered the delegated management Public-Private Partnership (PPP) model for protected area management, and has since expanded to running 17 parks in 11 countries, with over 13.3 million hectares under management. The AP model is designed "to restore and protect wild areas for the benefit of people and wildlife, while achieving long-term sustainability." Under this model, the organization assumes full responsibility for all park management functions, and is accountable to the government, who remains the owner. The government determines the policy for the landscape through mandates and resource allocation. Various legal entities are created within a single park to serve various functions. The components of the AP model are biodiversity conservation, community development, tourism and enterprise, management and infrastructure, and law enforcement.

AP aims to provide ecological, sociopolitical, and economic benefits for people living in and around the parks. The program works to manage the parks together with local communities, and invests in the development of a wide range of economic activities that vary according to the landscape (African Parks, 2020). In 2019, AP paid a total of $13.7 million in salaries to its staff, 95 percent of whom are locals. Tourism to the parks contributed $6.3 million to parks and communities, covering 10 percent of the overall African Parks budget. $493,000 was generated from social enterprises, including community guides, honey production, fisheries, and moringa projects. AP makes a variety of investments to support local communities, including in schools, health care, infrastructure, agriculture, and other local economic activities. Some of the parks have damage insurance schemes that pay farmers if wildlife damages crops, and some have built infrastructure that helps prevent wildlife from wandering onto local farms.

businesses on behalf of local communities.[31] While many other examples exist, most are small in scale, and are, therefore, not suitable for many traditional investors to support.[32]

Where a large enough company or group of companies is exposed to biodiversity risk, as in the case of tourism, the insurance sector is starting to apply innovative financing mechanisms to pay for conservation. Parametric insurance for conservation allows funds to be made available to restore ecosystems within days after a disaster, such as a hurricane, a fire, or an oil spill. The biodiversity that underpins ecosystems can be permanently lost if appropriate restoration actions are not taken in a certain period of time (see Box 6 for example). However, funds needed for emergency restoration work, whether from public agencies or from philanthropies, may take months to become available. Instead of the payout based on a lengthy claim adjustment process, the payout from parametric insurance is agreed upon in advance and triggered by a physical parameter reaching a pre-agreed target, such as wind speed, occurrence of a drought, or a fire. When the parameter reaches the target, it

31 Umiliki Investments. Conservation Capital. https://www.conservation-capital.com

32 Another example of creative generation of revenues is the Cumberland Forest Project of NatureVest—the impact investment arm at TNC, developed in collaboration with JP Morgan. This involved a $131 million investment to conserve 102,000 ha of critical biodiversity hotspots and protect key water supplies in the Central Appalachian region, sequester 5 million tons of CO^2e emissions and support the transition to more sustainable jobs for local communities that traditionally relied on the coal industry for employment. The project phased out coal activities and created four alternative income streams, from the sale of certified timber and carbon credits, the sale of hunting licenses, and land appreciation (TNC, 2019c).

BOX 6

Financing Mechanism 3: Parametric Coral Reef Insurance Policy in Quintana Roo, Mexico

In 2018, the Mexican state of Quintana Roo and various stakeholders, including hotel owners, The Nature Conservancy (TNC), and The National Parks Commission, launched a program to purchase a parametric insurance policy for part of the Mesoamerican Reef—a key piece of 'infrastructure' for the region as it attracts thousands of tourists each year, generating $10 billion in revenue, and protects coastal infrastructure from hurricane damage. Hurricanes are the biggest driver of short-term losses in reef structure, with 20—60 percent of live coral cover lost after a category 4 to 5 hurricane, compared to an annual decrease of 2—6 percent from other causes. Without targeted investment, this trend is likely to worsen.

Repair is one of the most cost-effective options for protecting beaches, but quick response is required, as damaged parts of the reef can die within 45 days. TNC estimates that using the first-response diving team to quickly repair the hardest-hit portions of the national park's 17 miles of reef after a hurricane will cost between $50,000 and $150,000, compared with the roughly $1 million hotels would pay to install half a mile of sea wall or other artificial protection (Smith, 2018). However, public and donor funds may take months to reach the impacted site.

The parametric policy, developed by SwissRe, is the first-ever insurance policy for a coral reef. It will speed up fund disbursement and restoration actions, maintenance of the reef and beaches, and training of a group of volunteer divers that stand at the ready to restore the reef after the next hurricane. Should wind speeds in excess of 100 knots hit a predefined area, an insurance payout will be made within days.

The premium is paid by Quintana Roo's Coastal Zone Management Trust (CZMT). The CZMT, established by the provincial government, was designed to collect funds from an existing fee paid by beachfront property owners, among other private and public sources, and to manage these funds for reef maintenance and repair. The Trust has paid for the training of Quintana Roo's Guardians of the Reef—a group of volunteer divers who are working to rehabilitate the reef, and are prepared to respond in the aftermath of a storm (TNC, 2019b). TNC provided a grant to help the government of Quintana Roo pay the initial premium for the policy. The state government indicated that it would direct tax revenue to the trust to pay for the premium in following years; however, this has not materialized and the insurance policy lapsed in mid-2020.

The Mesoamerican Reef Fund's Reef Rescue Initiative (RRI) provides an example of a mechanism with a similar mandate, but one that relies primarily on an endowment which provides both emergency funds and continuous support for reef restoration and rehabilitation in the region. The same model could be used where the response to an ecological disaster requires a rapid deployment of funds, such as for a forest fire or droughts in national parks.

triggers an immediate payout to the beneficiary, who can start restoration activities immediately. The InsuResilience Global Partnership notes great potential for this type of funding to increase, while detailing challenges still to be overcome, including the quantification of payouts, limited experience with the instruments to date, and systemic risks from climate or nature loss that may not be insurable (Beck et al., 2019). The "Global Ecosystem Resilience Facility" is one initiative actively promoting the development of the market for these products.[33]

33 The GERF seeks to help public and private organizations understand the true value of ecosystems and put in place effective protection measures for their conservation. In particular, the GERF focuses on ocean ecosystems, which have previously received

In summary, the financing of nonmaterial services of biodiversity is increasing in terms of innovation and efficiency, but the challenge of scale still remains. Private sector stakeholders are working with traditional public sector managers to devise new sources of revenue to support conservation projects and manage them more effectively. Innovative financing mechanisms, including performance-based bonds, PPPs, and insurance can be used to broaden the investor base, but projects remain localized and scale is still a challenge, with the absence of monetizable revenue being the most important impediment to scaling up.

Investments in green infrastructure and regulating services

Investments in 'green infrastructure' harness the regulating services[34] of healthy ecosystems, often to complement or replace traditional 'grey' infrastructure solutions. They fall under the umbrella of 'Nature-Based Solutions,' which help protect ecosystems and enhance biodiversity, and also provide numerous financial, economic, and social benefits to a broad range of public and private stakeholders. For example, global water infrastructure investment[35] currently largely flows to 'grey' improvements such as dams, pipelines, and treatment plants. Economic analysis has demonstrated that in some cases, natural infrastructure can supply the same quantity and quality of water at lower costs and, where investment is involved, generate a higher return (e.g., Jaffe et al., 2010). The types of solution being explored and adopted include:

- *Reforestation and forest restoration with native species*—to capture carbon, protect the watershed, improve water supply (including predictability and quality), and support drought management;
- *Green urban infrastructure*—to capture storm water and to reduce flooding through green walls and roofs and increases in permeable ground surface; and
- *Conservation or rehabilitation of mangroves, reefs, and wetlands*—to capture carbon; reduce flooding, coastal and soil erosion, and water salination, and purify water.

Many of these solutions carry important climate co-benefits. Reforestation and afforestation, and the conservation of terrestrial, wetland, and marine ecosystems, increase the capture and sequestration of carbon, and act as a buffer against extreme weather and climate fluctuations that damage physical assets and affect livelihoods. This makes these investments central to climate change mitigation and adaptation efforts. For example, NBS are estimated to be able to deliver 37 percent of the cost-effective climate mitigation needed through 2030 (Griscom et al., 2017). Potential NBS opportunities allow for the achievement of synergies between biodiversity and climate investments and optimization, simultaneously addressing challenges in both fields.

The financing of these projects is evolving. Green infrastructure can generate a return on investment in at least three different ways: (i) avoided costs; (ii) generation of an additional cash flow for the entity; and (iii) economic growth for the area benefiting from the green infrastructure. An example of avoided cost is the use of rain gardens, green roofs, and permeable pavements by the City of Washington, DC, eliminating the need for the construction of a large stormwater management tunnel under the city (see Box 7) (DC Water, 2017). However, avoided costs can be particularly difficult to evaluate ex ante and, in the case of the DC Water EIB, the implementation of green infrastructure has proven more expensive than anticipated, leading

less in the way of practical risk management and mitigation measures, to support the blue economy. Risk pools and mutual insurance are in development as key risk management tools for communities and ecosystems. Alternative risk transfer solutions, such as catastrophe bonds, are also a focus and, when up-front capital investment is required, the structuring of a resilience bond can be explored. See https://www.willistowerswatson.com/en-US/Insights/trending-topics/csp-global-ecosystem-resilience-facility

34 Regulating services may include: habitat creation and maintenance; pollination and dispersal of seeds and other propagules; regulation and air quality; regulation of climate; regulation of ocean acidification; regulation of freshwater quantity, location, and timing; regulation of freshwater and coastal water quality; formation, protection, and decontamination of soils and sediments; regulation of hazards and extreme events; and regulation of detrimental organisms and biological processes (IPBES, 2019).

35 Needs are estimated to be $500 billion annually (Woetzel et al., 2017).

the city to cancel a planned expansion of the project (DC Water, 2020). The water quality markets in North Carolina provide a good example of green infrastructure designed to generate a positive cash flow. The state has developed a scheme where entities can restore riparian wetlands and riparian forests that are proven to improve water quality. In exchange,[36] they are granted water quality credits that can be sold at a profit to developers who are obliged under state regulations to manage their water quality impacts.[37] Finally, the last type of return on investment from green infrastructure is economic growth at the local level, usually linked to added revenues from ecotourism. An example of this may be found in the City of Athens, Ohio, which is currently designing an environmental impact bond, the proceeds of which will be used to create a series of mountain biking trails to increase nature tourism revenues.[38]

Private payments for ecosystem services (PES) offer a promising source of finance for green infrastructure and regulating services. These payments allow users of an ecosystem service, such as clean drinking water, to contribute financially to compensate the economic benefit forgone by actors whose choices determine the availability of the service—for example, maintaining forest cover in a watershed, rather than clearing the land for agriculture. These contributions allow for the correction of an externality and are directed toward conservation activities. PES thus adopts a market-based approach to conservation financing. User-driven watershed investments from the private sector were estimated to be $15.4 million in 2015 (Bennett and Ruef, 2016). The payers were predominantly food and beverage companies, finance and insurance companies, private water utilities, and energy generation firms. The total amount of payments for watershed services is much higher, however, as the majority of payments come from the public sector. Public subsidies for watershed protection were estimated to be $23.7 billion in 2015 (Bennett and Ruef, 2016). Examples of biodiversity and watershed PES programs are included in Box 8.

A recent global assessment of market instruments for conservation,[39] released in 2018, found that the rapid growth in PES and other market instruments for watersheds can be partially explained by the local connection between land management in watersheds and beneficiaries of flood protection and water purification services (Salzman et al., 2018). Watershed payments from all market-based instruments grew from $6.7 billion in 2009 to $24.4 billion in 2015. While the private sector participates in these market mechanisms, public sector support is still crucial. In several countries, the public sector collects funds to pay for these programs through water utilities or taxes.

Forests provide important carbon sequestration services, and the forest carbon markets represent a growing pool of private finance that can potentially contribute to conservation and sustainable use of biodiversity. After the oceans, trees are the best-known 'technology' for capturing and sequestrating carbon emissions. While the voluntary carbon offset market is relatively small, recent surges in corporate climate pledges have led to an increase in demand for carbon offsets, creating what has been called a 'new gold rush' (Cavendish, 2019). Demand for voluntary forest-related carbon offsets has grown 140-fold in a decade (2008–2018) to $295.7 million in 2018, according to Forest Trends (Hamrick and Gallant, 2018). The list of corporations that have promised to calculate the emissions generated from certain business activities, and purchase carbon credits from projects that remove equivalent emissions elsewhere, is seeing steep growth. This growing pool of capital, if used strategically, could have a significant conservation and restoration impact.

36 North Carolina Department of Environmental Quality. Nutrient Practices and Crediting. Accessed on May 19, 2020. Available at: https://deq.nc.gov/about/divisions/water-resources/planning/nonpoint-source-management/nutrient-offset-information

37 Resource Environmental Solutions, 2020. Projects. Accessed on May 19, 2020. Available at: https://res.us/places/find-projects/?solutions=stormwater-management-nutrient-reduction

38 Quantified Ventures. 2019. Outdoor Recreation Environmental Impact Bond. Accessed on: May 19, 2020. Available from: https://www.quantifiedventures.com/outdoor-recreation-environmental-impact-bond

39 This includes public, private, and nonprofit financing and voluntary and compliance mechanisms. Please note that the most widely used definition of PES only includes voluntary transactions (Wunder, 2005).

BOX 7

Financing Mechanism 4: Pay for Performance Bonds—Infrastructure

Environmental Impact Bonds (EIB) are an outcomes-based financing mechanism that has been successfully used to mobilize private investment in green infrastructure and Nature-Based Solutions. Unlike green bonds, that are based on 'use of proceeds' (Nicola, 2013), the payout of an EIB is tied to the ecological performance of the projects that were financed by the bond. In order to structure the EIB, the issuer needs to define in advance conservation outcomes to be achieved, and establish probabilities of achieving the different levels of outcomes. The return on the bond then varies based on the achievement of those outcomes. If the projects outperform the target, the investors will receive a premium on the base rate. If the targets are missed, the investors will accept a discount on the base rate, and in some cases could accept to lose some or all of the loan principal.

EIBs are typically issued for public sector projects, financed by municipalities and local authorities, and could be traded in the municipal bonds market. The private sector is showing growing appetite in performance-tied investment in nature-based solutions, especially those issued by public sector entities.

The world's first EIB was issued in 2016 by the DC Water and Sewer Authority (DC Water, 2017), the water utility of the District of Columbia in the United States (North and Gong, 2017). DC Water was facing mounting pression from the US Environmental Protection Agency because, during heavy rain events, stormwater would overwhelm the sewer system and cause raw sewage and stormwater to be directly released in the waterways. DC Water was faced with the choice of upgrading its existing sewage system or of using green infrastructure, such as rain gardens, green roofs, and permeable pavements, to mimic the natural infiltration of rainwater. Issuing an EIB allowed DC Water to share some of that performance risk with investors.

Under the $25 million bond structure, investors (The Calvert Foundation and Goldman Sachs) receive a bi-annual interest payment of 3.43 percent for five years. An additional, contingent payment may be made at Year 5 based on a pre-agreed target performance of the green infrastructure. If the runoff reduction of between 18.6 percent and 41.3 percent is achieved, no extra payment is due. However, if the green infrastructure does not meet performance expectation, investors will pay DC Water $3.3 million. Conversely, if the green infrastructure exceeds the performance target, DC Water would pay investors $3.3 million. DC Water then would pass the cost of the bond to rate payers through their monthly bills. DC Water was expecting that the use of green infrastructure would be cheaper than the equivalent grey infrastructure, and would help it manage the rising costs of providing clean, safe water. However, a cost assessment three years after the start of the program showed that the net present value of the costs of green infrastructure over 30 years was almost double the cost of grey infrastructure. This disappointing result comes from the high costs of implementing green infrastructure in dense urban areas, and from the absence of revenues from co-benefits such as environmental health or urban biodiversity. However, because of these added benefits, and of the positive impact of green infrastructure on job creation, the city decided to implement a hybrid approach, incorporating both green and grey infrastructure.

Similar bonds for green infrastructures are in development in the United States in Atlanta, Georgia and Buffalo, New York. It is worth noting that Atlanta's EIB will be the first publicly-traded EIB (Quantified Ventures, 2019), as most EIBs are privately placed debt. Beyond stormwater management, companies and public agencies are exploring the use of EIB for coastal resilience, forest fire management, and ecotourism development.

BOX 8

Financing Mechanism 5: Biodiversity and Watershed Payment for Services Programs

Water quality protection represents one of the most important sources of payment for ecosystem services schemes. Private sector examples often involve the beverage industry. For example, Perrier-Vittel, the world's largest bottler of mineral water, entered into a land management agreement with farmers upstream from its water source to safeguard water quality (Perrot-Maître, 2006). Because of changes in agricultural practices, the company was facing water pollution risk. Perrier contracted with landowners to increase the use of agroforestry practices that would contribute to improved water quality. These programs remain difficult to invest in because they tend to be tailored to the specific needs of a single company and are not easily scaled up—the Perrier-Vittel project covers only 1,000 ha. However, replication and aggregation may be possible.

Biodiversity-focused payments for ecosystem services are still not very common. Conservation easements constitute a specific example. These are legal agreements between a landowner and a beneficiary interested in the conservation value of the land that restrict future activities on the land. These schemes can be financed by private foundations, NGOs or governments, for example by incentivizing farmers to leave land fallow rather than subsidizing crop or livestock outputs. In the United States, several investment managers are realizing significant financial returns through federal programs involving conservation easements and agricultural incentives.

Institutional mechanisms such as dedicated funds are usually developed to facilitate replication of initiatives that bring suppliers of services and beneficiaries together, providing standards, and enabling monitoring and verification. For example, The Nature Conservancy (TNC) has established a series of water funds across Latin America that allow diverse public and private downstream water users to pay for investments in watershed protection upstream. The Water Fund in Quito, Ecuador, set up by the government with the support of TNC, started with an investment of $21,000 and now has $9 million in capital to invest in watershed protection and improvements in agricultural practices across upstream communities, which serve as stewards and providers of watershed services. The model is being replicated across Latin America (Calvache et al., 2012).

Verification, however, remains a challenge for these markets. Emissions reductions from projects that claim to reduce deforestation or reforest are especially difficult to verify. This is even more of a concern when projects take place on another continent, and may have happened anyway.[40] Methodologies which aim to assure the integrity of the carbon offset process include the Climate, Community, and Biodiversity (CCB) Standards; the WWF Gold Standard; and the American Carbon Registry, but only a limited proportion of projects are covered by these standards. As demand for carbon offsets grows, so does the risk of fraud or double counting (Cavendish, 2019). Greater transparency, standardization, accountability, and auditing will be needed. This is one nature-based solution which has the potential to scale, but is not without its challenges—not least the pricing of carbon—which warrant extensive discussion beyond the bounds of this report. Box 9 provides an example of an innovative approach to carbon offsets.

In response to growing markets for ecosystem services, some landowners and land managers

40 A 2016 study found that 73 percent of carbon credits provided little or no environmental gain, as they supported projects that would have happened anyway (Institute for Applied Energy, 2016).

BOX 9

Financing Mechanism 6: Carbon Offset Forest Funds

In 2012, New Forests, an Australian sustainable Timberland Investment Management Organization (TIMO), launched Forest Carbon Partners,[i] a subsidiary dedicated to developing forest carbon projects in cooperation with large landowners, such as native tribes or industrial landowners. Forest Carbon Partners does not own or manage forestland, but instead uses its organizational resources to identify and develop forest carbon projects, and to market and sell carbon credits in the California market. Since 2012, the company has amassed a portfolio of 15 projects across the continental United States and Alaska.

