The Little Book of Investing in Nature

A simple guide to financing life on Earth

LBIN

Global Canopy

Global Canopy is an innovative environmental organisation that targets the market forces destroying tropical forests. Since 2001, we have been testing new approaches to tackling deforestation, and guiding companies, investors, and governments worldwide to think differently about our planet's forests.

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We are continually aiming to improve The Little Book of Investing in Nature and your feedback is welcome.

Please send comments to info@globalcanopy.org

Elizabeth Maruma Mrema

Ten years ago, The Little Biodiversity Finance Book was launched at the margins of the 10th meeting of the Conference of the Parties (COP 10) to the Convention on Biological Diversity in Nagoya, Japan. The meeting adopted at the same period, the Strategic Plan for Biodiversity 2011–2020.

We have come a long way since then. While we may fail to achieve the Strategic Plan's 20 Aichi Biodiversity Targets, some progress has been made, including on biodiversity finance. Supported by an active and increasing network of partners, such as the Biodiversity Finance Initiative of the United Nations Development Programme and others, many countries made progress in better organising their national resource mobilisation efforts and in devising and applying innovative financial solutions. Many governments also managed to increase their biodiversity financing, both international and domestic. We clearly understand better the complex interlinkages between climate change and biodiversity loss, and the resulting opportunities to generate financing co-benefits. Unfortunately, global biodiversity continues to decline, and we all know that we need to do more and demand to do better.

This includes financing: while there is a range of specific estimates of our biodiversity financing needs, based on different assumptions, methodologies and scenarios, all estimates point to a significant and persistent biodiversity financing gap for this decade. The coming years however, will be decisive for the future of our planet's biodiversity. COP 15 in China is expected to adopt the post-2020 global biodiversity framework, setting out crucial global goals and targets to protect and restore the natural world that we all rely on. Implementation of this framework will require an unprecedented mobilisation of financial resources from all sources and, with it, an unprecedented mobilisation of financial actors as partners in implementation.

Only by investing in nature can we achieve the sustainable and resilient future we all want. However, we also know that the policy impacts of COVID-19 are leaving many governments financially stretched. In addition to prioritising the protection of nature and mobilising the requisite financial resources, this points to the need to build more resilient economic models, by improving the efficiency of resource use, by realigning incentives and redirecting financial streams from biodiversity-harmful to biodiversity-positive impacts.

The present volume of The Little Book of Investing in Nature provides a treasure trove of insightful information on how to make progress along these different dimensions of biodiversity finance. Capturing the conceptual progress made in the last decade, it provides an almost encyclopaedic overview of the options available across the spectrum of financial solutions from different sources. I strongly believe that the book will provide useful guidance to biodiversity and financial practitioners and help them in designing effective financing strategies as an integral part of the implementation of the global biodiversity framework in the coming decade.

Elizabeth Maruma Mrema
UN Assistant Secretary-General and Executive Secretary
Secretariat of the Convention of the Biological Diversity

Rémy Rioux

In 2015, the Paris Agreement charted a new course in the global climate effort by including, as one of its three overarching objectives, a commitment to making finance work for climate. It has now become urgent to acknowledge that we must also make finance work for nature. Figures show that less than 0.2% of global GDP is channelled to maintain and preserve ecosystems while half of the world's GDP is dependent on nature even as the COVID-19 crisis demonstrates that mistreating biodiversity threatens both people and the planet.

Therefore, France is determined to put biodiversity high on the world's political agenda prior to COP 15. Leading "the fight of the century" – as President Macron said – requires addressing biodiversity loss and tackling climate change as intertwined challenges, including from a financial perspective. Accordingly, the Agence française de développement has decided that 30% of its climate finance will be nature positive by 2025. This reflects the rising engagement of public development banks (PDBs) to adopt nature-based solutions, building on their climate experience. With projects that represent 10% of global investments worldwide, PDBs have the means to scale up biodiversity-positive finance with a transformative impact. At the November 2020 Finance in Common Summit, the 450 PDBs of the world, signed a joint declaration[1] in which they affirm their awareness of the need for biodiversity financing. In this endeavor, they "stand ready to help align all financial flows with the future post-2020 Global Biodiversity Framework to be adopted at the COP 15." At the forefront of this engagement, the International Development Finance Club – which gathers 26 national and regional development banks from all over the world – has also decided to adopt increasingly nature-based solutions.