Ecotrust Forest Management (EFM) is a TIMO located in Oregon that owns and operates forestland with a focus on climate mitigation. It pursues several goals in parallel: offering a better risk-adjusted financial return to investors by diversifying financial returns through environmental markets, including carbon markets; improving the sequestration of carbon in the forest it manages; reducing the risk of forest fire; and creating economic opportunities in communities near their holdings. After a decade of operation, EFM has $190 million under management and advisement, and operates across 100,000 acres.[ii]

Another example is Wildlife Works, a company operating in Africa and Asia that seeks to protect local ecosystems from impact by local communities through the creation of new, biodiversity-friendly economic opportunities. In addition to producing branded apparel, Wildlife Works generates carbon credits from Reducing Emissions from Deforestation and Forest Degradation (REDD). The credits are also certified by the Community and Biodiversity Standard for their positive biodiversity impact. When companies purchase those carbon credits, they also directly contribute to biodiversity conservation and local livelihood (Responsible Investor, 2018).

i. New Forests. Accessed on June 1, 2020. Available at: https://newforests.com.au/forests-carbon-partners/
ii. EFM. Climate-smart forestry for a carbon-constrained future. Accessed on May 19, 2020. Available from: https://efmi.com/

have taken steps to monetize multiple ecosystem services payments from a single parcel of land. This approach, a practice known as 'stacking,' can provide multiple revenue streams for landowners, encouraging them to take an integrated approach to land management, better aligning economic incentives with ecosystem health. A single market or payment may not pay landowners enough to make projects cost-effective. However, multiple programs providing payment streams could cover the opportunity cost to landowners of forgoing a more extractive or destructive activity. Stacking can also incentivize landowners to develop higher quality projects, such as restoring a wetland for water quality benefits, instead of simply planting a vegetative buffer (Cooley and Olander, 2012). In some cases, companies stack payments for ecosystem services with revenue from the sale of goods; the Native-owned corporation, Sealaska, provides an example of this (see Box 10).

In summary, innovations in nature-based solutions are increasing and have the potential to expand—but are not without challenges. Projects trialing the replacement of 'grey' with 'green' infrastructure are increasing, and new financing mechanisms to support these initiatives are being explored. A 2019 World Bank and

BOX 10

The Role of Carbon Markets and Integrated Land Management—The Case of Sealaska

Sealaska, a Native-owned corporation in Alaska is using an integrated land management approach for its old-growth forest concession in the Tongass National Forest.[i] Traditionally, Sealaska relied heavily on income from logging. As logging expanded, the impacts affected the health of the ecosystem, with significant effects on the salmon population[ii]—an important source of income and sustenance for the local population. In 2015, Sealaska gained access to California's carbon markets, providing a way for the company to diversify its activities, including through selling carbon credits to British Petroleum (BP).

After economic analysis that included natural capital valuation, going beyond assessing the simple substitution of timber revenue for carbon credit revenue, Sealaska made the decision to set aside nearly half of its 336,000 acres in Southeast Alaska for 100 years. This act of conservation leaves the forest free for trapping, hunting, and crucially, salmon spawning. Additionally, conservation requires limited investment of capital to recoup, as compared to logging. In 2018, the Alaska Sustainable Fisheries Trust (ASFT) set up a nonprofit, SeaBank, to conduct research and assess the natural capital value of Southeast Alaska's intact forests and fisheries through social, economic, and ecological lenses. SeaBank was created to give residents information and tools to lobby for long-term, responsible management over short-term extraction. Using some of the data generated by SeaBank, Sealaska was better able to assess the value of activities that are supported by a healthy, intact forest, and to assess the optimal role of carbon credits in diversifying the company's revenue-generating activities.

Sealaska's project is registered under the 'improved forestry management' protocol of California's carbon markets. The carbon credits helped make 2018 the most profitable year in Sealaska's history (Sealaska, 2019). Between 2015 and 2019, the company made $100 million selling carbon credits to oil companies (Elbein, 2020), and currently sells its carbon credits to British Petroleum at $13 to $16 per credit. Sealaska's mandate enabled it to take an integrated and longer-term approach to managing its business, considering environmental stewardship in addition to profit generation, as well as profits for both future and current shareholders.

i. The 11 million acres of the Tongass National Forest is estimated to provide $13 billion in ecosystem services annually.
ii. There is a symbiotic relationship between the forest and the salmon population that migrates from the ocean up the streams into the forest. The salmon feed the trees and the trees shelter pools that salmon grow in. With logging, salmon streams and their fisheries withered as hatcheries were eroded and exposed to sun.

World Resources Institute report found that, "Integrating nature into mainstream infrastructure systems can produce lower cost and more resilient services." Green infrastructure can be packaged and marketed as 'green investments,' which may help to ease financing challenges. Additionally, governments, the private sector, and development agencies sometimes provide grants or concessional loans for green infrastructure because it both improves services and supports broader environmental and social goals (Browder et al., 2019). NBS, particularly through PES, can be used by governments and between private actors to price externalities and realign business practices. Capital market instruments such as bonds and funds are being used to attract wider sources of private finance into these projects. Aligning these structures with investor needs requires further development, and scaling them requires greater standardization.

Investment in the provisioning services of biodiversity

Biodiversity provides material goods that contribute to everyday life, and which are often traded on markets. These include food, fiber, raw materials, energy, and genetic resources. The private sector is involved in the management and production of these goods. Often, however, the resource from which they originate is a public good, for example when the good is the genetic material for curing a highly contagious disease, or where it is characterized by open access, for example in the case of fisheries. In these cases, the incentive for private sector participation is diminished.

The role of green finance is to identify mechanisms to direct capital toward the provision of these goods sustainably. Examples of this include sustainable forestry and fishing. Labeled bonds are financial instruments which can be used to incentivize these sustainable business practices. One example, the Seychelles sovereign blue bond, is described in Box 11. So called 'transition bonds' could also be issued to green supply chains. For example, the beef supplier Marfrig issued $500 million bond from ING and BNP in July 2020, with the proceeds used to buy beef from cattle ranchers who comply with non-deforestation criteria (Avery, 2019b). Further issuance could come from funds, development banks, or project managers to allow them to access a broader group of investors beyond their usual donor partners, or combined through blended finance techniques to provide the risk/return profiles to match different investor needs. For example, the Conservation Fund launched a $150 million green bond in 2019 that is perhaps the first pure conservation green bond of its kind. This is a plain vanilla[41] 10-year bond with a 3.4 percent coupon, rated A3 by Moody's, with a green bond opinion by Sustainalytics.[42]

BOX 11

Financing Mechanism 7: Blue Bonds

In 2018 the Republic of the Seychelles launched the world's first sovereign blue bond. The bond has a $15 million face value, a 10-year tenor, and a coupon rate of 6.5 percent. A $5 million concessional loan from the Global Environment Facility (GEF) reduces the coupon rate paid by the Seychelles to 2.8 percent (World Bank Group, 2018a). The World Bank, which helped develop the blue bond, also provided a $5 million guarantee. Three of the main investors are Calvert Impact Capital, Nuveen, and U.S.-headquartered Prudential Financial, Inc.

The public funds raised by the blue bond provide grants and loans to the real sector that help to catalyze private investment in conservation and sustainable marine resources management—mostly in the fishing sector. These grants and loans are dispersed by the Blue Grants Fund and the Blue Investment Fund, managed respectively by the Seychelles' Conservation and Climate Adaptation Trust (SeyCCAT) and the Development Bank of Seychelles. These grants can help to grow domestic industry that contributes to conservation and is aligned with sustainable marine resources management (World Bank Group, 2018a). The blue bond demonstrates the potential for countries to harness capital markets to finance sustainable investments and the demand from private investors for sustainable investment opportunities.

41 As opposed to a labeled bond.

42 Goldman Sachs was the bookrunner. Proceeds are being used to increase the scale of the Working Forest Fund, which invests in sustainable forestry, and in protecting natural ecosystems through the permanent conservation of at-risk working forests (The Conservation Fund, 2019).

Greening finance: reducing biodiversity and ecosystem services loss

The role of financial incentives in greening real sector behavior

Biodiversity loss has double materiality for the real and financial sectors. As discussed in section 2, loss of nature services means loss in income, higher costs, or practices that expose a business to other categories of risk. For this reason, industries which traditionally have had the largest negative impacts on biodiversity are exploring ways to address it. They are driven not only by risk management incentives, but also by potential productivity drivers—including through the generation of premiums compared to traditional products and services. For example, agricultural commodities sectors have begun to recognize the biodiversity risk and opportunities facing their industry, and the ongoing shift in consumer preferences resulting from associated biodiversity loss. As a result, some producers have taken steps to shift their practices toward more biodiversity-friendly approaches.

Certifications and standards are aimed at providing corporate buyers, consumers, and investors with additional information on the biodiversity impact of companies. The Roundtable on Sustainable Palm Oil certification, for example, has become a requirement for many large buyers, given increasing awareness in recent years of the deforestation associated with noncertified palm oil (Steinweg et al., 2019). Other certification bodies exist for specific commodities and sectors (e.g., the Forest Steward Council and Marine Stewardship Council) and for companies that meet certain standards (e.g., the Rain Forest Alliance and Wildlife Friendly Enterprise Network).[43] In the coffee sector, Nespresso seeks to source coffee from producers that meet the 'AAA Sustainable Quality' program standard developed by Rainforest Alliance. With support from IFC, Nespresso will help farmers scale up agroforestry planting of native shade trees. The approach promotes biodiversity conservation and environmentally sound restoration of degraded lands, and delivers financial benefits to farmers (IFC, 2016). Nature-reliant consumer-facing sectors, such as the fashion industry, are facing especially significant pressure to green their supply chains.

New industry standards and financial sector initiatives for the shipping sector are incentivizing 'greening' of the industry. Such initiatives include the treatment of ballast water, blackwater, greywater, and bilge water on ships; the reduction of noise pollution; and the treatment of solid waste at ports and terminals. Stricter emissions standards from the International Maritime Organization (IMO) and the framework for the financial sector to assess the Paris alignment of shipping portfolios (the Poseidon Principles) have been particularly instrumental in helping to drive these changes. IFC has also supported green shipping projects—for example by financing the Mediterranean Shipping Company, one of the largest shipping companies in the world, to retrofit 150 ships with filters to treat ballast water to reduce alien species invasion and negative ecological impacts, in line with international standards (IFC, 2017a).

Since biodiversity risk can underpin systemic, portfolio, and economy-wide risk, the adoption of sustainable practices can be incentivized by the financial sector. Where risks and opportunities related to productivity, reputation, and market share are not sufficient to incentivize significant shifts in corporate behavior—and where sufficient industry or regulatory standards are not in place—the financial sector can drive change. Financial institutions, including banks and institutional investors which operate at the portfolio rather than project level, make decisions driven by the risk profile and exposure of their client pools and by their own sustainable finance goals, reacting to government regulations and to customer demand for green finance products.

To incentivize changes in corporate behavior, lenders are starting to use financing tools which

43 Rainforest Alliance. Accessed on June 2, 2020. Available at: https://www.rainforest-alliance.org/ and Wildlife Friendly Enterprise Network.

Coral reef: © Vitas Edush/Shutterstock

link the cost of capital to the achievement of sustainability objectives. The use of Sustainability-Linked Loans (SLLs) has grown significantly since the first loan was issued in 2017. These loans, linked to the borrower's performance on ESG criteria, saw a 168 percent jump in volume to $122 billion in 2019 (Bloomberg, 2020). The proceeds of SLLs are fungible and are not directed to specific green projects, as are green loans and green bonds. The pricing of the loan is linked to key sustainability performance indicators, with the lender and the borrower working together to set a target. If this is met, the borrower benefits from a reduction in the interest rate on the loan. The incentives for the lenders go beyond reputation and corporate sustainability, as these loans are said to represent better credit risks and demonstrate better risk management and governance by the borrower, offsetting the lower rate (Box 12). In addition, most of these loans are structured as 'revolving credit facilities' provided by multiple banks, so no one financial institution bears the full cost. In some cases, donor institutions can provide the financial incentive when the borrower meets the environmental target—at what can be a relatively low cost for a high level of impact. In 2019, ING created the first capital call facility for a private equity group with an interest rate tied to sustainability targets, providing evidence that the trend is expanding beyond corporate lending (ING, 2019). These loans are governed by standards issued by the Loan Market Association in 2019 (LMA, 2020). The main limitation of this model is that it relies on underlying assets that can generate a reliable and regular cash flow necessary to service the loan. However, once this hurdle is cleared, this instrument can easily be scaled up and replicated to other sectors, such as eco-tourism and certified agricultural commodities. As a representative of BNP Paribas, a frequent SLL adviser and lender, has said, "this type of financing will likely become the new normal in the industry" (BNP Paribas, 2019).

BOX 12

Financing Mechanism 8: Sustainability-Linked Loans

In late 2019, Bunge, one of the world's largest agricultural producers, took out its first sustainability-linked revolving credit facility, following closely behind its competitors, Louis Dreyfus and Wilmar (Louis Dreyfus Company, 2019; DBS 2018). Through the sustainability-linked mechanism, the interest rate on Bunge's RCF is tied to the company meeting several key performance targets, deemed core to the company's business. Two of these targets have the potential to substantially reduce the company's biodiversity impact and associated risks: 1) increasing traceability for its main agricultural commodities and 2) supporting increasing levels of adoption of sustainable practices across its wider soybean and palm supply chain (Bunge, 2019). These types of financing mechanisms, categorized as 'sustainability-linked loans,' provide an example of the greening of the financial system. They have the potential to help drive the transition to the nature-smart economy by offering a short-term financial incentive for management to implement a company's sustainability strategy and provide a signal to investors that the company is taking steps to do so. On the lending side, these instruments are said to represent better credit risk and demonstrate improved risk management and governance by the borrower, offsetting the lower rate.

In early 2020, Finnish forest-based bioindustry company, UPM, became one of the first companies to link an RCF to a biodiversity target. The interest on the €750 million RCF is tied to UPM meeting its goal of having a net positive impact on biodiversity in the company's forests in Finland, and a separate carbon reduction target (BNP Paribas, 2020).

Biodiversity offsets

At the project level, the biodiversity risk mitigation hierarchy remains the key approach currently used to avoid or reduce project impact on biodiversity.[44] The hierarchy provides a framework for understanding and analyzing impacts on biodiversity, with the ultimate goal of minimizing unavoidable impact to biodiversity from development and business activities. The risk mitigation hierarchy has four steps:

- *Avoidance*—A project should be designed in a way that avoids impacts on biodiversity and ecosystem services. An option could entail relocating the project or using an alternative design.
- *Minimization*—If impacts cannot be avoided, they should be minimized by reducing the footprint of the project, putting in place best management practices for example, or using temporary roads and structures.
- *Restoration*—To the greatest extent possible, any impact should be reversed and the site restored to its original state as soon as possible. Any delay in the restoration will create a temporal loss of the functions of the habitat.
- *Offset*—Any impact that cannot be avoided, minimized, or reversed should be offset through the protection, restoration, or creation of a similar habitat in proximity to the impact site. Without this last step, it is unlikely that projects could claim no net loss of biodiversity, and a net gain even less so.

Each subsequent option in this hierarchy is less desirable than the previous one; priority needs to be given to 'avoidance', with each step adopted only if the previous one is not feasible. For example, it would be inappropriate to restore

44 For example, the mitigation hierarchy is a key component of IFC's Performance Standard 6.

and offset impacts to biodiversity when they could have been avoided altogether. Finally, scientists recognize that some biodiversity should not be impacted at all, because it is rare and significant, because it is critical for the survival and well-being of local communities, or it because restoration or mitigation is impossible.

Biodiversity offsetting involves investing in a separate biodiversity conservation project as a way of offsetting the significant and unavoidable residual impact of another project. Regulated biodiversity markets offer investors an opportunity to generate returns by taking on and managing the environmental liabilities of project developers. Regulated biodiversity markets exist when a project proponent is required by regulation, often as a condition of obtaining a permit, to provide mitigation for its impacts. The mitigation can be for direct impact on species or habitat, as is the case for biodiversity offsets.[45] However, other markets exist where nature and biodiversity are used as green infrastructure to generate offsets. For example, there are currently functional or pilot markets for the water quality improvements offered by vegetated riparian buffers, or for reductions in stream water temperature through the shading effect of riparian forests.[46]

Mitigation banking is a way to facilitate the scaling of these investments—generating financial returns through the sale of biodiversity offsets to developers. Specialist fund managers finance and aggregate projects with measurable biodiversity impacts and sell mitigation credits. Mitigation credit banks are growing, primarily in developed countries, with transactions in the year 2016 estimated at $3.6 billion (Bennett and Galland, 2017). Almost all growth in this market has occurred in the United States, Australia, Canada, and Germany, and the credits have mostly been used for wetlands. Mitigation banking has been introduced on a voluntary basis in Malaysia, and for compliance purposes in the Northern Mariana Islands, and is in the process of being piloted in Colombia (Salzman, et al., 2018).

A country's enabling environment is crucial to ensuring the success of a mitigation banking program. In developing countries, permittee-responsible mitigation is the most common approach to compliance. However, many countries, including Brazil, Cameroon, China, Colombia, Egypt, India, Mozambique, and South Africa, allow developers to pay a compensation fee rather than implementing an offset. According to a study on PES conducted by *Nature Sustainability*, "from an efficiency and ecological perspective, large mitigation banks can achieve economies of scale in design, maintenance, and monitoring, enabling them to protect larger contiguous areas that offer better ecological outcomes than smaller, isolated permittee-responsible mitigation projects." These programs require a strong legal framework, effective monitoring, and credible enforcement (Salzman et al., 2018). It is also crucial that the unit used to measure biodiversity credits adequately reflects the value of the services of an ecosystem. Box 13 provides further detail on mitigation banking.

Biodiversity offsets show great potential—but require careful design and effective institutional setups. International good practice calls for offset projects to not make local people worse off. This means in practice that there is no net gain—and little point—in undertaking an offset project which itself does harm. It is crucial that when biodiversity offsets are utilized, models integrate local poverty alleviation, equity, and cultural heritage factors (Griffiths et al., 2019). The core principles in the design of successful biodiversity offsets include *additionality*, in which conservation gains are above what would have been obtained without the offset; *equivalence*, which requires careful application of scientific principles; and *permanence*, which

45 For example, under the Endangered Species Act in the United States, companies are required to mitigate their unavoidable impacts to the habitat of endangered species, regardless of the potential absence of ecosystem services provided to communities. This regulation has created a thriving conservation banking market where one can purchase panther credits, red-legged-frog credits, or golden-cheeked warbler credits (U.S. Department of the Interior, 2003).

46 Willamette Partnership. Water Quality Training. Accessed on July 28, 2020. Available at: https://willamettepartnership.org/water-quality-trading/

means that conservation persists in perpetuity. Beyond these core principles, good practice that applies to biodiversity offset schemes includes, among others: using a "landscape approach" that takes into account relevant habitats and species; looking beyond the boundaries of a specific protected area; applying sound science as well as traditional knowledge; meticulous project supervision; building the capacity of institutions and stakeholders; addressing livelihood concerns; and robust stakeholder engagement, among others (World Bank, 2016).

BOX 13

Financing Mechanism 9: Biodiversity Mitigation Banking

Biodiversity mitigation banking can offer a more efficient and ecologically sound alternative to permittee-responsible mitigation. In advance of any impact, a biodiversity offset developer, called a mitigation banker, receives approval from public agencies to develop a mitigation bank on a specific piece of land. The mitigation banker will then protect the land in perpetuity through a conservation easement, implement environmental restoration activities, and provide an endowment that ensures the land will be managed in perpetuity by a nonprofit land trust. In exchange for these actions, the mitigation banker receives a number of environmental credits that can be sold to developers. The type of credit is determined by the type of habitat or ecosystem that is being protected. The area in which a credit can be sold and used to mitigate impacts is determined by the ecology. For example, a wetland credit can only be used to mitigate an impact in the same watershed as the one where the offset project is located. For endangered species, the area is defined by the range of the species, subspecies, or specific population.

If a project developer needs to offset the unavoidable impact of its project, it has the option of purchasing mitigation credits from a mitigation bank instead of implementing its own biodiversity offset project. If it purchases a credit, the developer does not have to manage an additional project, and can transfer the environmental liability to another entity. Developers are often willing to pay a premium for this convenience. Through this premium and the aggregation of credit purchasers, mitigation bankers can generate significant profits. Investors are needed to provide the up-front capital to obtain a mitigation bank permit, and to design and build a bank. This capital is often provided in the form of private equity, as the cash flows generated from mitigation banks are too irregular for debt, and the relatively small scale of investments (usually $3–5 million per project) does not allow them to raise capital in public markets (Bennett and Galland, 2017).

An example of a company working in this space is Ecosystems Investment Partners, an investment group specializing in mitigation banking and biodiversity offsets. The firm acquires, restores, and conserves priority properties (such as wetlands, stream, and habitat mitigation and restoration projects), and sells the credits generated to customers who must offset their unavoidable environmental impacts. The firm recently closed its fourth US compensatory mitigation fund. Because it is one of the only fund managers with a track record in the space, it was able to raise $455 million in less than 10 months (Monument Group, 2020).

Barriers to scaling up biodiversity finance

Despite growing innovation in nature-related financing, challenges to scaling up remain. These fall into three main categories: (i) public policy failures that fail to correct for the wedge between the social and private costs of stakeholders' decisions, which promote overuse or overharvest; (ii), the lack of data and measurement standards for measuring impact and biodiversity risk; and (iii) issues with small-scale or otherwise noncommercial biodiversity investment opportunities which make private sector financing challenging.

Policy failures

Policy and market failures mean that the private players in the real and financial sectors alone cannot fully absorb social costs and risks originating from the loss of biodiversity. Governments spend around $500 billion per year in economic support that is potentially harmful to biodiversity—five to six times more than the estimated global spending on biodiversity (OECD, 2020a). Under the status quo, economic incentives (fiscal, sector, trade, and financial policies) generally favor expansion of economic activity, and often environmental harm, over conservation, restoration, and the sustainable use of nature in support of economic activity (IPBES, 2019). The failure to account for the social and environmental externalities associated with biodiversity loss results in the underpricing of biodiversity risk and misinformed investment and policy decisions. In such cases, public policies to correct for externalities, public goods, and asymmetric information are needed.

In practical terms, this means reforming economic incentives in the form of subsidies, credits, or tax relief in key sectors driving biodiversity loss. Agriculture,[47] forestry, and fisheries are priority sectors, as they are collectively responsible for 60 percent of biodiversity loss, mostly from deforestation, unsustainable exploitation, and water extraction (TEEB, 2018), and a quarter of all GHG emissions. Energy is another priority sector. There is broad evidence that economic incentives in these sectors are not aligned with sustainability goals. For an overview of economic incentives intended to promote biodiversity conservation and sustainable use (such as biodiversity-relevant taxes, fees, and charges, and tradable permits) and the finance they generate or mobilize, see the OECD's report *Tracking Economic Instruments and Finance for Biodiversity* (OECD, 2020c). For example, in 2017, 76 predominantly OECD and G20 economies spent $340 billion in fossil fuel support (OECD, IEA, 2019). In the same year, the OECD countries provided $228 billion of support to farmers, of which $116 billion could be considered harmful to biodiversity (OECD, 2020b). Over half of global subsidies to fisheries, estimated at $35 billion per year, are for fuel support and result in overfishing (Sumaila et al., 2016). More examples are provided in Table 3.

Challenges with data, measurement, and standards

Measuring both the risks associated with failure to conserve biodiversity and the benefits of doing so remain challenging. Progress has been made in measuring and monitoring climate risk and benefits—but for structural reasons biodiversity measurements are more complex.

Lack of targets and data

One overarching challenge is that there is no single high-level policy goal for biodiversity conservation to work toward. At the highest level, there is no clear apex target for biodiversity,

47 Agriculture: Support for the agriculture sector tends to have negative environmental impacts (e.g., through deforestation, wetland conversion, etc.) if it: (i) pushes food prices below extraction cost by lowering the cost of finance and/or inputs to farmers without constraints; (ii) lowers the costs of inputs without constraints; (iii) supports output directly; or (iv) creates a gap between domestic and international commodity prices. Such policies promote unsustainable agricultural practices, and facilitate the expansion of agriculture through land-use change, leading to deforestation and the conversion of wetlands. This, in turn, reduces the provision of ecosystem services needed to sustain the sector in the long term. For example, in Brazil, the complexity and geographic distribution of the rural agricultural credit system is resulting in a mismatch of credit supply and demand across the country (Assunção and Souza, 2019).

Table 3. Examples of Distortive and Potentially Environmentally Harmful Support

Country	Policy	Year Active	Potential mechanism for impact
Brazil	Preferential interest rates on working capital loans	2018 - present	May support unsustainable practices on commercial farms
Indonesia	Subsidized fertilizer	2012 - present	Reduces the cost of fertilizer inputs, potentially leading to excess inputs, and supporting agriculture in marginal areas
India	Subsidized fertilizer	1970s - present	Various instruments have been used in India over the years to subsidize fertilizers, notably nitrogen-based fertilizers such as urea, effectively lowering their per-unit cost below market prices; this has encouraged their overuse (both in absolute terms and relative to other available fertilizers), causing damaging effects on soil quality, an increase ground water pollution and negative health impacts on communities
Mexico	Subsidized electricity for pumping water	2001 - present	Could support unsustainable water extraction and use, leading to ecosystem impacts and increased demand for electricity

Sources: OECD, 2020b, World Bank Group, 2018b, Ministry of Agriculture and Farmers Welfare of India, 2016.

similar to the 1.5°C temperature increase ceiling established by the Paris Agreement. Developing such targets is difficult, as biodiversity loss is multidimensional, encompassing the loss of genetic diversity, species, and ecosystems. Inter-species interactions and interactions between species and ecosystems are complex. As a result, developing a single goal or measure of success, in terms of resource mobilization, is difficult, and most governments have not articulated a clear target to the private sector. Some countries or blocs of countries are taking steps to develop detailed targets and strategies with estimated costs attached, such as the EU Biodiversity Strategy, released in May 2020. Integrating biodiversity risk is a much more complex problem from a financial stability perspective than climate change risk—because, among other reasons, it is highly dependent on local factors, despite having global implications (Chenet, 2019). However, a recent report published by the Dutch Central Bank calls for the development of a biodiversity risk disclosure framework, which would provide supervisors with data to allow them to begin to integrate biodiversity factors into risk monitoring frameworks (van Toor et al., 2020).

Data on biodiversity and ecosystem services is still lacking at a national level—but technology can be used to fill in crucial gaps. From the perspective of real sector firms looking to assess and limit their environmental footprint, there is a dearth of data on basic species occurrence in developing and emerging countries. Data simply may not exist, making it challenging for companies to conduct environmental and social (E&S) impact assessments. From a broader perspective, there is still uncertainty about how much pressure biodiversity and ecosystems can withstand before they reach critical thresholds, beyond which large-scale, irreversible degradation of nature can unravel and interact with climate change in unpredictable ways. New technology and continued scientific research has the potential to fill in the gaps—for example, the terrestrial biodiversity database developed by the World Bank, using remote sensing data, can support implementation of environmental standards for infrastructure projects and investment

in environmentally sensitive infrastructure in a cost-effective and environmentally sound manner.[48] Crucially, better data, scenarios, and forward-looking risk analysis tools also need to be developed to better understand and assess the systemic risks associated with nature loss.

Lack of standardized investment taxonomy and definitions

In addition to national level challenges, data on the relationship between companies and biodiversity are lacking and are complex to measure. Although companies have historically incorporated some biodiversity criteria into their business models,[49] many obstacles remain that prevent companies from incorporating biodiversity risk into their business planning. These include the following barriers:

- The links between biodiversity and business, through operations and supply chains, are extremely complex and often not well understood by companies themselves.
- Biodiversity risk can be endogenous to the company—as in the case of BP and the Deepwater Horizon Oil Spill—or exogenous, and therefore a lot more difficult to assess and manage—as in the case of a coastal hotel at risk of increased hurricane damage and reductions in tourism due to the disappearance of the local coral reef. The relationship between the impact of biodiversity on business, and in turn the impact of business on biodiversity, can be difficult to unpick.

The complexity of gathering data on corporations and biodiversity risk is exacerbated by a lack of a standardized investment taxonomy and definitions. The field of conservation investment is just starting conversations that have been taking place for years in the green or climate finance field. It is not clear what the qualifications for conservation investments should be. Financial institutions need a clear investment taxonomy of potential conservation investments in order to be able to report back to regulators and investors. IFC has developed such a taxonomy and will start testing it in 2021.

Lack of standardized risk reporting and accounting frameworks

The financial and economic implications of biodiversity risk are generally poorly understood by the real and financial sectors, policy makers, supervisors, and regulators. This is partly because there is limited requirement for reflecting biodiversity as a financially material risk in mandatory disclosures. The consolidated financial statements of listed companies following the IFRS or GAAP standards allow corporations to define material risks from the perspective of shareholders and investors. A 2012 study of the materiality of natural capital found that, "in general, the focus on financial measurement for determining materiality acts as a barrier to the identification of biodiversity and ecosystem services issues as material" (Bonner et al., 2012). Even when mandated to report on non-financial elements, such as by the EU Non-Financial Reporting Directive,[50] standardized disclosures are lacking, as companies can decide how and under which framework to disclose.[51] The Global Impact Investing Network (GIIN)'s IRIS+ System is one of the few examples of financial reporting frameworks that include biodiversity criteria. Launched in May 2019, the framework is designed for use by impact investors, and currently has about 11,000 users (Suttor-Sorel, 2019).

While climate-related financial risks are beginning to be better understood, largely due to standardized risk reporting frameworks, biodiversity-related financial risks do not yet have such a framework.

48 The database is accessible at: https://datacatalog.worldbank.org/dataset/terrestrial-biodiversity-indicators. A brief description of the database is accessible at this blog: https://blogs.worldbank.org/opendata/overlapping-priorities-data-mapping-biodiversity-and-development-activities?CID=WBW_AL_BlogNotification_EN_EXT

49 Such as quotas for fisheries, grazing, and timber harvesting permits.

50 This requires the largest companies to disclose certain "non-financial information on the way they operate and manage social and environmental challenges."

51 https://www.finance-watch.org/wp-content/uploads/2019/05/Making-Finance-Serve-Nature_Finance-Watch-Report_23May2019_web.pdf

A standardized financial risk reporting framework (like the framework discussed in Box 14) could drive evolution in corporate decision making and cross-sectional analysis within peer groups and sectors. Without such a standardized framework, the use of risk information in applications such as credit risk assessments or insurance pricing is limited. The financial sector requires a framework that allows for the estimation of expected changes over the medium term, as well as amplification between climate change and biodiversity loss. Box 14 provides a proposed financial reporting framework for biodiversity risks.

Analysis by the CBD Secretariat found that, "biodiversity is not often explicitly addressed and reported on in sustainability reports, and, even when it is, there appeared to be a lack of coherence and consistency across reports" (CBD, 2020). Table 5 lists nonfinancial reporting frameworks identified by CBD that include some biodiversity considerations (Convention on Biological Diversity, 2018). Reporting in line with these frameworks is voluntary. Of those listed, CDP's[52] framework has the most granular biodiversity disclosure requirements, for companies reporting under its forests program. However, the framework is not yet widely applied. In 2019, CDP, on behalf of its investors, requested that over 1,400 companies report on five forest-risk commodities—timber, palm oil, cattle, rubber, and soy, and approximately 20 percent (300 companies) complied. Through CDP's supply chain initiative, it also requested disclosure from companies in the supply chains of high forest risk companies, on behalf of the purchasing company. This set of companies responded at a higher rate, with approximately 60 percent disclosing (399 suppliers), demonstrating the relative influence purchasers have over suppliers. However, a CDP representative noted the continued challenges around traceability (CDP, 2020). And since most of these frameworks rely on measuring and disclosing use of resources and impact on biodiversity and ecosystem services in the previous year, they are backward looking. Additionally, use and impact are not assessed within the context of local ecosystem limits and planetary boundaries, hindering the ability of management and investors to assess and manage corporate sustainability.[53]

Corporate natural capital accounting efforts are expanding, but these efforts are still nascent and mostly voluntary. A 2019 journal article in the *Oxford Review of Economic Policy* outlines a need for natural capital accounting and reporting systems to serve two distinct purposes (Barker, 2019). Firstly, according to this analysis, natural capital accounting should provide information to meet the needs of shareholders in order to support a transition toward environmentally sustainable business models. Secondly, natural capital accounting should contribute to the conservation of natural capital as an end in itself. As noted in this article, "extant corporate accounting and reporting practices favor one of these purposes at the expense of the other, a problem that is unlikely to resolve itself and that most likely requires a regulatory intervention" (Barker, 2019). While the needs of shareholders are increasingly being addressed, a shareholder-oriented perspective constrains the value of natural capital to only that which privately affects shareholders. In addition to this challenge, there is a lack of standardization in corporate natural capital accounting. The UK Natural Capital Committee developed the Corporate Natural Capital Accounting (CNCA) framework in 2014, designed to address this issue by ensuring comparability and consistency. Other frameworks for corporate natural capital accounting include the Natural Capital Protocol, 'CARE-tdl', and the BSI Natural Accounting Standard (Suttor-Sorel, 2019).

However, both sustainability reporting and natural accounting, absent the context of ecosystem thresholds and levels, leave companies and investors without the information they need to effectively manage corporate sustainability. In response, the use of 'context-based' or 'integrated' reporting and accounting frameworks is becoming more widespread (UNRISD, 2020). Under such a framework, a company using water,

52 Formerly the Carbon Disclosure Project.
53 Formerly the Global Reporting Initiative.

BOX 14

Reporting Lessons from Climate Change

The Task Force on Climate-related Financial Disclosure (TCFD) framework can serve as a foundation for building a framework for biodiversity risk (TCFD, 2017). TCFD terminology can be used to classify biodiversity risk, derived from the dependencies and impacts on nature of real and financial sector companies, communities, and governments. The proposed framework below is built on frameworks developed by PwC, WWF, and BaFin, and separates biodiversity risks into three types: physical, transition, and systemic (WWF and PwC, 2020).

- **Physical risk**—risks related to the physical impacts of biodiversity loss. These risks originate in the dependencies, impacts, and exposure of real sector companies, communities, and governments on nature.
- **Transition risk**—risks related to the transition to the nature-smart economy. These risks emanate from where a company falls (sector, geography, jurisdiction) in the transition, the effects of new regulation and evolving expectations from the public, and how the company assesses and manages its physical risks.
- **Systemic risk**—risks related to impacts from extreme physical or transition risk. These risks stem from biodiversity serving as the foundation for an economy and the interdependent nature of loss, transition, and economic activity that results.

Risks are then mapped to five channels: operations, market, credit, insurance, and regulatory/legal risk (Table 4).

Table 4. Biodiversity Risk Transmission Channels

Categories of Biodiversity Risk	Channels: Operations	Market	Credit	Insurance	Regulatory/ legal
Physical risk	• Changes in quantity or quality of key inputs • Need to replace free natural systems with engineered solutions	• Supply chain disruptions may lead to loss in market share	• Mispricing of capital leads to suboptimal expenditure • Credit rating does not reflect real risk of default	• Companies lack sufficient coverage for risks • Insurance companies incur losses from mispricing risk	• Lawsuits from communities harmed by projects • Fines from regulators • Loss of license to operate
Transition risk	• Business model becomes obsolete from biodiversity change or regulatory change • Supply chains require redesign • Assets become stranded	• Loss of market share to more biodiversity friendly competitors • Consumers boycott company or products	• Increase in cost of capital due to increased biodiversity risk • Loss on bond portfolio once markets price-in biodiversity risk	• Increase in insurance costs due to risk • Companies may become uninsurable • Changing size of segments in the insurance market	• Loss of license to operate • Regulators force transition on an entire sector • Increase in risk of lawsuits for companies that fail to transition
Systemic risk	• Supply chain failures create risk for entire regions or sectors	• Consumers boycott products from an entire region or sector	• Downgrade of sovereign debt	• A sector becomes uninsurable • Correlated losses threaten insurance companies	• Increase in regulations at the international level

Source: Authors.

Table 5. Reporting Tools That Include Biodiversity Considerations

Organization	Description
CDP	CDP focuses on the disclosure of information on greenhouse gas emissions, along with water and forests. Backed by over 800 institutional investors, CDP gathers information through annual questionnaires sent on behalf of these investors.
Climate Disclosure Standards Board (CDSB)	CDSP is an organization of businesses and environmental organizations committed to advancing and aligning corporate reporting to equate natural capital with financial capital. CDSP's 'Framework for reporting environmental and climate change information' is complementary to the Natural Capital Protocol, and compliant with the EU Non-Financial Reporting Directive.
GRI[a]	GRI is an international independent standard-setting organization that helps businesses, governments, and other organizations understand and communicate their impacts in areas such as climate change, human rights, and corruption. GRI produces standards used by thousands of real and public sector reporters in over 100 countries. Of the largest 250 corporations in the world, 93 percent report on their sustainability performance, and 75 percent of these use GRI guidelines to do so (KPMG, 2017). The GRI standards include four 'disclosures' on biodiversity and the management approach to biodiversity using GRI 103: Management Approach, as well as other indicators relevant to biodiversity.
The International Integrated Reporting Council (IIRC)	IIRC has created an Integrated Reporting Framework that includes biodiversity and ecosystem health. As a general framework to integrate thinking and decision making, it does not include specific indictors or metrics.
Sustainability Accounting Standards Board (SASB)	SASB provides sustainability accounting standards based on sustainability topics and related accounting metrics at the industry level that are likely to constitute material information to companies in that industry. The extractives sector is the only sector for which the SASB framework classifies biodiversity as a material issue for more than 50% of companies in the sector.

Source: Authors.
a. Formerly the Global Reporting Initiative.

for example, would gauge the sustainable amount of water it can use in the watersheds in which it operates, taking into consideration local social and environmental criteria. One such tool, which allows companies to calculate performance relative to social and environmental criteria, is the Future-Fit Business Benchmark. The Future-Fit framework asks companies to report their progress toward 23 science-based 'break-even goals', the achievement of which Future-Fit deems as necessary to prevent a company's operations from slowing down the transition to the sustainable economy (aligned with the SDGs). The tool can also be used to map a path toward positive impact, beyond the break-even goals, and to quantify progress. One of the break-even goals in the Future-Fit framework is "natural resources are managed with respect to the welfare of ecosystems, people, and animals" (Future-Fit, 2020). Assessing the sustainability performance of a company requires the recognition of social and environmental thresholds and limits.

While there are robust international performance standards that address biodiversity project risk, many companies do not apply them. The IFC Performance Standards (see Box 15) and the Equator Principles are the most widely recognized as robust standards for assessing projects' environmental impacts. IFC Performance Standard 6 on biodiversity requires no net loss of biodiversity where feasible in natural habitats, and net gain in critical habitats. To reduce global biodiversity and ecosystem loss, these standards need to be adopted and applied by a greater number

BOX 15

The IFC Performance Standards

IFC's Performance Standard 6 is focused on 'Biodiversity Conservation and Sustainable Management of Living Natural Resources.' Under this standard, the recipient of IFC financing should consider, assess, avoid, and minimize negative impacts on biodiversity and ecosystem services.