Last but not least, PDBs can work with the private sector to factor in nature in the way we invest, produce and consume, and demonstrate that solutions encompassing business and biodiversity protection are possible. This is also what *Finance in Common* is about, and I am confident that *The Little Book of Investing in Nature*, published on the occasion of the *One Planet Summit* taking place on January 11, 2021, will greatly contribute to showing a way forward compatible with the sustainability of our planet.

Rémy Rioux
Chairman of the International Development Finance Club (IDFC) & Agence française de développement (French Development Agency) CEO

[1] Finance in Common (2020). Joint Declaration of all Public Development Banks.

Philippe Zaouati

Nature has become a hot topic for the sustainable finance sector in recent years, and now it is moving to the top of the mainstream finance agenda, attracting the interest of pension funds, insurance companies, and banks. Like for the climate issue, we are witnessing successive steps: from awareness to commitments, and from commitments to concrete actions. But unlike climate action, which took many years to develop this momentum, there is a clear urgency now and we need to act fast; much faster than before.

The COVID-19 crisis is a resounding wake-up call which combines environmental, social, health, and economic issues in one major challenge. Responding to this challenge will require the building of more resilient, equal societies, which can live in harmony with nature. Transforming institutions, companies, and even individual behaviour requires real efforts. Let us be clear: we will not be able to meet the Sustainable Development Goals and biodiversity objectives by making marginal adjustments. A systemic change is required.

So where do we start; how can we move quickly to concrete, transformative actions? Unlocking the power and agility of the finance sector can play a catalytic role. To do this we need to address two major bottlenecks in financial activities: (i) accurately assessing and managing risks, and (ii) identifying new opportunities. All financial professionals, from commercial teams to risk management and even accounting departments, need to integrate the nature lens in their analyses, together with the climate lens. The impact of financial activities on nature, positive and negative, needs to be integrated in all decisions made, and then monitored and reported on.

Financial institutions can play a key role in bringing funding, innovation, and accountability, but they can't do it alone; transformative change will require collaboration between public and private entities and civil society. This Little Book is a great example of such collaboration, aimed at raising awareness to support concrete actions within a larger systemic change. We need to re-invent the relationship between society and nature, and the stakes are too high for us to fail.

Philippe Zaouati
Mirova CEO

John Tobin and Andrew Mitchell

When Global Canopy first published The Little Biodiversity Finance Book in 2010, we could not have foreseen how much attention would ultimately be devoted to three questions that it alluded to: How much funding does nature get today? How much funding should it get tomorrow? And how are we going to get there?

Then, the biodiversity financing gap seemed too big to bridge. At the time, impact investing was a relatively new concept. The Principles for Responsible Investment (PRI) had just been crafted. But in 2014, a team representing Credit Suisse, WWF and McKinsey, proposed a radical solution. If investing in nature could make a tangible return, the private sector could help pay for its conservation. The problem was not the lack of money, but the lack of competitive risk-adjusted returns which at the same time safeguarded biodiversity and delivered sustainable livelihoods.

As the practice of investing for impact has grown, we have seen an explosion of interest in the idea of leveraging the tools of finance to address the global biodiversity crisis. Many have found this to be easier said than done — indeed, investing in nature for long-term profit, rather than exploiting it for short-term economic gain, is turning traditional economic models on their heads. Innovations such as blending private finance with government guarantees are accelerating biodiversity investment now.

Still, we are in the early stages of the growth of biodiversity finance. If investment activity is to become a substantial part of the solution to the biodiversity crisis, a variety of structural obstacles will have to be overcome. Crucially, 'numbers for nature' that allow investors to compare the environmental performance of different transactions, are lacking. Climate finance has a '2 degrees Celsius' target and an easily understood currency – a tonne of CO_2. The Convention on Biological Diversity must strive at its next global summit towards an agreement for nature that is equivalent to the agreement secured for climate in Paris in 2015, including a clear set of goals.

The rules governing the investment activity of asset managers and financial advisors need resetting. Today, these rules encourage short-term economic returns, to the exclusion of any consideration of the collateral environmental or social damage of their investments. But this represents a disservice to the clients to whom they purportedly owe fiduciary duties. What use is a pension that pays out into a world devoid of life? Would altering incentive structures to reward sustainable outcomes lead financial institutions to make better investments in nature? As a younger generation of wealthy investors takes over their family offices, and the trillions of dollars that they manage, those refocusing on 'purpose' and inter-generational benefits may find a safe haven in investments in nature.