Requirements differ depending on whether the project is located in a modified, natural, or critical habitat. Performance Standard 6 requires recipients to achieve no net loss of biodiversity where feasible in natural habitats and net gain in critical habitats. The standard places emphasis on engagements with relevant experts and conservation organizations in defining both the assessment and mitigation measures for biodiversity. IFC Performance Standards, including PS6, are the basis on which the Equator Principles are built, followed by the leading banks in the world. For this reason, they are the international biodiversity benchmark for private sector financing. The Convention of Biological Diversity, COP-11 Decision XI-7 on Engagement with Business, also references IFC's Performance Standards as well as the Global Climate Fund (financial mechanism under the UNFCCC).

of financial institutions and companies across markets. At the national level, many countries have environmental regulations in place that require developers to assess and limit the impact of their projects. In some emerging markets and developing countries, however, these regulations lack clear standards and enforcement mechanisms. Other initiatives to develop standards for project impact and offsets include the work of The International Association for Impact Assessment,[54] which is developing methodologies to assess the social and environmental impacts of projects globally, and The Business and Biodiversity Offset Program, which developed a standard for biodiversity offsets that is being used internationally by several companies (BBOP, 2012). An increasing number of countries, such as Colombia and South Africa, have also adopted a national standard for biodiversity offsets.

In addition to standards, several tools have been developed to assess the impact of business operations on biodiversity. For example, the Caisse des Depots et Consignations (CDC) has developed the Global Biodiversity Score, a tool that can be used by companies and financial institutions to measure their impact on biodiversity throughout their supply chains or portfolios (CDC Biodiversité and ASN Bank, 2018). Other tools such as the Product Biodiversity Footprint, bioscope, the Biodiversity Footprint methodology, and the Biodiversity Impact Metric, can be used by companies to assess the impacts of their supply chain or of specific products. Several ESG data providers also offer environmental risk data and indices to users, supplying them with information on biodiversity risk in the areas surrounding a project.

Some companies are starting to use these tools to incorporate biodiversity into their decision making processes. The Integrated Biodiversity Assessment Tool (IBAT) for Business, a multi-institutional tool developed by IUCN, allows companies to estimate risks that construction or operations under consideration may pose to critical habitats, and the opportunities for biodiversity conservation near production sites, through desk analyses.[55] Some companies have also started to develop and implement Integrated Biodiversity Management Systems to manage risks to biodiversity at the overall corporate level, instead of at the project level.

54 International Association for Impact Assessment. 2020. Accessed May 18, 2020. Available from: https://www.iaia.org/
55 Integrated Biodiversity Assessment Tool. 2020. Accessed May 18, 2020. Available from: https://ibat-alliance.org/

Tools are being developed to assess the relationship between investment portfolios and biodiversity. For example, the Natural Capital Finance Alliance developed Exploring Natural Capital Opportunities, Risks, and Exposure (ENCORE), a tool that allows financial institutions to assess both the impact of an investment portfolio on biodiversity, and its dependencies on biodiversity (NCFA, 2020). Additional examples of industry initiatives to measure biodiversity impact are in Box 16.

A consequence of the lack of standardization in accounting, reporting, and impact measurement is that the measurement and tracking of private finance for biodiversity is limited. There are currently no comprehensive private sector biodiversity financing studies at country levels. BIOFIN, an international initiative supporting 36 countries around the world in developing biodiversity financing plans, estimated in 2019 that, of its member countries that completed their biodiversity expenditure review, only 8 (including Costa Rica, the Philippines, and South Africa) reported on private sector expenditure (World Bank, 2020c). BIOFIN notes that this information is partial, and there are methodological and practical challenges to tracking expenditure, notably the lack of clarity on what constitutes 'private sector expenditure' and 'biodiversity expenditure.' The absence of baselines for the monitoring and evaluation of biodiversity outcomes also pose a challenge (World Bank, 2020c).

BOX 16

Industry Initiatives to Measure Biodiversity Impact

France's Article 173 of the Energy Transition Law motivated four French asset managers to launch a call for expressions of interest in January 2020 for a partner to develop and implement an innovative tool to measure both the impact and dependency of investments on biodiversity. The asset managers—AXA Investment Managers, BNP Paribas Asset Management, Sycamore Asset Management, and Mirova—have specified that the methodology will ideally apply a life cycle approach, assessing company supply chains from product use to end-of-life. Additionally, the methodology would be compatible with investment taxonomies and internal environmental assessment systems already in use. The data provided should simplify portfolio performance assessment in relation to an index. The approach must be applicable to companies active in the main market indices, and ideally also compatible with other asset classes such as unlisted equities, infrastructure, and real estate. In a statement, the asset managers said, "We hope the tool we develop will be used by all market players, and that it will become a benchmark tool" (Mirova, 2020).

In March 2020, ASN Bank, along with a group of five other Dutch financial institutions, launched the Partnership for Biodiversity Accounting Financials (PBAF), which aims to develop a common accounting measure for the positive biodiversity impacts of investments. In 2016, ASN committed to having a net positive biodiversity impact by 2030 and has measured its biodiversity footprint every year since. ASN uses the ReCipe methodology developed by the Dutch National Institute of Public Health and Environment. The methodology generates a parameter that shows the fraction of species lost in a certain area during a certain time—the potentially disappeared fraction of species (PDF). This unit is then translated into hectares (Avery, 2019a). So far, ASN Bank says that every company it has assessed has a "net negative impact on biodiversity." The initiative will help to answer questions on how financial institutions can compensate for the negative impacts of their investments. ASN has said, "We need to invest in nature-based compensation." The initiative will help to define how positive impact is measured and what the reference point is (Verney, 2020).

Sea otter (Enhydra lutris), Monterey Bay, California: © Enrique Aguirre/Shutterstock

In summary, though awareness of biodiversity risk is growing in the financial sector, a lot more needs to be done, and lessons can be learned from the industry's response to climate change. The Equator Principles show that the financial sector can play a leading role in driving the real sector to better manage biodiversity risk. As outlined above, the data, standards, and tools to catalyze this are beginning to be developed. However, further work is needed. The WEF Global Risks report (World Economic Forum, 2020b) notes that biodiversity is currently mentioned in less than half of Fortune 500 company reports, of which only a handful set measurable and time-bound targets. Dependency on biodiversity is still absent from the risk assessments of most companies. While most developed countries have well-established regulations requiring environmental impact assessment, this is not the case in many developing countries. The development of a standardized methodology for assessing company impact on biodiversity would provide clarity and direction to both governments and companies. Data quality and availability will continue to pose challenges, but the risk of irreversible change and lasting impacts on the economy call for a proactive approach. As Roel Nozeman from ASN Bank has stated, "We can't wait for perfect data, there is a crisis going on (Verney, 2020)."

Challenging characteristics of biodiversity projects

A key challenge with biodiversity projects, even more than other environmental and social projects, is their small scale and localized nature. Most biodiversity challenges are location-specific and solutions need to be tailored to individual conditions. This creates difficulties in both identifying a problem that could be solved by the private sector, and then replicating a solution across a large enough market. Biodiversity projects will need to be aggregated in many cases.[56] As with the infrastructure sector, the challenge is not so much a lack of capital as the lack of a pipeline of biodiversity investment opportunities.

56 To provide one example, the *Climate Policy Initiative* analyzed Brazil's rural credit system, which parcels out funding to agribusinesses big and small, and found that loans to smaller farmers lead to more efficient land use and reduced deforestation—a major contributor to climate change. Every 1.00 percent increase in credit offered by the National Program for Family Farming at the municipal level results in a 0.03 percent increase in forest area, as the proceeds go to fund more intense land use rather than toward felling trees to expand the arable area. In contrast, rural credit extended to large agribusinesses leads to an expansion of pastures and cropland, increasing deforestation (Assunção and Souza, 2020).

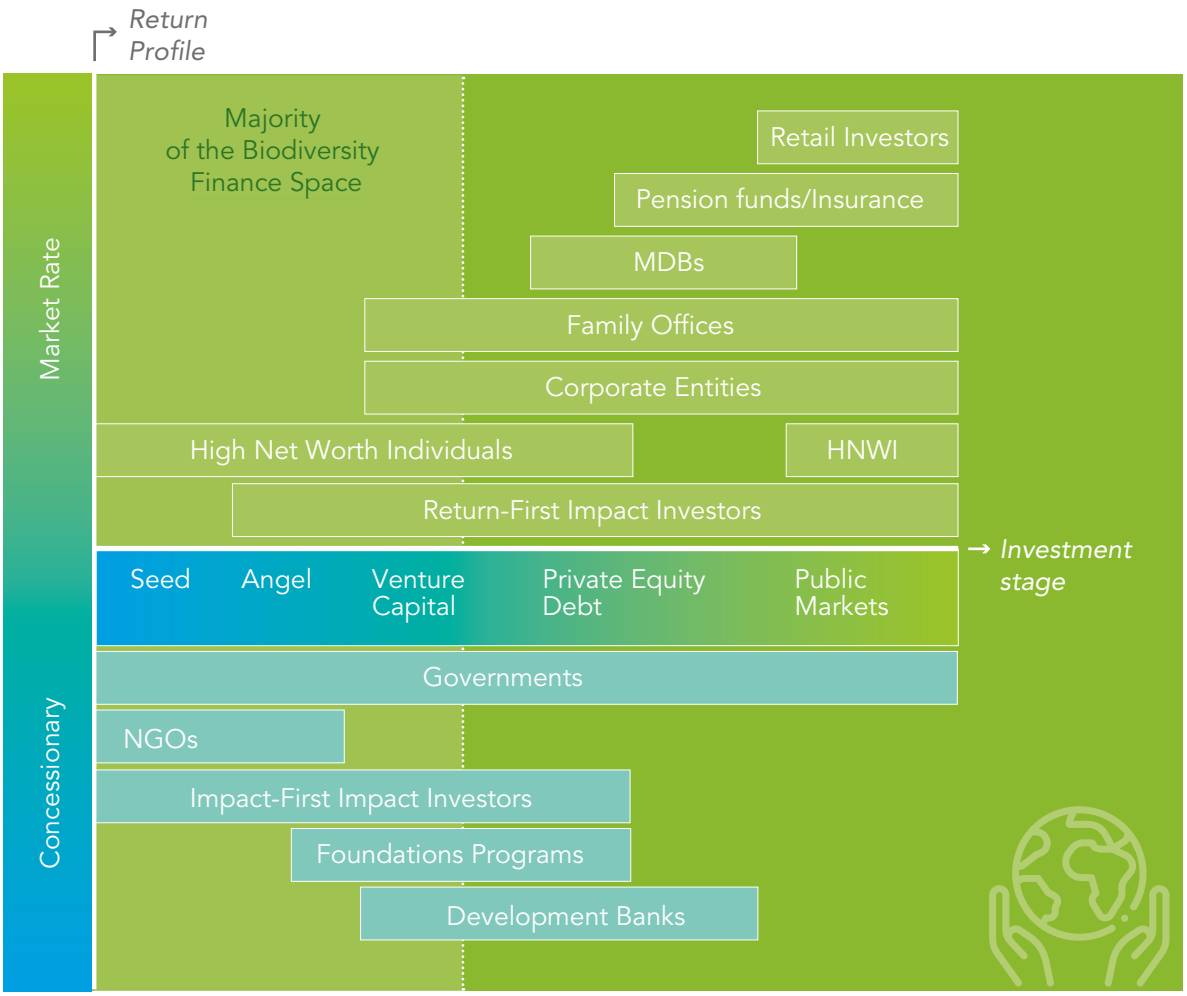
Coffee bushes in a shade-grown organic coffee plantation on the western slopes of the Andes in Ecuador: © Morley Read/Shutterstock

Biodiversity projects rarely have an easily monetizable cashflow, making it difficult for them to attract private sector financing. Biodiversity and many of the ecosystem services it supports are public goods whose true value is not reflected in economic transactions. Though there is growing interest in—and capital available for—biodiversity financing, finding projects with the characteristics that match investors' profiles is proving difficult, as many do not generate revenue or a cashflow. Allowing for investments in ecosystem services requires the valuation and monetization of the benefits provided by nature. It also requires appropriate mechanisms to capture the resource's rent, apply a price or payment scheme, and distribute these financial benefits to various stakeholders. Experts in this field are working actively to address these challenges.

Even where projects do generate a cashflow, the financial returns are often low and below market return hurdles. In many cases, nature-based or nature-friendly projects do not have a competitive risk-return profile, and remain small-scale, niche initiatives. 'Blended finance' is needed, mixing concessional and commercial returns. However, creating an efficient blended structure and allocating risk and return to various investors is more complex for biodiversity than it has been for the renewable energy sector, for example. In the renewables sector, the key challenge is to support the development and deployment of new technologies and lower costs to a level where these new business models can compete with fossil fuel-based businesses. In the case of biodiversity and ecosystem services, due to the risky and untested character of the investment, new sources of concessional finance and different approaches to 'blending' are needed. Traditional sources of finance, such as governments and development banks, are important actors in the development of biodiversity-focused ventures.

Innovative ecosystem and biodiversity projects are still mostly in their early stages, making it

Figure 10. The Biodiversity Investors' Universe

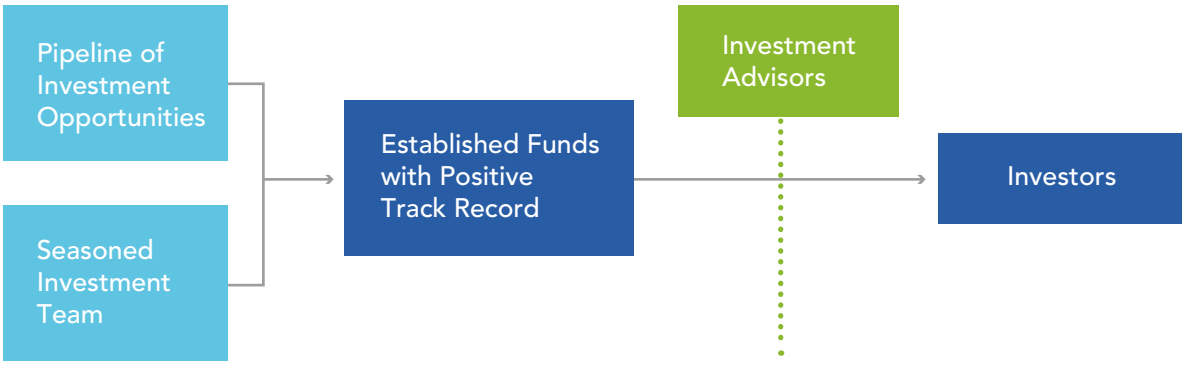


difficult for them to attract a broader range of investors and to scale up. While most opportunities are still early-stage investments, most investors are looking for larger, more mature opportunities, and for investment funds with established track records (KKR, 2016). As illustrated in Figure 10, the majority of investors participate in large and well-established funds with a positive track record. The key component of established funds is a seasoned investment team with deep industry expertise and the ability to execute investment from a reliable pipeline of investment opportunities. However, most investment managers in the biodiversity space are raising their first fund. Because it is a nascent field, most of the business models remain unproven. For example, the fund manager Althelia was able to overcome this challenge through seed funding from donors for their Climate Fund—securing a first loss guarantee from the USAID Development Credit Authority to allow it to lend up to $133.8 million to forest conservation and sustainable land use projects (USAID, 2014). A key innovation of the fund has been its use of carbon credits as both a source of return to investors and as a collateral for the loans, allowing it to make investments in projects that would be too risky for regular investors.

Financial professionals are too often unfamiliar with biodiversity finance. Investment teams at pension funds and other large asset owners do not have

enough knowledge of biodiversity to be able to create risk pricing models and capital allocation strategies that take biodiversity factors into account. Financial advisors and wealth managers, the gate keepers to most investors—including high-net worth individuals and retail advisors - are also unfamiliar with this space (see Figure 11 below). Development organizations are often ill-equipped to provide the technical assistance and the small-sized grants and loan needed in this space. For this reason, they often rely on nongovernmental organizations to channel their capital. Although largely ignored by the current efforts to develop conservation investments, it will be critical to build a critical mass of expertise and data in order to unlock the doors for most investors.

Figure 11. Investment Advisors' Role in the Investment Process



Source: Authors.

Red ants: © khlongwangchao/Shutterstock

Chapter 4
The Way Forward

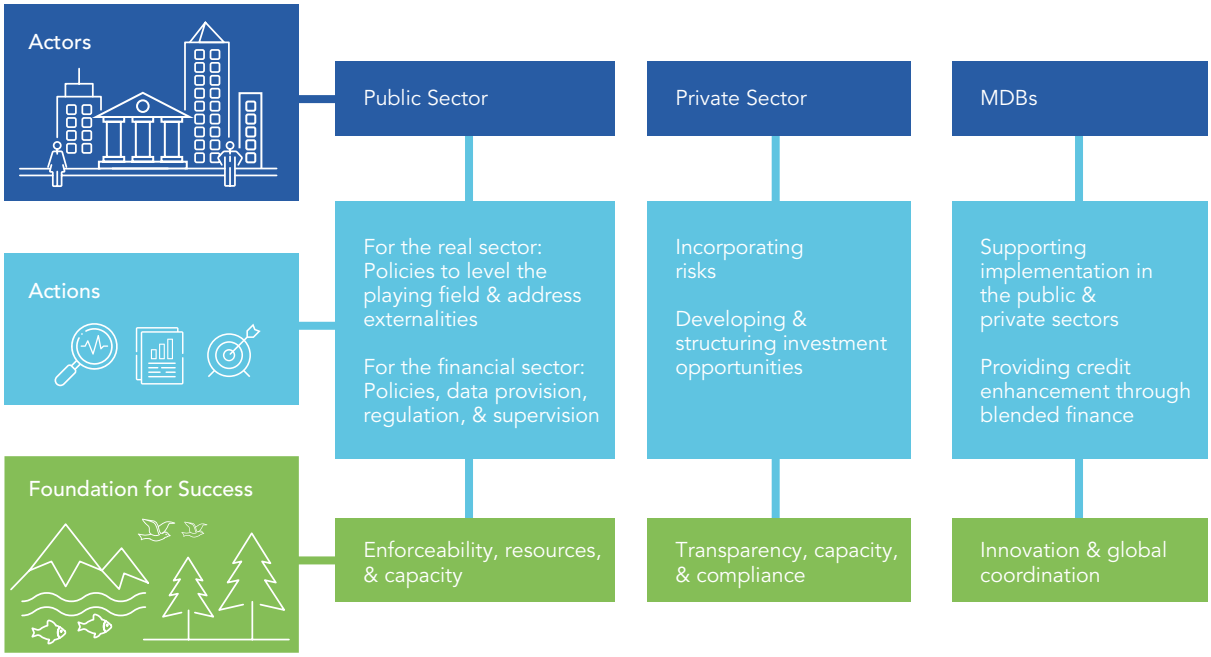
Mobilizing resources at scale for biodiversity is a complex problem, and a composite web of solutions involving different players will be required to move forward. These solutions are broadly centered around the public sector's role in creating a supportive enabling environment with the right incentives, standards and, regulations; providing data and information; and integrating a systemic risk lens in the planning and decision-making processes. On the private sector side, the key will be for financial institutions to support the incorporation of biodiversity risk into investment decisions via risk measurement and reporting. This will encourage businesses to operate in a more sustainable manner and prevent biodiversity loss; this is known as *greening finance*. In addition, more innovation in developing projects with sufficient cashflow and returns, and financial instruments with the right risk return profile is needed; this is known as *financing green*. Multilateral development banks such as the World Bank Group can play an important role in bringing these sectors together—including through de-risking and scaling projects.

The role of public policy and financial regulation

To address the double materiality of nature loss and degradation, government response needs to cover both the real and financial sectors. Governments play a key role in addressing the market failures and lack of enabling environment that are impeding greater private sector participation in biodiversity finance. Their action is instrumental in ensuring that the policy space—which includes both economic and financial sector policy—is consistent with environmental sustainability goals, and that private biodiversity finance develops into a more mature, *efficient, and mainstream market* that can support the transition to a nature-smart economy.

While governments globally are focused on immediate responses to controlling the COVID-19 pandemic and increasing the level of economic activity, recovery packages being designed can incorporate short-term biodiversity opportunities

Figure 12. The Way Forward

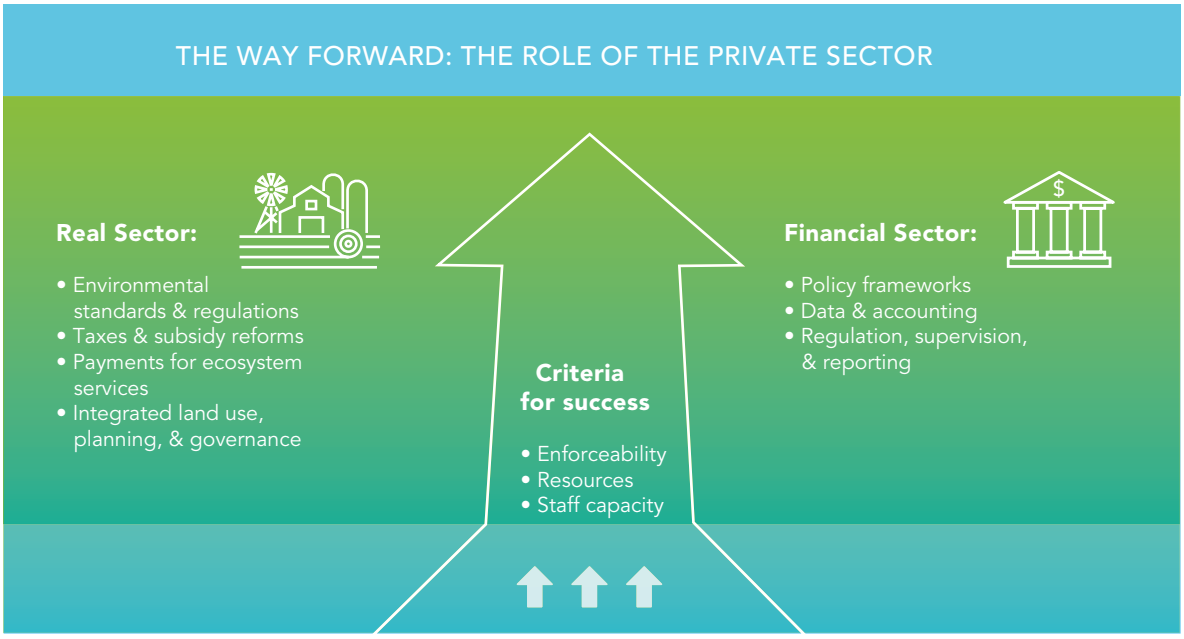


Source: Authors.

and contribute to the avoidance of future risks. Environmental policies and programs focused on biodiversity can play a crucial role in contributing to a stable and resilient recovery and addressing the biodiversity risk that may have contributed to the pandemic. Investment in avoiding long-term risk does not require a trade off with short-term needs. For example, restoring degraded forests or other landscapes can create jobs in the short term while also generating net benefits worth hundreds of billions of dollars from watershed protection, climate change resilience, better crop yields, and forest products (Hallegatte and Hammer, 2020) (New Climate Economy, 2014). Productive safety net programs can achieve significant scale – past examples include the Mahatma Gandhi National Rural Employment Guarantee in India, which covered 80 million people (Subbarao, 2013) and the National Program for Community Empowerment Program in Indonesia with 10 million participants (Hallegatte, 2020). Pakistan has implemented the largest program during the current downturn. Through its 10 Billion Tree Tsunami Program has created more than 63,600 jobs to contribute to the country's reforestation efforts. Many of the new jobs are being created in rural areas, with a focus on hiring women and youth (Khan, 2020).

Governments should mainstream biodiversity aspects at strategic levels in sector-wide planning. In the infrastructure sector, for example, impacts on biodiversity are cumulative. In the renewables sector, projects are often clustered in the same watershed or airshed. Incorporating biodiversity sensitivity screening, equivalent to and alongside technical and commercial factors in early sectoral planning, will enable the consideration of biodiversity factors in a more meaningful and sustainable manner. For example, the IFC's Scaling Solar and Scaling Wind initiatives take into consideration the biodiversity aspects upstream of competitive tenders to independent power producers (IPPs). With the knowledge gained in early planning, biodiversity management and mitigation could be priced into the tariff structure and built into power purchase agreements, rather than being considered only at the often 'too late' stage of the environmental and social impact

Figure 13. The Way Forward: Policy and Regulation



Source: Authors.

assessment (ESIA). Another example is in Jordan, where IFC supported the government's effort in developing a more sustainable wind sector. Wind energy experienced considerable stakeholder pushback from conservation organizations concerned about the impacts on biodiversity. IFC led a multi-stakeholder effort to establish a regulatory framework to assess, monitor, and manage potential cumulative impacts of the wind sector on iconic bird species, and the framework has since been successfully implemented in wind energy projects country wide (IFC, 2017b).

Debt-for-nature swaps are one instrument which could help countries fund economic and conservation goals. They can be used to blend finance in order to mobilize domestic real sector investment in conservation and sustainable industry (example in Box 17). The current economic shock comes after an unprecedented surge in borrowing, both public and, particularly, private, with total debt stocks reaching $229 trillion at the end of 2018, over two-and-a-half times global GDP, and up from $152 trillion at the onset of the 2007–2008 global financial crisis (UNCTAD, 2020). As a result, many developing countries are seeking debt relief. While countries in dire need of relief may find it difficult to meet conditions for refinancing their debt, there is potential for debt-for-nature swaps to be an effective tool for the achievement of economic and conservation goals, as part of a broader debt relief package (see Box 17). Additionally, as the COVID-19 crisis creates financial stress for agricultural commodities producers, some governments and conservation organizations may see an opportunity to purchase land from distressed producers for conservation purposes or to be leased to smallholders, who would be required to incorporate sustainable practices into their operations.

The recommendations for governments, financial regulators, and supervisors can be organized into two key areas of intervention: (i) policies and regulations to level the playing field in the real sector; and (ii) policies, data provision, regulation, and supervision to drive integration of biodiversity criteria into financial decision making and market development. These two sets of policies work together to help a country move toward a nature-smart economy.

BOX 17

Financing Mechanism 11: Seychelles Debt for Nature Swap

As part of a $21.6 million debt swap brokered by the Nature Conservancy (TNC) and others in 2016, the Seychelles agreed to designate 30.0 percent of its exclusive economic zone as a Marine Protected Area (MPA). This is up from 0.04 percent protected before the deal. More than two-thirds of the Seychelles economy is dependent on tourism and fishing, with the fishing industry valued at $300 million annually. According to TNC, this was the first debt conversion to focus on marine conservation, and also the first with a policy commitment. The debt was purchased from European Paris Club creditors via a $15.2 million loan from TNC and $5 million of grants from several foundations (TNC, 2020).

The debt was restructured to extend the average maturity on the notes from eight to 13 years, with approximately a quarter to be paid in local currency, and was purchased at a $1.4 million discount (Cornish, 2018). The debt is now held by The Seychelles Conservation and Climate Adaptation Trust (SeyCCAT), an independent private trust which disperses blue grants funded by the debt conversion.[i] TNC will be repaid in full, but part of the interest payments the government makes to SeyCCAT will be used to fund conservation and climate adaptation work. Additional interest payments will be placed in a long-term investment trust fund to continue paying for conservation work once the loan is paid off (Strand, 2016). From this deal, SeyCCAT will fund $5.6 million of marine conservation and climate adaptation activities, and award $3 million to an endowment that can fund similar activities in perpetuity, over a 20-year period (World Ocean Initiative, 2020).

The loan to the Seychelles from TNC was financed through the organization's NatureVest conservation investment unit, which raised loan capital from commercial investors. One of the most complicated aspects of the project was the negotiation, led by the government with stakeholders, to determine the location of the MPAs and the rules that would govern them. Two years of consultations preceded the execution of the deal, and another four before the plan for the full 30 percent of MPAs was agreed upon. The MPAs include both High Biodiversity Protection Areas and Medium Biodiversity Protection and Sustainable Use Areas. The latter is designed to conserve natural ecosystems and support sustainable economic activities, including catch and release fishing, tourism charters, and renewable energy (TNC, 2020).

It is possible that the current economic crisis could create more opportunities for these types of deals, which could also help provide crucial sources of conservation funding, even as other sources dry up during the recession. In the Seychelles the President has exempted businesses that fund conservation from paying taxes until September 2020, due to the pandemic-induced reduction in tourism. The CEO of SeyCCAT has commented: "With the debt for nature deal, we have a recurring fund, enabling us to continue financing conservation efforts even when other sources of income for conservation are at risk (World Ocean Initiative, 2020)." While the debt-for-nature swap freed up some savings for the Seychelles to invest in managing its MPA, more funding is needed to meet the country's 30 percent target, and to fund the management of the MPA over time.

i. The Seychelles Conservation and Climate Adaptation Trust. 2020. Accessed on May 18, 2020. Available at: www.seyccat.org

Leveling the playing field via real sector policies

Real sector policies directly influence the behavior of firms that operate in productive sectors, such as agriculture, food and beverage, textile and fashion, construction, energy, and mining. These policies are critical because they change the incentives of the industries and value chains that are driving the loss and degradation of ecosystems. They include: (i) standards and regulations, often termed command and control policies; (ii) pricing policies, which include fiscal policies governing taxes and subsidies, fees, and payment for ecosystem services; and (iii) information disclosure rules. The key role of real sector policies is to correct for externalities and other market failures, thus levelling the playing field on which private actors operate. Protecting and sustainably using nature involves the conservation of natural areas, and the restoration and avoidance of damage to ecosystems. These activities can impose a private opportunity cost on businesses, given that they involve public goods and externalities. Nature tends to be underpriced, leading to private investment decisions that contribute to the overexploitation and misuse of natural resources.

Standards and Regulations

Standards and regulations are the most common type of policies used to protect biodiversity and ecosystems. They are aimed at re-orienting investment toward more sustainable practices by allowing or preventing a defined set of activities or production processes. Building the capacity of environmental agencies at the national level will be required for these measures to succeed. Regulatory measures include (but are not limited to):

- Land planning and governance reform to ensure clear and secure land tenure integrated with inclusive and informed landscape planning, and protection of indigenous lands and community-based forest and land management initiatives;
- Introduction of stricter pollution standards, for example, on pesticide and fertilizer use; and
- Broadening of the base for mandatory environmental impact assessments that integrate biodiversity across sectors and industries with mandatory biodiversity offsets.

Businesses often adopt standards on a voluntary basis to green their supply chains and incorporate biodiversity conservation into their business practices. For example, over 1,200 companies have voluntarily made commitments to low- and zero-deforestation in their supply chains, and almost 211 million hectares of commercial forest operations have been certified by the Forest Stewardship Council (FSC, 2020). In industries in which this happens, the alignment of real sector policy with the objectives of conserving, restoring, or avoiding a negative footprint on ecosystems is even more important, as it will level the playing field and allow the scaling up of existing voluntary initiatives. Governments can provide further support for such practices by promoting sustainable certification and transparency in supply chains.

Governments can also lead the way by integrating biodiversity considerations into their procurement practices and using nature-based solutions in public works. Governments, utilities, and other infrastructure service providers can transition to a policy of evaluating and, where feasible, shifting to natural infrastructure solutions for every decision about infrastructure design and procurement. It will be key for these entities to exercise greater creativity around creating cashflows and revenues from public good resources.

Subsidy and tax reform

Besides standards and regulations, well-designed fiscal reforms can increase welfare while reconciling economic growth with nature and the services it provides to people. The literature on Environmental Fiscal Reform (EFR) has so far focused predominantly on climate change. But EFR can also be applied to biodiversity and ecosystem services. To maximize impact, and to ensure that the main drivers of biodiversity loss are addressed, efforts should concentrate on agriculture, forestry, fisheries, energy, and mining. The most important opportunities are likely to be found in the potential to reform perverse subsidies (OECD, 2020b).

The repurposing of perverse subsidies toward ecosystem conservation and restoration can play an important role, particularly when ecological services are underpriced or underprovided. While not all production subsidies are harmful to the environment, and their burden is gradually declining, they remain a significant opportunity cost for the taxpayer, and a factor contributing to environmental degradation. Reforming economic incentives requires a two-step approach: (i) an assessment of the existing programs that do not work and need to be eliminated; and (ii) gradual repurposing of support in favor of sustainable production practices. Successful examples of green subsidies are emerging. For example, Brazil has established a Low-Carbon Agriculture (ABC) Plan[57] to provide low-interest credit to sustainable agriculture that is both climate smart and more biodiversity friendly. Technical assistance support, provided by the World Bank to farmers in the context of the ABC Plan, achieved a 1:7.2 leverage ratio. This means that for each $1 invested by the project in providing technical assistance, beneficiaries invested $7.2 of their own funds to adopt low-carbon and conservation technology. It is a powerful example of how small amounts of public finance, often with a link to carbon finance, can be used to effectively mobilize private resources that foster conservation efforts, such as preservation of organic matter in the soil , or limiting the conversion of natural habitats. While the ABC program has generated traction in recent years, it still represents only 2 percent of the total credit disbursed annually through Brazil's government-subsidized National Rural Credit System. This system is known to suffer from significant inefficiencies and conflicting incentives and to encourage activities that are damaging to climate and biodiversity (Lopes and Lowery, 2015). Together these factors create a strong case for scaling up subsidized credit that promotes better social and environmental outcomes.

Taxation is another important component of fiscal reforms, as revenue generated from biodiversity-relevant taxes amounts to less than 1 percent of total revenue generated from environmentally-relevant taxes in OECD countries[58] (OECD, 2020c). There are multiple entry points for biodiversity-relevant taxation, including land use change, harmful inputs into agricultural production (pesticides, fertilizers), emissions and pollution from production, and exports and direct resource extraction, among others. Taxes on groundwater extraction, and hunting and fishing license fees, represent a promising tool to prevent ecosystem use beyond its replenishment rate, and also an effective way to achieve fiscal, public health, and economic objectives. While the political economy challenges around the implementation of tax reform are significant, the current 'reform window' around COVID-19 support and recovery packages could represent an opportunity. Ten Brink (2011) notes that fertilizer and pesticide taxes, or excess nutrient taxes, can improve efficiency in fertilizer use, and reduce the associated environmental damage. This is demonstrated in the experiences of several European countries, including a 20–30 percent decrease in fertilizer use in the Netherlands and a 15–20 percent decrease in Sweden.

An important challenge with real sector policy, and fiscal policies in particular, is that reform creates winners and losers. Political economy considerations in the design of the reform are paramount, as these will determine whether a reform succeeds. Stakeholders who could be affected by policies that protect ecosystem services, like water yield, pollinators, fish production, and carbon sequestration, include landowners, farmers, fishermen, and workers in sectors related to the use of these resources. Key considerations at play are the competitiveness of domestic industries; distributional impacts, notably the impact of the reform on the poor; vested interests; and political acceptability (OECD, 2017). These have undermined the efforts of many developed and developing countries to introduce environmental fiscal reforms (EFR), for example, by creating exemptions of key sectors

57 Brazil's Low-Carbon Agriculture (ABC) Plan is a credit initiative that provides low-interest loans to farmers who implement sustainable agricultural practices.
58 Average 2016–2018.

such as agriculture and industry (Chaturvedi, 2014). A positive feature of both subsidy reform and taxation is that they generate resources that can be used to compensate those who lose subsidy support. Country experiences show that the key to the success of EFR is a phasing out of conventional subsidies while investment is ramped up in complementary social and development programs. In the context of climate change, assessments of the potential effects of a carbon tax and other fiscal reforms suggest that governments could reap a 'triple dividend' through: curbing pollution, generating and funding development co-benefits and public goods, and raising economic activity (Pigato, 2019). Similarly, a recent assessment (Hogg et al., 2016) of the potential for EFR across the 28 EU members found that a combination of environmental and energy taxes can generate substantial revenue for member governments and have a positive impact on jobs if these measures replace other taxes, such as those on employment.

Greening the financial sector

Financial sector policy frameworks and biodiversity strategies

National roadmaps or strategies for greening the financial sector can help set an overarching framework. Governments can pursue an overarching policy framework that maps a multi-pronged approach to better assess and manage environmental risks and opportunities, in the financial sector and the economy more broadly (Van Acker and Mancini, 2020). Such a roadmap could align financial sector policies, regulations, incentives, and government spending with biodiversity goals. It could prioritize actions and coordination between relevant stakeholders. A task force or expert group, including representatives from regulators, relevant ministries, the financial sector, the real sector, the science community, and nonprofit organizations, could serve as an advisory body on the creation of the roadmap, which would lay out the government's strategic priorities for industry development and green investment. This would include plans for developing a pipeline of priority projects, such as projects structured as PPPs. The roadmap should include targets for the role that the private financial sector should play in financing the country's biodiversity objectives. Several countries, including the UK, have implemented strategies, policies, and instruments with this aim. While several of these strategies include biodiversity criteria, it is crucial that biodiversity considerations are central to the strategy and on an equal footing with climate considerations.