It is our hope that we have built on the strong tradition of Global Canopy's Little Book series with this new publication on biodiversity and finance. In answering the three questions posed above, we offer the most current and rigorous estimates available and demonstrate the extent to which this field has evolved in the past decade. For those new to the field, we aim to provide a simple guide to some of the specific mechanisms for financing biodiversity conservation currently in use.

Finally, we seek to draw attention to the breadth of options available to national governments currently negotiating a new set of biodiversity targets for the 2021–2030 period to replace the Aichi Biodiversity Targets. If there is one thing that has become entirely clear to us in the process of editing this book, it is that, unless we fundamentally change the movement of money to become nature-positive, rather than being nature-negative as it is on balance today, we will continue to finance ourselves into extinction. This book discusses how we can begin to make that change.

John Tobin-de la Puente
Professor of Practice,
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Andrew W. Mitchell
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How does this book help?

As the impacts of human activity on the natural world have become increasingly clear in recent years, alongside human dependences on a healthy environment, the conversation has shifted from “Should we save nature?” to “How do we pay for it?”. Few in government or business today doubt the inherent value of nature or the importance of managing it sustainably. The interest in halting the loss of biodiversity is enormous and is coming from unexpected quarters. Meeting after international meeting closes with strongly worded calls to protect nature, and the dialogue among the public sector, business, and civil society has never been more active. But once economics rears its head, then the dialogue becomes muffled, and participants start shuffling papers and shifting their eyes nervously.

The Little Book of Investing in Nature aims to energise that dialogue by clearly laying out options for financing biodiversity conservation. While some measures to protect biodiversity may come at an economic cost, others are likely to generate strong returns, economic and otherwise. This book presents evidence that, if a well-considered series of measures to protect nature is implemented, nature may be able to pay for itself.

As the international community considers how to finance biodiversity protection for the next decade and beyond, *The Little Book of Investing in Nature* aims to help governments, NGOs, the private sector and others compare existing and future options for financing conservation in a clear and consistent way. To do so, this publication introduces an overarching framework that organises biodiversity financing mechanisms into the following categories: revenue generation, better delivery, expenditure realignment, avoidance of future expenditures, and catalysts. To facilitate comparison of the various available financing options within each category, the book uses a set of common criteria that are presented graphically with icons. A comprehensive biodiversity financing plan is likely to include options from more than one of the categories.

This book is designed to serve not only the needs of the public sector, business and civil society actors in developing practical financing solutions for biodiversity, but also as a survey of the variety of mechanisms currently in use in biodiversity finance for those who want to understand how to invest in nature in a manner that helps protect our biosphere rather than damage it.

Contents

Understanding biodiversity

1

What is biodiversity?

Biodiversity in its broadest sense is the richness of life on Earth. Biodiversity is defined under the Convention on Biological Diversity (CBD) 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." Biodiversity occurs at all levels – genetic, species and ecosystem – and it is often best illustrated by considering the wide variety of plant, animal and microorganism species that exist across the planet. To date, around 1.8 million different species have been discovered and documented (Vié et al. 2009), but this number only scratches the surface; the best working estimate of the total number of species, documented and undocumented, on Earth is around 8 million, 75% of which are insects (IPBES 2019).

Biodiversity and genetic diversity are on a steady decline. The Living Planet Index determined an average decline of 68% in animal population sizes between 1970 and 2016 (WWF 2020) with some species groups and continents experiencing even greater loss; the Latin American and Caribbean states experienced a 94% decline in biodiversity during this period. Estimates on the current species extinction rate range from tens to hundreds of times higher than the natural extinction rate (IPBES 2019). In addition to biodiversity, this publication will refer to two additional related concepts: natural capital and ecosystem services. These concepts are often incorrectly used interchangeably by conservation stakeholders and practitioners. Therefore, these concepts are defined here for clarity.