Governments can further mobilize private finance for biodiversity through including a role for the private sector in National Biodiversity Strategies and Action Plans (NBSAPs). NBSAPs constitute the main implementation mechanism of the Convention on Biological Diversity, and include country-specific strategies for resource mobilization. With the support of BIOFIN, several countries are preparing strategies that specifically identify opportunities for private sector finance. In Mexico, impact investment is identified as a key priority, and BIOFIN is seeking to develop investment-ready portfolios of conservation and sustainable use projects in or near Protected Natural Areas. In Kazakhstan, BIOFIN is supporting the introduction of biodiversity offsets as a formal instrument; the introduction of tax incentives for ecotourism development; and the creation of an enabling environment for attracting forest-based carbon offsets from the international market, and from multinational enterprises operating in the country.[59]

Data and Accounting

While ensuring that policies and incentives are aligned with biodiversity conservation goals, governments can also provide the knowledge and data which real and financial sector firms will need when building biodiversity into their risk analysis and investment decisions. For governments, at the highest level, this means implementing natural capital accounting (NCA),

59 BIOFIN. 2020. UNDP. Available at: https://www.biodiversityfinance.net/index.php/biofin-around-world

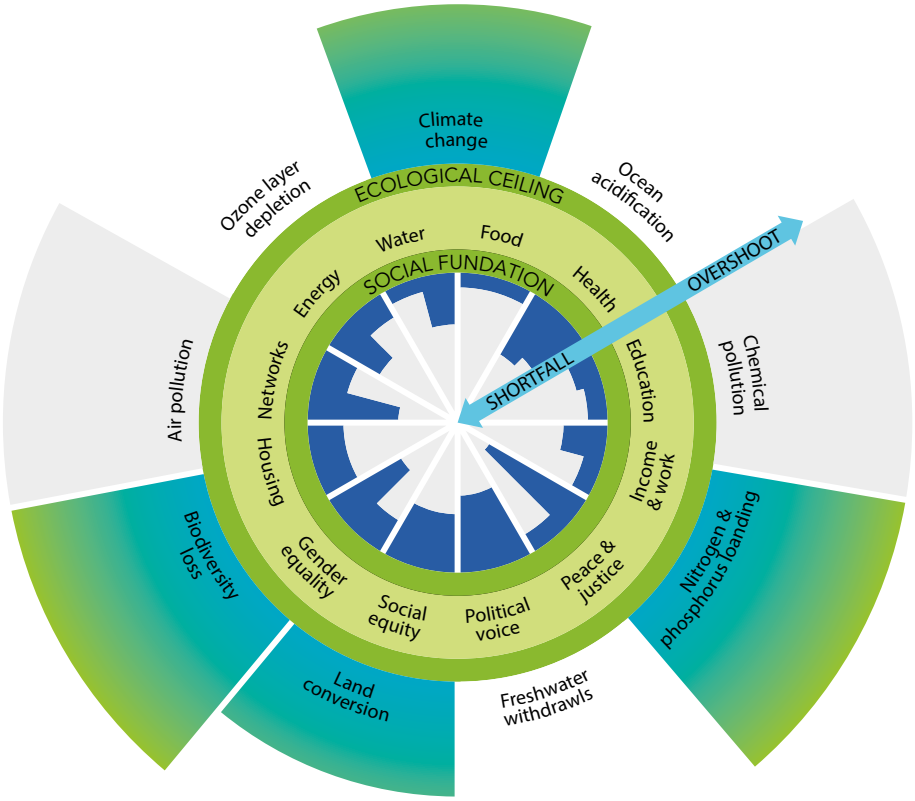
A community planting native species of trees to prevent erosion and land degradation, as part of a World Bank funded project in Ethiopia: © WBG.

a systematic way to measure and report on stocks and changes in natural capital. Organizing this information in a standardized way can help decision makers understand how nature interacts with the economy, creating the foundation for the design of policies. NCA can serve both macro- and micro-level decisions. At the micro level, it can be linked with firm-level disclosures that account for flows, which will help set companies on a path to developing metrics that are context-based, and will provide investors with better information on the long-term impacts of their investments. The UN's standard for NCA is the System of Environmental Economic Accounting (SEEA), which from 2020 will be included as an indicator for measuring the SDGs. Over 80 countries are already implementing SEEA. Subnational governments, real sector companies, and nonprofits also have a role to play in implementing NCA.

The current pandemic has demonstrated the necessity of contextual, coordinated monitoring of ecosystem thresholds and planetary boundaries, at the global, national, and corporate levels, supported by the implementation of aligned corporate and national natural capital accounting or reporting. Methodologies such as NCA, 'Doughnut Economics' (see Figure 14) (Raworth, 2017), and a 'Planetary Health Dashboard' (Degnarain, 2020) deserve further consideration.[60] China's Gross Ecosystem Product (GEP) measure provides an example of another innovative approach. GEP is being developed and tested, and will be reported alongside GDP.[61] In the private sector, companies practicing context-based sustainability work backwards from global social, economic, and environmental thresholds in order to determine metrics for corporate sustainability performance (CSO, 2020). According to a recent UNRISD report (2020), "the bottom line is that it is only possible to gauge whether a company is on a sustainability pathway if it discloses data that are structurally oriented, quantified, contextualized, and user friendly."

60 According to the Doughnut Economics model, the economy should operate within the space between an ecological ceiling (Rockström et al., 2019's planetary boundaries) and the social foundation (the SDGs).
61 IUCN. 2020. Gross Ecosystem Product (GEP). Accessed on May 19, 2020. Available at: www.IUCN.org

Figure 14. The Doughnut of Social and Planetary Boundaries



Source: Raworth, Kate. 2017. Doughnut Economics.

Governments can take steps to invest in, and to mobilize private investment in, technology that improves data quality and availability. There are several promising technologies for addressing data gaps (see Box 18). Remote sensing and artificial intelligence, for example, allow for better tracking of deforestation. 'Fintech' tools, including blockchain, tokenization, and smart contracts are also being explored to support local communities involved in conservation projects (UNEP, 2019).[62] The main impediment to the wide adoption of conservation monitoring technologies, and therefore of the potential for financial return, is the lack of funding of public agencies and nonprofit organizations in charge of managing biodiversity in protected areas. New sources of financing to expand the use of these technologies should be explored.

Regulation and Supervision

Supervisors and regulators have a strong role in supporting better management of biodiversity-related risks across the financial sector through better risk assessment, standards, and reporting. For financial institutions to fulfill their roles of effectively managing and distributing risks and allocating resources to productive uses, governments and financial sector regulators will need to take steps to better enable the integration of biodiversity criteria into economic and financial decisions. Tools which are at their disposal (also listed in Table 6) include:

- **Green investment taxonomies.** There is a need for the development of national and regional

62 For example, Ant Financial, a subsidiary of Ali Baba, has developed a conservation video game which makes a donation to plant trees based on virtual tree growing game results (UNEP, 2019).

BOX 18

Tech for Conservation

Citizen science, or active public involvement in scientific research, is growing—using new technology to monitor air and water pollution and take stock of flora and fauna (Irwin, 2018). In 2017, multiple citizen-science organizations banded together to form the Citizen Science Global Partnership, which aims to expand the application of citizen science to monitor progress toward the SDGs. The Global Biodiversity Information Facility (GBIF), the world's largest such repository of such data, gets half of its billions of data points from citizens. GBIF estimates that it has supplied data for more than 2,500 peer-reviewed papers in the past 10 years.

The use of technologies has led to a more decentralized approach to data collection and monitoring. A project called Ground Truth 2.0, supported by the European Commission, has set up six pilot 'citizen observatories' in Africa and Europe, designed to encourage a dialogue between laypeople, scientists or data processers, and data users. The challenges associated with citizen-sourced data are, however, significant. Deviations from standard protocols and biases in recording and sampling have been observed (Tiago et al., 2017). In order to become an official data stream, citizen science needs to become more institutionalized and methodologies more standardized (Irwin, 2018).

Earth Bank of Codes, another potentially impactful use of technology for conservation, is aimed at empowering citizens through payments for their stewardship, by putting all genetic codes of the biodiversity in the Amazon rainforest on the blockchain. Users, including scientists and pharmaceutical companies, can then buy access to the codes with cryptocurrency, part of which will be paid directly to the communities taking care of the area of the rainforest where a particular genetic code originates. The long-term goal of Earth Bank is to help developing countries and communities rich in biological and biomimetic assets to move toward an economy that is more dependent on these assets and less dependent on natural resources and commodities. Through this, Earth Bank aims to increase the economic value of stewardship relative to extraction. The platform is designed to make "the current and future value of nature's assets visible and accessible" and to protect the property of the stewards of these assets. Earth Bank notes that bio-piracy and inequitable benefit sharing are problems that have prevented communities and developing countries from realizing significant benefit from these assets in the past.[i]

i. Earth Bank of Codes. Accessed on June 30, 2020. Available at: https://www.earthbankofcodes.org/

taxonomies to identify activities that contribute to sustainable biodiversity. Such taxonomies provide a way for governments to identify target areas for investment and to provide pilot projects. Taxonomies can also help financial institutions and regulators measure the alignment of financial flows with biodiversity goals, and to assess and identify risks (more in Box 19 below). In addition, taxonomies provide a framework that can serve as the basis for labeling standards.

- **Labeling.** In order to promote the use of sustainable financing instruments in channeling capital to projects aligned with the nature-smart economy, it is crucial that standards and labels are developed. Standards for labeling will prevent green washing and help to ensure financial stability and market integrity. These may come from industry groups and associations, but regulators and governments can also play a role, providing guidance and encouraging standardization. The Green Bond Principles are an example of a successful collaborative approach to developing standards, which has proven successful (ICMA, 2018). While biodiversity conservation and

restoration are already considered eligible activities for green bonds, the green bond framework needs to go further and impose a 'do-no-harm' requirement with an emphasis on biodiversity. The Green Loan Principles take a similar approach, recognizing projects which tackle natural resources depletion, loss of biodiversity, and air, water, and soil pollution.[63] A specific methodology could be devised for biodiversity finance instruments. IUCN recently launched a Global Standard for Nature-based Solutions, which the organization describes as "a framework for the verification, design, and scaling up of NBS" (IUCN, 2020), and which can be used to label both new and existing projects. Governments could consider adopting this standard in order to mobilize greater private investment in NBS.

- **Supervisory risk assessment.** As with climate change, the systemic nature of biodiversity risk (Suttor-Sorel, 2019) necessitates its assessment at the aggregate level, requiring financial stability monitoring by central banks and supervisors. Supervisors should develop tools and methodologies to map, quantify, and monitor biodiversity-related financial risks, by such means as developing and implementing macro-level stress testing methodologies. Supervisors should integrate key biodiversity and ecosystem services risks in supervisory approaches, risk scoring models, and potentially prudential frameworks.
- **Regulatory risk assessment.** In addition to their own risk assessments, regulators will need to encourage or require financial institutions to incorporate biodiversity criteria into their risk assessment and investment processes. For the banking sector, this would involve central banks encouraging or requiring scenario and stress testing of loan portfolios, particularly for banks that are exposed to highly biodiversity dependent sectors or geographies. These tools will need to be developed, as is currently the case for measuring climate risks. Regulators overseeing nonbank financial institutions, such as insurance companies and pension funds, should also provide guidance on how biodiversity risk can be incorporated into the risk assessment and investment process of the firms they oversee. For the insurance sector, regulatory incentives could help with the integration of biodiversity data in assessment tools that underwriters, surveyors, and others use to assess premiums and incentives (Beck et al., 2019).
- **Disclosure.** There is a need for a global standardized reporting framework for biodiversity and ecosystem services-related risks, and for this framework to be mainstreamed. Incorporating biodiversity as a material risk in financial accounting standards like IFRS and US GAAP would be one way to ensure consistent reporting of hidden costs and externalities, and to settle the methodology accountants use to disclose natural capital as a stream to be maintained (Suttor-Sorel, 2019). Simultaneously, a Taskforce on Nature-related Financial Disclosures (TNFD) could develop a framework and recommendations—complementary to and building on, or part of—the framework

Table 6. Regulatory and Supervisory Tools and Approaches

63 Green loan issuance amounted to about $60 billion in 2018.

and recommendations of the Taskforce for Climate-related Financial Disclosure (TCFD), a high-profile initiative led by the Financial Stability Board (FSB).[64] For both accounting and reporting frameworks, context will be crucial to ensure such information can be effectively interpreted and risks managed. A working group is currently conducting preparatory work for the establishment of TNFD. Representatives of the working group have indicated that it aims for a framework to be ready for use in 2022, and that the framework would align with the EU double materiality reporting requirement illustrated in Figure 5. Box 20 provides examples of existing biodiversity reporting regulations and initiatives.

- **Solvency and capital regulations.** Whether regulators could or should go beyond risk assessment and reporting to incorporate 'non-financial' risks such as biodiversity and climate (the current debate is focused on the latter) into prudential standards is an open question. Some institutions—for example, the central banks of Bangladesh and China—have already introduced a mechanism for incentivizing green lending in refinancing policies.[65]
- **International networks.** Networks can help standardize these supervisory tools, and assist regulators in adopting them and implementing international good practice. Cooperative government-led efforts to establish supervisory and regulatory frameworks for mobilizing

BOX 19

Investment Taxonomies and the Role of Policy Priorities

While the EU Sustainable Finance Taxonomy is the best known globally, Mongolia has also begun to implement a green investment taxonomy, and is paving the way for other emerging markets to follow. These two taxonomies offer examples of different approaches in taxonomy development. Where the EU's Technical Expert Group on Sustainable Finance was instructed to disregard policy goals and focus solely on science-based targets, the Mongolian Sustainable Finance Association (MSFA) was tasked with developing a taxonomy that would help the country reach policy targets. Together *sustainable agriculture, land use, forestry, and ecotourism* is one of its eight categories. Key strategic challenges Mongolia encountered in its taxonomy development included: setting priorities and boundaries (development vs. sustainability goals, social vs. environmental); and finding a balance between international standards and Mongolia's unique needs (MSFA, 2020).

Source: Mongolian Sustainable Finance Association. 2020. Mongolian Taxonomy.

64 As of February 2020, over 1,027 organizations, representing a market capitalization of over $12 trillion, had pledged their support to the TCFD recommendations. The recommendations serve as an important foundation for the work of sustainable finance initiatives. TCFD. 2019. Accessed on May 19, 2020. Available at: www.fsb-tcfd.org

65 In China, the interest rate that commercial banks get on central bank reserves is a function of a score—the so-called Macro Prudential Assessment (MPA) score. The higher the MPA score, the higher the interest rate they get. The MPA score depends on several dimension of banks' activities, such as their capital adequacy ratios, their liquidity conditions, the quality of their assets, their competitiveness behavior, etc. (Zheng, 2018). The amount that a bank provides in green loans positively impacts its MPA score. The People's Bank of China also introduced a scheme that allows commercial banks to pledge green bonds as collateral at preferable conditions in exchange of central bank's liquidity (The World Bank, 2020a).

BOX 20

Biodiversity Reporting

The most explicit biodiversity risk disclosure requirements to date have been imposed by France. Article 173-VI of France's 'Energy Transition and Green Growth' law, which went into effect in January 2016, requires investors to disclose how they factor ESG criteria and carbon-related aspects into their investment policies. The French Parliament recently amended Article 173 to require the disclosure of biodiversity impacts starting in 2021 (Ernst & Young, 2017).

Other European governments are following suit, including the UK government, which has pledged in its Green Finance Strategy, published in 2019, to "work with international partners to catalyze market-led action on enhancing nature-related financial disclosures" (HMT UK, 2019). The Dutch Central Bank (DNB) published a report in June 2020 on the risks to the financial sector arising from biodiversity loss. The report calls for the development of a biodiversity risk disclosure framework (van Toor et al., 2020). The EU Taxonomy of Sustainable Activities also creates pressure for disclosure. Conservation and restoration of biodiversity and ecosystems is one of the categories of the taxonomy. Additionally, all investments under the taxonomy are required to 'do no harm' under its six categories of environmental objective (European Commission, 2020b).

climate finance are significant, and growing. Two key government-led initiatives have been established in recent years and are quickly expanding—the Network for Greening the Financial System (NGFS)[66] has expanded to 46 members, and the Coalition of Finance Ministers for Climate Action to 52 members.[67] This is a testament to the interest from the public sector in advancing climate action through economic and financial reforms. The guidance and recommendations put forward by these two groups are helping to lay a strong supervisory, regulatory, and policy foundation for climate action. In addition, the Sustainable Banking Network,[68] which brings together regulators and banking associations from 38 emerging markets, representing 85 percent of emerging markets banking assets, has been working within their domestic financial sectors to improve environmental, social, and governance risk management and increase capital flows to climate projects. The 'Green Swan' report (Bolton et al., 2020) notes the role of central banks, regulators, and supervisors in mitigating systemic risks by calling for and promoting broader and coordinated change in order to fulfill their own financial and price stability mandates.

Enforceability, resources, and staff capacity will be crucial to the success of the recommendations included above, in achieving better integration of biodiversity criteria in the financial sector. As sustainable finance broadly, and biodiversity finance in particular, are new fields for most financial supervisors, regulators, and many policy makers, there will likely be an initial need for technical assistance and capacity building in many countries. Governments should be equipped with the tools and information needed to be effective

66 The NGFS 2019 Inaugural report said there were "compelling reasons" to look beyond climate risk to broader environmental risks. It raised concerns that environmental degradation could "cascade to risks for financial institutions" because "reduced availability of fresh water or a lack of biodiversity could limit the operations of businesses in a specific region"—businesses to which banks are exposed (NGFS, 2019).

67 Coalition of Finance Ministers for Climate Action. 2020. Accessed on May 19, 2020. Available at: https://www.cape4financeministry.org/coalition_of_finance_ministers

68 Sustainable Banking Network. 2020. IFC. Accessed on: May 19, 2020. Available at: https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/company-resources/sustainable-finance/sbn

in crafting approaches that take into account their own unique economic, social, and environmental contexts.

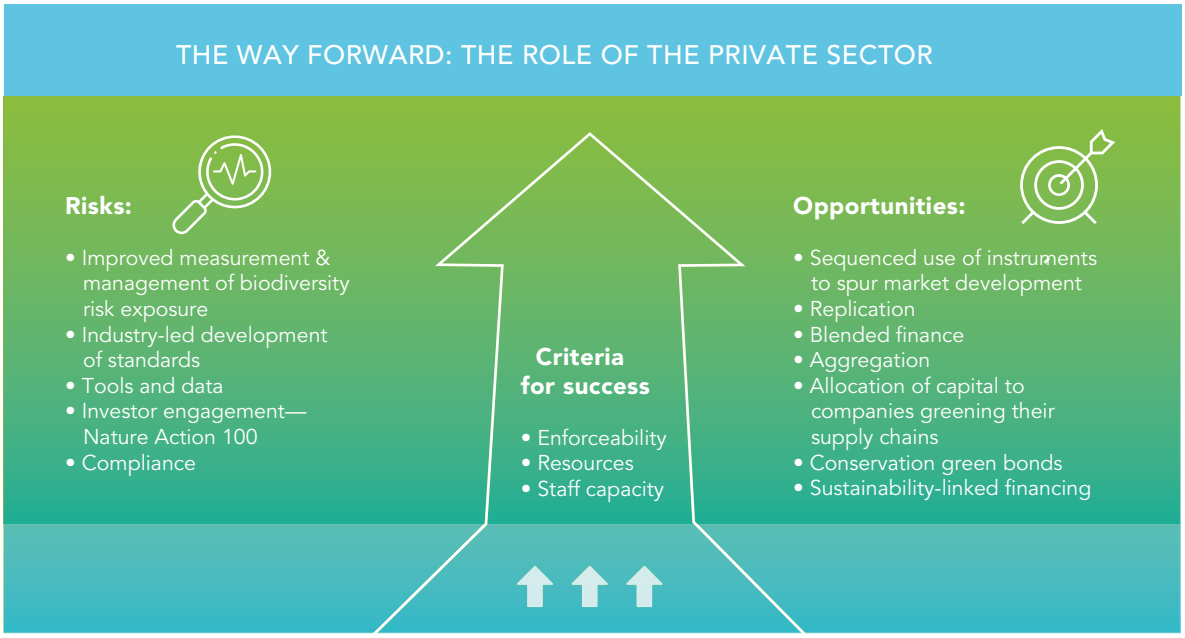
Private sector adoption of risk management tools and development of financial instruments

In order to leverage private sector financing for conservation, financial sector firms need to develop and adopt the tools to measure and manage biodiversity risk exposure. They also need to develop and scale up innovative financing approaches. Using a stylized framework (Figure 16), this will involve both moving investments up the y axis, improving their biodiversity impact, and along the x axis, using blended finance and other financial instruments, to improve investment returns and allow crowding in of private sector financing from a broader range of investors. For *greening finance*, this requires increasing the understanding and recognition among companies and investors of the link between risks and degradation of biodiversity and ecosystems, to encourage them to take natural capital risk into account in their investment decisions. For *financing green*, this will require establishing a track record for these new business models, and enhancing their ability to generate cash flows.