Natural Capital
In general terms, 'capital' is defined as the stock of materials that exists within a system at any given time (Costanza et al. 1997). Some common forms of capital are financial capital, produced capital, and human capital. Natural capital, per the Natural Capital Coalition, refers to "the stock of renewable and non-renewable resources (e.g. plants, animals, air, water, soils, minerals) that combine to yield a flow of benefits to people" (Natural Capital Coalition, n.d.). Much as an investor will use financial capital to generate profits, a stock of trees or population of fish will provide a future flow of timber or food. Managi and Kumar (2018) have estimated that between 1992–2014 the value of the Global Natural Capital stocks per capita declined by nearly 40%.

One of the most important and recent studies on natural capital valuation is by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). In 2019, IPBES warned of the deteriorating state of natural capital – between USD 235 to 557 billion in crop value is at risk due to insufficient pollination, and around 25% of assessed species are at risk of extinction within the next decade (IPBES 2019). Similarly, The Economics of Ecosystems and Biodiversity (TEEB) aims to incorporate biodiversity valuation with policymaking and business practices. TEEB recommends that businesses recognize all dependencies and impacts on biodiversity to a) identify risks and b) advertise the sustainability of their products/services to consumers (TEEB 2010).

Ecosystem Services
Biodiversity, healthy ecosystems, and the survival of species all have intrinsic value, but their instrumental value to humans is provided through the products and services we obtain from ecosystems and is best described using the term "ecosystem services". Biodiversity loss compromises the delivery of fundamental ecosystem services like pollination, and the global loss of all pollinator species would lead to a drop in annual agricultural output of an estimated USD 217 billion annually (Helmholtz 2008).

Like produced capital, such as a water treatment facility that improves water quality, natural capital provides a vital flow of ecosystem services. Ecosystem services are functions of an ecosystem that directly or indirectly benefit human wellbeing (Daly and Farley, 2004; Voldoire and Royer 2004). Specifically, ecosystem services include both portions of the natural capital itself, such as timber or fish, that are harvested from ecosystems as well as the flows of services, such as watershed protection or climate regulation, that can be derived from and rely on stocks of natural capital.

Biodiversity
Biologically diverse ecosystems provide a greater flow of ecosystem services than non-diverse systems (Hooper et al. 2005, Flombaum and Sala 2008). The provision of finance to support biologically diverse ecosystems – or alternatively to support the biodiversity of a stock of natural capital – therefore ensures the reliable provision of ecosystem services from the world's stocks of natural capital. This, by extension, ensures that the stock of natural capital and the services they provide are more resilient to shocks and changing physical environments – a necessity in the face of widespread impacts of climate change (World Bank 2020).

Conversely, investments in the provision of ecosystem services alone could have a negative impact on the provision and sustainability of the flow of other ecosystem services into the future. Where human intervention in an ecosystem aims to maximize provision of a service, it can often have a negative effect on biodiversity, leaving the system less resilient and lowering the provision of other services. For example, reforestation replacing natural forest with monoculture plantations provides an ecosystem good but decreases the biodiversity.

Learn more

The value of forests

Forests occupy about 30% of the Earth's surface but support over 80% of the world's terrestrial biodiversity, which underpins vital ecosystem services in climate, water, food and energy security as well as human health from local to global scales (UNFF 2018). These services have global benefits, such as mitigating carbon emissions, but also local ones – over 1.6 billion people are dependent on forest services with 300–350 million depending entirely on forests for shelter and subsistence. Tropical forests in particular are extremely biodiverse. In these forests, more than 480 tree species can occupy a single hectare, and they house up to 50% of terrestrial biodiversity, 70–90% of which lives directly within or on trees (Butler 2019).

From 1990 to 2016, the world lost over 1.3 million square kilometres of forests, an area larger than South Africa (World Bank 2016). Commercial agriculture is responsible for over 70% of deforestation due to demand for palm oil, soy, timber and cattle (Lawson 2014). Private finance can help mitigate this trend through zero-deforestation investments and sustainable supply chain practices that promote habitat protection while delivering positive financial results. The Global Impact Investing Network's (GIIN) timber benchmark reported in 2019 that 18 sustainable timber impact funds had net returns of 8.6% or higher compared with the average 4.2% returns delivered by conventional forestry funds (GIIN 2019). Forest regulations via forest management plans (FMPs) for logging concessions have also been successful, for example in the Congo Basin, where Forest Stewardship Council certification was used. FMP areas within the Congo Basin had 74% less deforestation between 2000 and 2010 compared with non-FMP areas in the same region (Tritsch et al. 2020).