Incorporating risks

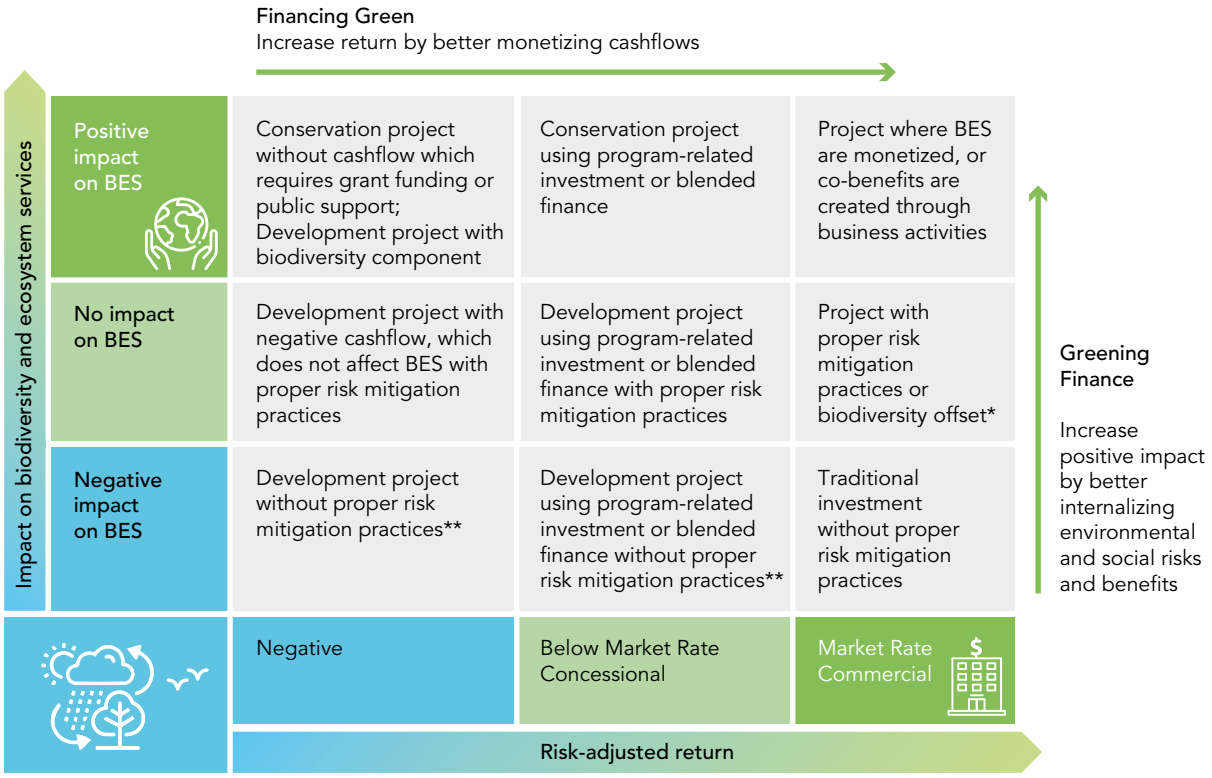
The financial sector does not have to wait for regulation, and can continue to develop its own standards and good practices for incorporating biodiversity and ecosystem services–related risks into investment decisions. Standards developed by the private sector can anticipate or comply with the regulatory framework. The sector could support and coordinate industry initiatives outlined earlier in the paper, and provide capacity building for implementation. As is established in the 'Green Swan' report (Bolton et al., 2020), risk assessment techniques to date have been largely backward looking, and hence are missing the sort of 'green swan' risks that climate and biodiversity and ecosystem services losses represent. Forward-looking scenario-based analysis needs to be

Figure 15. The Way Forward—The Private Sector



Source: Authors.

Figure 16. The Two Dimensions of Mobilizing Private Sector Finance for Biodiversity and Ecosystem Services (BES)



Source: Authors.
Note: The figure assumes that projects comply with national environmental regulations. Standards refer to IFC Performance Standards or other widely accepted market standards. *The creation of an offset should compensate for any negative/residual impacts on biodiversity generated by the project. **Negative impacts on BES are commonly addressed by projects financed by MDBs through their own compliance mechanisms and compliance with national regulations.

developed and improved by the financial sector, as well as by governments and regulators. Box 21 provides an example of how investment managers are integrating biodiversity criteria into their investment decision making.

Engagement with companies has the potential to be a powerful tool for investors to push the real sector to better manage biodiversity risks. This is evident in the climate sector, where engagement is cited by investors as a crucial tool for managing systemic climate risks—those that cannot be diversified away. Elements of biodiversity risk are also systemic, as has been seen with the impact of COVID-19. The best way for investors to address undiversifiable risks, like biodiversity and ecosystem services–related risk, is to engage with companies that are contributing to the risk. Global corporations and their supply chains are major contributors to biodiversity and ecosystem loss. Climate Action 100+, launched in 2017, is a five-year initiative led by investors to engage systemically important greenhouse gas emitters and other companies across the global economy that have significant opportunities to drive the clean energy transition and contribute to the achievement of the Paris Agreement goals.[69] A study conducted by the European Corporate Governance Institute has shown a link between investor engagement on ESG issues and portfolio risk reduction. A similar 'Nature Action 100' could be launched, which would engage with the 100

69 Climate Action 100+. 2020. Accessed on May 19, 2020. Available at: http://www.climateaction100.org/

BOX 21

ACTIAM: Integrating Biodiversity Criteria into Investment Decision Making

ACTIAM is a sustainable impact investment manager with assets under management of ~$77 billion assets under management. Its clients include insurance companies, pension funds, banks, and private investors. ACTIAM integrates criteria relevant to planetary boundaries, the SDGs, and financial materiality into its investment decision–making processes. ACTIAM's sustainability policy categorizes potential investments into four key categories, ranging from projects with a clear 'positive impact,' to those considered 'unacceptable.' For investments that do not address sustainability concerns, but have a 'high adaptive capacity,' ACTIAM engages to see if risks can be managed.

The asset manager screens hundreds of companies on a daily basis. Assessments of biodiversity policies and management of biodiversity and ecosystem services–related risk exist at the company level, including screening of companies operating in regions with fragile ecosystems, or those with operations that can severely disturb land or marine areas. However, since granular data on biodiversity and ecosystem services at the supply chain and project level are rarely readily available, the company has developed its own tools and is working on integrating satellite deforestation monitoring technology to select and monitor its investments.[a]

There are several key obstacles to mobilizing private sector investment in biodiversity and ecosystem services at scale: (i) lack of knowledge among portfolio managers on biodiversity trends and the role of the banking sector in addressing them; (ii) mismatch between projects and investors on financial requirements, notably the bankability and scale of projects; (iii) corporations lacking scenario analysis to inform them of the consequences of not paying attention to environmental risks; (iv) short timeframes in portfolio management decisions, vs. long timeframes required for positive environmental impact to manifest itself; and (v) only partial participation of the financial sector in this discussion. For example, local banks are a strategic stakeholder to involve, as they make the decisions to invest in palm oil or other activities with substantial environmental impacts.

a. China MEE and World Bank. 2019. Workshop on Resource Mobilization in the Convention on Biological Diversity: Harnessing Private Finance. Accessed May 19, 2020. Available at: https://www.worldbank.org/en/events/2019/11/05/workshop-on-resource-mobilization-in-the-convention-on-biological-diversity-harnessing-private-finance?cq_ck=1578954214935

firms with the largest impact on biodiversity. As frameworks, tools, and standards to facilitate more meaningful analyses of biodiversity risk are being developed, engagement allows investors to influence companies' approach to biodiversity risk management with more nuance.

Investment vehicles can be created which support and reinforce these engagement activities, facilitating the strategic allocation of capital through the development of biodiversity funds, ETFs, and indices. Investors may be able to improve the biodiversity impact of their portfolio through the allocation of capital to companies and sectors that have committed to improving the conservation impact of their operations. For example, 19 companies joined together in 2019 to launch the 'One Planet Business for Biodiversity' initiative, which aims to protect and restore biodiversity through actions to green agricultural supply chains (WBCSD, 2019). Themed investment instruments—such a biodiversity funds, ETFs, and indices—are likely to be developed.

4.2.2 Developing Financial Instruments

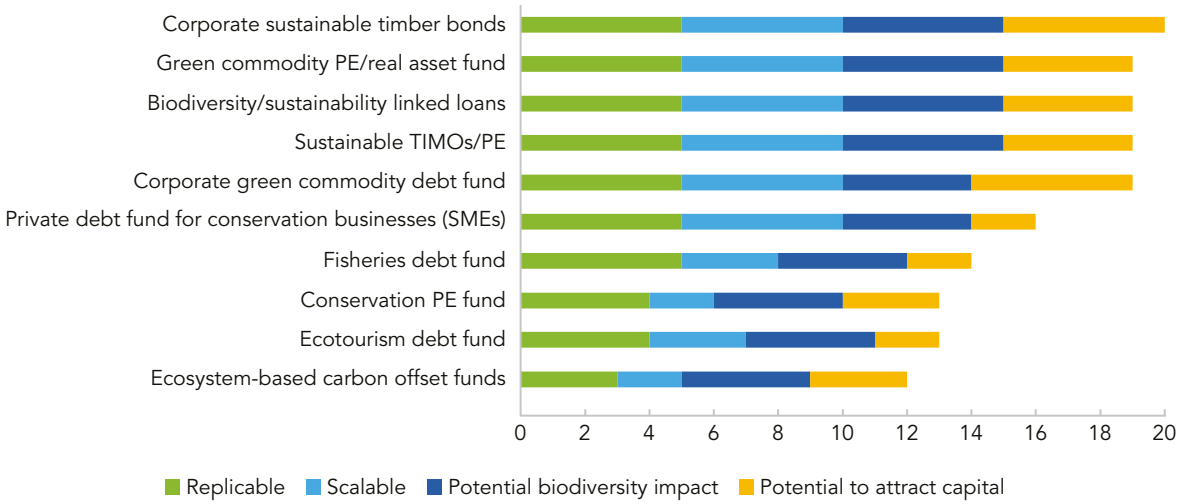
Though the innovative application of biodiversity financing tools is expanding, the outstanding

question is—how many of these mechanisms can be scaled? The examples provided throughout this report demonstrate that financial innovation in biodiversity financing is taking place with the aim of mobilizing more private financing for nature. Innovative business models and project structures can be standardized, which can facilitate replication and expansion from pilots. However, there is a need for pragmatism about which projects can feasibly be scaled. Many of these instruments are replicable, but are applicable mostly to smaller, local projects, which make it difficult for them to be scaled up to shift significant amounts of capital to invest in biodiversity. The first step is thus to identify where the opportunities lie, as shown in experience from climate finance, which only became mainstream once renewable energy was clearly identified as a sound long-term investment opportunity. Figure 17 and Table 7 provide a qualitative assessment of relevant instruments currently being deployed; it is hoped that scores of instruments will improve over time as policies, regulations, and markets develop further.

Project standardization and replicability will also be crucial to developing biodiversity investment opportunities. In 2019, the Coalition for Private Investment in Conservation (CPIC) launched a series of blueprints aimed at replicating and expanding successful investments in nature. The blueprints focus on key sectors—including sustainable cocoa, forestry, coastal resilience, and marine protected areas—and provide companies and conservation agencies with business plans, risk management tools, and conservation impact strategies in each sector, aimed at making deals bankable. The hope is that these blueprints will help to develop the pipeline and provide assets suitable for financial aggregation. To overcome the challenges associated with the small scale and localized nature of biodiversity projects, individual producers and initiatives can be combined or pooled at the sector or landscape/geographic level. In the case of sectoral aggregation, individual producers can be organized into associations or cooperatives, or abide by sectoral standards established by a buyer, industry, or investor. In the case of landscape-wide aggregation, local actors and producers linked to a particular territory can be pooled under the principle of protecting the natural assets of that specific territory. This can help channel investment to key landscapes where biodiversity loss is concentrated. Additionally, it can help to drive investment to publicly owned land with restoration potential.

Project pipeline development will also be key. Several private equity investment companies have established a successful track record in the field

Figure 17. Top 10 Investment Instruments with High Feasibility in Emerging Markets, Scored According to Potential



From 1 (very low) to 5 (very high) in each category (qualitative analysis). Source: Authors.

Table 7. Biodiversity Finance Instruments/Models

Model	Scoring					
	Replicable	Scalable	Appropriate for developing countries	Potential biodiversity impact	Potential to attract capital	Aggregated score
Corporate sustainable timber bonds	5	5	5	5	5	25
Corporate green commodity debt fund	5	5	5	4	5	24
Sustainable TIMOs/PE	5	5	5	5	4	24
Biodiversity/sustainability linked loans	5	5	5	5	4	24
Green commodity PE/real asset fund	5	5	4	5	4	23
Private debt fund for conservation businesses (SMEs)	5	5	5	4	2	21
Conservation green bonds (municipal)	5	3	1	5	5	19
Ecotourism debt fund	4	3	5	4	2	18
Fisheries debt fund	5	3	4	4	2	18
Conservation PE fund	4	2	4	4	3	17
Conservation ETF	5	3	1	2	5	16
Ecosystem-based carbon offset funds	3	2	4	4	3	16
Ecosystem insurance	3	2	3	4	3	15
EIB for green infrastructure (municipal or corporate)	3	3	1	5	3	15
International biodiversity offsets	3	3	3	4	2	15
Mitigation banking PE fund	3	2	1	5	4	15
Conservation PPP	3	1	4	5	2	15
Blue conservation PPP	3	1	4	5	2	15
Conservation impact bond	2	2	3	5	3	15
Debt for nature swap	2	1	5	4	2	14

Source: Authors, see assessment criteria in Annex (Table 13).

of nature-related investments—examples include mitigation banking: Ecosystem Investment Partners; sustainable forestry: New Forests, Lyme Timber, and Conservation Forestry; and pure private equity: Generation Investment Management, Vision Ridge Fund, and KKR Impact Fund. As these companies become more experienced in this sector, their funds under management are likely to increase. However, scale will be restricted by the pipeline of available investments. There is a need for concessional capital to invest in pipeline development through business accelerators, especially in technology that contributes directly to conservation and to monitoring and evaluation—for example, precision agriculture and biotechnology.

The use of pooled investment vehicles, which allow for the aggregation of projects and investors, is

also key for mainstreaming these investments. As noted, private equity funds are establishing a track record. Some pooled debt vehicles have been raised, which include securitization of a portfolio of conservation properties by The Conservation Fund, and the Iroquois Valley Farms Real Estate Investment Trust (REIT).[70] Issuance of private debt for green infrastructure and sustainable agriculture is highly scalable and replicable because these opportunities present credible collaterals and sources of cashflow. These pooled vehicles are critical to expanding the investor universe for conservation finance. Most investments are relatively small, and have a high level of risk. However, once properly aggregated, diversified and packaged, they may be an efficient and relatively safe way for investors to gain exposure to the sector.

Supporting implementation: the role of multilateral development banks

Multilateral Development Banks (MDBs) have a key role to play in mobilizing solutions for public sector and private sector action, and in creating new mechanisms for biodiversity financing. Policy makers and development financial institutions are in a position to work closely with investors to develop financial mechanisms which can both fill the biodiversity financing gap and meet institutional investors' risk and return needs. Innovative financial tools and approaches are being developed to allow institutional investors to take advantage of investment opportunities with social and environmental impacts. The new instruments aim to reduce risk, blend public and private finance, and facilitate investment across a project's life cycle. They include concessionary finance, loan guarantees, policy insurance, foreign exchange liquidity facilities, pledge funds, and subordinated equity. While new tools and blending approaches have been geared mostly toward mobilizing climate finance, many could be similarly applied to biodiversity investments. New instruments can also help attract institutional investment to markets where it has not traditionally flowed, as green bonds have demonstrated.[71]

The use of blended finance can catalyze new business models and investment vehicles. According to Convergence, the leading network on the subject, blended finance is the use of catalytic capital from public or philanthropic sources to increase private sector investment in sustainable development. It can take different forms, such as technical assistance to a recipient of a private investment; concessional finance such as a low interest loan provided in parallel to a private investment; or a guarantee on an investment or an entire portfolio of investments. In the biodiversity finance space, blended finance can play two critical roles: (i) it allows for the exploration and proof of new business models and the expansion of successful ones to new sectors and geographies; and (ii) it allows new investment vehicles focused on conservation finance to be raised and deployed. An example of the first role is the $8.25 million GEF grant that was provided to the Coalition on Private Investment in Conservation to allow for the development of new business models in conservation.[72] This money will allow businesses to develop proof of concepts that make them more investable. An example of the second, in which a cornerstone investor provides catalytic capital, is the AGRI3 Fund, seeded by the Netherlands and Rabobank. AGRI3 aims to de-risk loans to farmers to fund their transition to sustainable and deforestation-free agricultural practices. The fund is a blended finance vehicle which aims to unlock $1 billion in capital to help the agricultural sector over the financial hurdle associated with transitioning. The fund sees a market opportunity in partnering with small—and medium-sized producers, aggregated in cooperatives or through

70 Before changing its structure into a REIT, Iroquois Valley Farm was issuing private debt backed by portfolios of farms that were converted to organic agricultural production, allowing investors to support the transition of farms from traditional practices to organic certification in the United States.

71 Convergence. 2020. Blended Finance. Accessed on May 19, 2020. Available at: https://www.convergence.finance/blended-finance

72 GEF. 2019. CPIC Conservation Finance Initiative—Scaling up and Demonstrating the Value of Blended Finance in Conservation. Accessed on: May 19, 2020. Available at: https://www.thegef.org/project/cpic-conservation-finance-initiative-scaling-and-demonstrating-value-blended-finance

BOX 22

Financing Mechanism 12: MDB/IFI Funds

The 'Eco.business Fund,' initiated by Germany's KfW Development Bank and Conservation International,[i] provides debt financing, channeling most funds into local financial institutions. Its objective is to promote business and consumption practices that contribute to biodiversity conservation and sustainable use of resources, and to mitigate the impacts of climate change across four priority sectors - agriculture, fisheries, forestry and tourism. The tiered structure allows the fund to tailor risk-return profiles for different investors. Public investors tend to take on more risk and lower returns, which in turn attracts private investment.[ii]

Another similar fund, the 'Legacy Landscapes Fund,'[iii] draws in philanthropic and other donor funds to support landscapes of high biodiversity value in developing countries, which currently receive only 13 percent of global biodiversity conservation investment. Characteristics of the fund that make it highly attractive to donors include: an independent structure that is not managed by a public entity; a lean management style that outsources non-core functions; the possibility of earmarking funding; and the possibility for donations to be tax-deductible. In addition to capital, the fund also provides technical assistance to address low capacity and to ensure that it can operate in a sub-optimal policy environment. The structure is well suited for supporting projects that depend on public support.[iv]

i. With financial support from the German Federal Ministry for Economic Cooperation and Development (BMZ) and the European Commission.
ii. Eco.business Fund. 2020. Accessed on May 19, 2020. Available at: https://www.ecobusiness.fund/en/
iii. Supported by the Federal Ministry for Economic Cooperation and Development (BMZ), KfW Development Bank, Agence Française de Développement (AFD), Campaign for Nature (CfN), Frankfurt Zoological Society (FZS), the International Union for Conservation of Nature (IUCN), the UNESCO World Heritage Center, and the Worldwide Fund for Nature (WWF).
iv. The Legacy Landscapes Fund. 2020. Accessed on May 19, 2020. Available at: https://legacylandscapes.org/

contract farming schemes together with merchant companies. (Rabobank, 2020).

MDBs and donor organizations can also step up, target, and innovate in their own approach to providing finance for biodiversity conservation. The Green Swan report (Bolton et al., 2020) notes various proposals for how IFIs can step up their role in supporting the climate agenda. This logic applies—by extension—to the biodiversity and ecosystem services agenda, given the possibility of systemic risks implicit in nature's degradation and loss. Many multilateral and bilateral donor countries currently channel grants to biodiversity-rich countries to carry out programs for the protection of biodiversity. The OECD Creditor Reporting System estimates bilateral and multilateral flows of biodiversity finance (ODA and other non-concessional outflows) to have been $5.5 billion and $565 million,[73] per year, respectively, between 2015 and 2017 (OECD, 2020a). However, tracking tools are far from exhaustive, and tend to capture only the tip of the iceberg of biodiversity finance, focusing on expenditures that directly contribute to conservation, and missing the broader efforts to green standard investments. To harness the two levers of resources mobilization—financing green and greening finance—donors and multilateral institutions (see also Table 8) can reprioritize how these ODA funds are granted and utilized:

- Firstly, donor countries can support in-country enabling conditions and the policy environment—including regulatory, fiscal, financial, and trade—to unlock the other mechanisms in the report. This process starts with support for national planning strategies,

73 These are OECD's mid-range estimates, which count 100 percent of principal flows (Rio marker 2) and 40 percent of significant flows (Rio marker 1) (OECD 2020a).

Table 8. Activities through which MDBs Can Help Develop Supportive Enabling Environments

Planning
Create knowledge of the importance of ecosystem services in poverty reduction and shared prosperity
Develop growth scenarios integrating ecosystem services
Support whole-of-government NBSAPs that include a role for the private sector
Policy advice
Provide sector policy advice on removing harming subsidies/putting in place right incentives (tax, etc.)
Advise on supportive sector policies (greening supply chains, etc.)
Provide advice and TA on developing innovative approaches to cashflow monetization for biodiversity projects/nature-based solutions
Provide support for devising national biodiversity investment plans
Help countries develop plans for greening financial systems
Support countries in developing economic recovery packages that incorporate short-term biodiversity opportunities and contribute to the avoidance of future risks
Data, measurement, and standards
Support countries in producing Natural Capital Accounts
Provide comparable international data
Work with standard setters to ensure biodiversity included in taxonomies, product labels, etc., in a harmonized way
Greening the financial sector and risk assessment
Build tools and capacity for financial sector regulators to incorporate bio risk into their own regulatory and supervisory oversight and risk assessments
Build tools and capacity for financial sector firms (banks, insurance companies, institutional investors) to incorporate biodiversity into their own risk assessment and investment processes
Incorporate biodiversity risk into FSAP analysis

including the development of roadmaps for the financial sector.

- Secondly, donors could promote better alignment and synergies between the biodiversity and ecosystem services agenda and the climate change agenda, including both mitigation and adaptation. Conservation and nature-based solutions should go hand in hand, and each dollar should be optimized to achieve dual benefits.
- Thirdly, MDBs could improve the mainstreaming of biodiversity across their lending portfolios, especially in the agriculture, infrastructure, extractives, and urban sectors. Again, MDBs' experience integrating climate change criteria into their decision-making processes provides a useful example of this.
- Finally, MDBs are in a position to lead the private finance sector by developing transparent accountability and reporting standards for biodiversity protection, including the promotion of the rigorous, universal application of IFC Performance Standard 6, requiring the use of the mitigation hierarchy (see Box 22).

Rhino in Amboseli national park Kenya: © Volodymyr Burdiak/Shutterstock

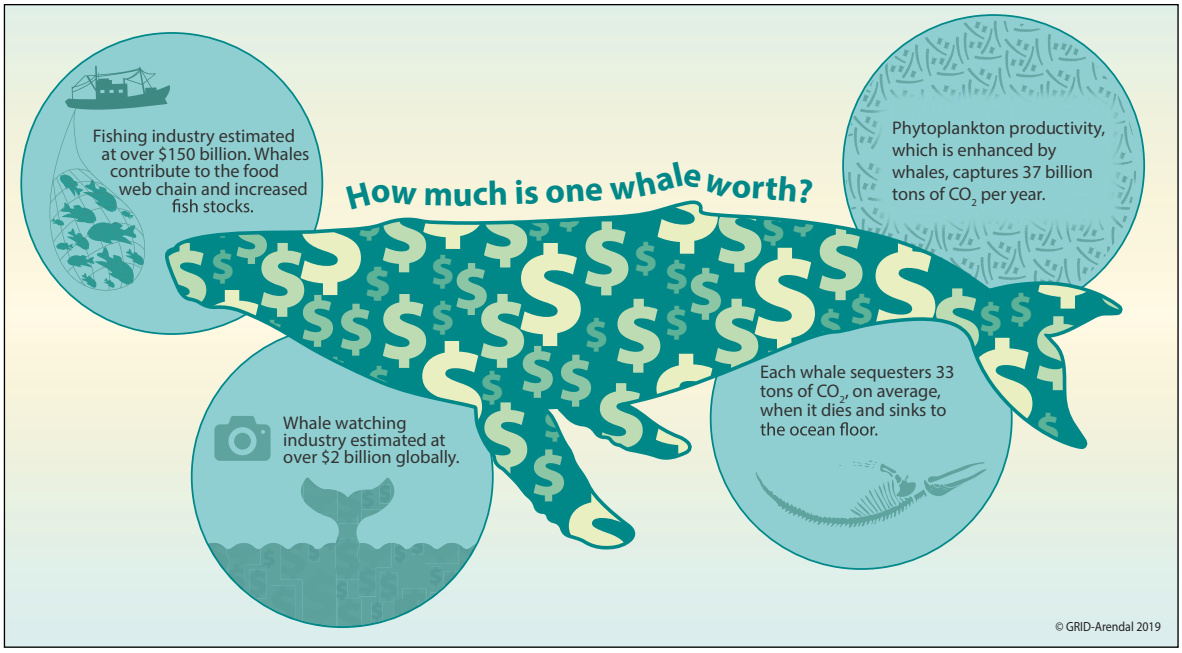
Chapter 5
Conclusion

Although awareness of the importance of biodiversity and nature conservation is growing, market failures and policy failures mean that it is proving difficult to translate this awareness into action. Awareness of the importance of biodiversity and nature, and the material risks to the real and financial sectors which degradation poses is increasing—not least due to the 2020 COVID-19 pandemic. Failure to account for the social and environmental externalities associated with biodiversity loss has resulted in the underpricing of biodiversity risk and poorly-informed investment and policy decisions. Biodiversity and the many ecosystem services it supports are public goods whose true value is not reflected in economic transactions. At the same time, the overexploitation of nature is often the result of policy choices in the presence of competing development needs, which in turn create vested interests that can make change more difficult.

Simply put, nature has value, but not a price.[74] Mark Carney, the former Governor of the Bank of England and United Nations Special Envoy for Climate Action and Finance, has said: "Amazon is one of the world's most valuable companies, yet the Amazon region appears on no ledger until it is stripped of its foliage, and converted to farmland. The price of everything is becoming the value of everything. This crisis (COVID-19) could help reverse that relationship, so that public values help shape private value. More fundamentally, the traditional drivers of value have been shaken, new ones will gain prominence, and there's a possibility that the gulf between what markets value and what people value will close" (Carney, 2020). As the IMF has asked, "Can you put a price on a whale?" (Chami et al., 2019)?[75] The answer is not just yes, but that we must. Figure 18 shows some of the ways in which the IMF has determined whales provide economic value. While it is impossible to quantify the full value of a whale, the estimated economic value can influence investment in species protection, which can allow the full value of the whale to be realized by humans and the biosphere. Additionally, while it is not possible to put a price on the majority of species, identifying the economic value of some species will help protect others in their ecosystems.

74 "When people talk about natural capital not being assigned a value, it's not true. We have put a price on nature. And that price is zero," Ed Barbier, Colorado State University (Avery, 2019a).
75 This analysis has estimated the value of a single great whale at more than $2 million—which comes to more than $1 trillion for the current stock of great whales (Chami, 2019).

Figure 18. The Value of a Whale



Source: Chami et al., 2019. IMF.

A supportive enabling environment needs to be put in place before the finance needed to meet biodiversity goals will flow. Much still needs to be done to create an environment that will enable stakeholders to tap into a broader range of financial sources, which will be needed to meet the biodiversity and nature conservation goals. Until policies are aligned and economic incentives redirected for positive, rather than negative impact, market failures will not be resolved.

Lessons on how to tackle this problem have been drawn from the climate sector. As CPIC's Fabian Huwyler has said: "We're just not going to be able to save our natural resources by taking small incremental steps. Just 'doing a little better' is not going to be enough. We have to crack natural capital valuations and build them into the entire market" (Avery, 2019b). Climate finance has benefited from substantial sums of dedicated concessional finance, which has helped to scale renewable energy technologies and allow them to compete with, and increasingly replace, existing fossil fuels.[76] High profile networks of regulators, alongside private sector initiatives, have begun to mainstream climate risk analysis into corporate reporting and financial sector risk analysis. Global commitments and measurable targets have provided an overall framework for this. There are important similarities between climate and biodiversity risk. Among these are the fact that they are both systemic risks requiring management or mitigation using analytical tools and policy instruments. Thus, the biodiversity financing space can harness lessons already learnt in the climate sector. It is also increasingly recognized that these risks are linked, and that biodiversity and nature losses need to be tackled in a complementary manner alongside climate risk, rather than competing with it for investment and other resources.

Yet there are also important differences between biodiversity financing and climate financing—which will mean that a different approach and emphasis will be required. With climate finance,

76 According to Bloomberg New Energy Finance, "more than two-thirds of the global population today live in countries where solar or wind, if not both, are the cheapest source of new electricity generation. Just five years ago, coal and gas dominated that picture. By 2030, new wind and solar ultimately get cheaper than running existing coal or gas plants almost everywhere" (BNEF, 2019).

much progress has been made through *'financing green'*, i.e., investment opportunities, particularly in renewable energy. Subsidies have been used to support new technologies, with new industries now operating viably and able to compete with fossil fuel production in many cases. Incorporating climate risk into financial balance sheets—i.e., *'greening finance'*—has been slower, but now has momentum, for example through reporting initiatives such as TCFD and the stranded asset debate. It can be argued that biodiversity financing will take the opposite route. Financing biodiversity projects at scale is difficult because of their very nature—being localized and small in scale, with many lacking revenue or cashflows which can be monetized. And as noted, putting a price on something which has previously been seen as free or a public good is challenging. However, awareness of the risks of biodiversity loss is rising fast and is increasingly being recognized as financially material. Introducing incentives for biodiversity conservation into existing business models, including by greening supply chains, is likely to have the biggest impact.

This report highlights 'Big Five' ideas which have the potential to have the impact to meet the urgent challenges of biodiversity loss. Among the many policy ideas presented in this paper, and innovative financing approaches showcased, the 'Big Five' key initiatives, listed below in Table 9, could act as important catalysts to scale finance for biodiversity and ecosystem services.

Table 9. Five Big Ideas to Mobilize Private Finance for Biodiversity

1. Environmental Fiscal Reforms (EFR)

Governments could include EFR as part of crisis recovery plans. The current design of stimulus plans opens a potential 'reform window' in which to tackle these difficult issues. Reforming agricultural subsidies and land ownership has the largest potential impact of the recommendations in this paper, and can be complemented with investment in social, development, and job creation programs.

Governments/regulators	Real sector	Financial sector
• Develop subsidy reform policies • Develop land ownership reform policies • Develop green stimulus plans	• Engage with governments on sector subsidy transition and reform • Support smallholder farmers in transitioning to sustainable and regenerative practices through TA and aggregation	• Develop and deploy funds and financial instruments that drive transition in the real sector, including through sustainability linked instruments and aggregation of projects • Invest in and support biodiversity credits

2. National Data Provision and Planning

Governments can support the integration of biodiversity criteria in financial sector decision making by adopting natural capital accounting (NCA) practices and providing relevant data as a public good. Governments can also mobilize private investment for biodiversity by including a role for the private sector in their National Biodiversity Strategies and Action Plans (NBSAPs).

Governments/regulators	Real sector	Financial sector
• Adopt NCA practices • Develop NBSAPs that include a role for the private sector	• Utilize public NCA data and adopt corporate NCA practices: integrating data into project planning, operations, and investment decisions • Align planning and investment with NBSAPs	• Incorporate NCA data into risk analysis • Engage with governments and the real sector on NBSAP financing

Table 11. Continued

3. Establishment of TNFD

The initiative to establish a Taskforce for Nature-related Financial Disclosure (TNFD) can be supported by both private and public sector stakeholders. The initiative, which can be built on or be part of the TCFD, will provide a framework and guidance for regulating and supporting biodiversity reporting and risk assessment by real and financial sector firms. A TNFD framework can help avoid excessive additional requirements for real and financial sector firms and fragmentation of reporting standards.

Governments/regulators	Real sector	Financial sector
• Require regulatory assessment of systemic risk • Require regulatory reporting requirements for biodiversity risk	• Provide multi-stakeholder support for the development of TNFD framework • Adopt TNFD risk assessment and reporting framework • Integrate biodiversity reporting alongside climate reporting	• Develop and adopt TNFD risk assessment and reporting framework at portfolio level • Standardize project level risk assessment • Adopt biodiversity investment taxonomy and standards for biodiversity financial instruments

4. Establishment of a 'Nature Action 100'

Investors could come together to identify the top 100 companies with the greatest negative impact on nature, and establish an equivalent of the 'Climate 100', to drive changes in real sector corporate behavior—including greening of supply chains.

• Develop industry standards for greening supply chains • Regulate and enforce environmental protection	• Commit to industry standards • Work with suppliers to green supply chains • Set corporate biodiversity goals • Adopt NCA practices	• Engage with investee companies to encourage commitment to industry standards • Develop financial instruments aligned with industry standards/impact measures

5. Providing catalytic capital

MDBs and governments can mobilize private investment for biodiversity goals by serving as cornerstone investors and providing catalytic capital to funds and other financial instruments that aggregate projects.

Governments/regulators	Real sector	Financial sector
• Use concessional finance for aggregated instruments • Provide technical assistance • Promote standardized measures of impact • Identify the asset that generates value (PPP) • Align land management rights with green growth	• Provide market access • Build capacity on business model • Standardize practices across projects • Aggregate projects	• Adopt standard measures of impact • Standardize investment products • Develop aggregation financial instruments

Annex

Table 10. Summary of Recommendations by Stakeholder Group

Summary of Recommendations		
Governments	Private sector	MDBs
Levelling the playing field via real sector policies	Risk management and financial instruments	Supporting implementation
Standards and regulations 1. Land planning and governance reform 2. Pollution standards 3. Mandatory standardized environmental impact assessments that integrate biodiversity criteria 4. Biodiversity offsets regulation and best practice guidance 5. Voluntary sustainable certification and supply chain transparency 6. Biodiversity friendly procurement practices 7. Strengthen regulation protecting high biodiversity areas and ecosystems supporting endangered, endemic, migratory species 8. Strengthen regulations protecting biodiversity and ecosystems with significant economic value **Subsidy and tax reform** 9. Environmental fiscal reform	**Incorporating risks** 1. Standards 2. Scenario analysis 3. Engagement **Developing investment opportunities** 4. Application of new instruments—scale, replication, and aggregation 5. Sequencing of instruments 6. Private equity and pipeline development 7. Strategic allocation of capital through public equity 8. Development of biodiversity funds, ETFs, and indices 9. Labeled bonds 10. Labeled loans 11. Pooled debt vehicles 12. Carbon and biodiversity offset markets 13. Incorporating biodiversity criteria into investment processes 14. Blended finance and risk mitigants	1. Developing new instruments 2. Blended finance 3. Strategic application of ODA funds 4. Alignment between the conservation agenda and the nature-based climate solutions agenda 5. Mainstreaming biodiversity across lending portfolios 6. Develop transparent accountability and reporting standards for biodiversity protection 7. Support governments in developing enabling environments 8. Acting as cornerstone investors in funds and other instruments that aggregate projects and scale investment vehicles

Table 10. Continued

Summary of Recommendations		
Governments	Private sector	MDBs
Greening the financial sector		
Financial sector policy frameworks and biodiversity strategies 1. Green financial sector roadmaps 2. NBSAPs **Data and accounting** 3. Natural Capital Accounting 4. Planetary health metrics and contextual reporting 5. Technology for data **Regulation and supervision** 6. Taxonomies 7. Labeling 8. Supervisory risk assessment 9. Disclosure 10. Solvency and capital regulations **Developing investment opportunities** 11. Serve as cornerstone investor by providing catalytic capital to funds and other financial instruments that aggregate projects		
Foundation for success		
Enforceability, resources, and capacity	Transparency and capacity	Innovation and global coordination

Table 11. Criteria for Assessing Biodiversity Finance Instruments and Models

Criteria for Assessing Biodiversity Finance Instruments and Models (list of instruments and models in Table 7)
Replicable
Question: Can an identical project structure be used for other projects in different geographies or countries?
Criteria: • Does the project require specific ecological or geographical conditions? (such as charismatic species or large cities downstream of project) • Does the project require specific community-related conditions? (such as community governance structure, recognition of indigenous people rights, or the devolution of land rights to communities to create conservancies) • Does the project require specific regulations, access to data or to technical capacity beyond the usual? • Does the project require specific funding conditions? (such as the fact that green infrastructure financing usually involves municipal bonds)
Scalable
Question: Can the same project structure be used to include more land, companies, or stakeholders?
Criteria: • Do companies involved in the project manage, either directly or indirectly, large expanses of land that are subject to the same threat/opportunity? • Is it feasible to aggregate smaller companies or communities under a single umbrella with standardized standards and operations?
Appropriate for developing countries
Question: Can the project structure be transferred to or between developing countries with lower levels of governance, regulation, technical capacity, and internal investment capacity?
Criteria: • Does the project require specific regulations, governance/enforcement capabilities, access to data or to technical capacity beyond the reach of most developing countries? • Does the project require specific funding conditions beyond the reach of developing countries?
Potential biodiversity impact
Question: Can the project generate a large ecological uplift when compared to a business-as-usual scenario?
Criteria: • Is the project potentially taking place in, in the near vicinity of, or connected to areas with medium or high biodiversity value? (urban forests and urban green infrastructure may not, unless the improved water quality benefits downstream ecosystems) • Will the project reduce an existing or expected threat either directly (by stopping poaching in a protected area or logging of a primary forest) or indirectly (by creating a buffer for a protected area) beyond the business-as-usual scenario? • Will it restore an impacted ecosystem beyond the business-as-usual scenario? • Is the positive impact expected to be durable because of the long-term governance and funding created by the project, in particular to the benefit of local communities?

Table 11. Continued

Criteria for Assessing Biodiversity Finance Instruments and Models (list of instruments and models in Table 7)
Potential to attract capital
Question: Can the project attract large amounts of capital, in particular institutional capital?
Criteria: • Would the cash flows generated by the project support commercial returns given the level of risk? • Would the scale of the opportunity allow the raising of multiple investment vehicles that can give exposure to the project type to institutional investors? Is the opportunity expected to remain for long enough to incentivize investment? • Is the current investment infrastructure able to easily shift to access this new opportunity? (For example TIMOs going to sustainable TIMOs and carbon is a simpler shift that finding a private equity group in the blue economy.) • Is the investment structure similar enough to existing asset classes that investors and their advisors may agree to overlook the novelty? (Green infrastructures may look a lot like municipal infrastructure for example. Therefore, a track record gained in municipal infrastructure financing may be used for green infrastructure financing.) • Would the risk/return profile support leverage and the issuance of fixed income products?

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