Climate Security

Tropical rainforests have a double-cooling effect on the climate. Standing forests, without any intervention by man, sequester vast quantities of carbon dioxide (CO_2) out of the atmosphere acting as a 'carbon sink'. This service removes about 15% of human CO_2 emissions from the atmosphere every year, equivalent to around 1 tonne (or metric ton) of carbon dioxide per hectare per year (Lewis et al. 2009; IPCC 2007). Instead of rewarding this service, however, we are destroying it. Tropical deforestation is turning these forests from carbon sinks to carbon emitters, accounting for around 10% of our global greenhouse gas emissions, the second-largest source of CO_2 emissions behind fossil fuel combustion (UNFF 2018). Tropical forests also account for one third of our planet's ability to evaporate water from land into the atmosphere, cooling the Earth's surface and creating clouds that reflect sunlight back out to space (Malhi 2011). The recycling of water vapour by forests back into air currents also helps to maintain rainfall regimes over vast areas. For example, much of the rainfall in the Andes that feeds glaciers and high-altitude populations has been recycled over lowland Amazonian forests (Poveda et al. 2008).

Water Security

Over 90% of the world's cities and 75% of accessible freshwater sources depend on forested watersheds for clean water (McDonald and Shemie 2014; Millennium Ecosystem Assessment 2005). Forests act as a type of natural infrastructure, or naturally built infrastructure, that filters out sediment and nutrient pollution from bodies of water. Deforestation therefore increases the costs needed to sanitate water.

Food and Health Security

Forests underpin food security in three ways: providing food to local and indigenous communities, enabling products that people sell to purchase food, and ensuring the environment is suitable for many agricultural practices (Pimentel 1997). Forests provide a diversity of nutrient-rich food for rural people and act as a safety net in times of drought or food shortage (Arnold et al. 2011). Small-scale farmers often depend on the ability of forests to recycle nutrients and prevent soil erosion. At regional and continental scales, forests help to recycle water vapour that falls as rain in agricultural areas far from the forest border. In Amazonia, winds carry moisture recycled by the forest in 'flying rivers' down to the south of Brazil and beyond, supporting agricultural production in the South American breadbasket (Vera et al. 2006; Marengo et al. 2004).

As well as providing a sustainable source of fresh food, forests are an essential source of wild-harvested medicines for both local communities and global pharmaceutical companies. Trade in medicines and plants derived from tropical rainforests is estimated to be around USD 108 billion per year (Simula 1999). Undisturbed tropical forests can also have a moderating effect on infectious diseases: 40% of the world's population lives in malaria-infested regions and heavily deforested areas can see up to a 300-fold increase in the risk of malaria infection compared with areas of intact forest (MacDonald and Mordecai 2019). The commercial trade in bushmeat is also increasing human exposure to new diseases that are carried by wildlife. Efforts to conserve areas of high biodiversity can reduce the likelihood of diseases such as SARS (Jones et al. 2008) and, more recently, COVID-19 being transmitted from wildlife to humans.

Energy Security

Tropical forests support energy security at the local, regional and global levels. More than 2 billion people rely on timber as their primary source of fuel for cooking, heating and other energy needs (IPBES 2019). Currently, however, fuelwood collection is a major driver of deforestation, particularly in Africa and Southeast Asia (Griscom et al. 2009). Forests are also essential to the production of hydroelectricity through the regulation of water flow and the reduction of sedimentation in rivers at regional scales. For example, given that over two thirds of Brazil's electricity supply is generated through hydropower, any changes in forest cover – which would affect rainfall patterns, surface run-off and sedimentation of dams – severely threaten the country's energy security (MacDonald 2016).

Livelihood Security

More than a billion of the world's poor depend on forests for some part of their livelihoods and food security, and around 60 million indigenous people depend almost entirely on forests for their survival (World Bank 2004). About 38 million square kilometres in 87 countries, or about 40% of all terrestrial protected areas, is managed by indigenous people, highlighting both indigenous people's role in biodiversity protection and their dependence on these protected areas (Garnett et al. 2018). Also, 12% of the population in low-income nations lives within optimal tropical reforestation areas (Erbaugh et al. 2020). Critically, maintaining forests is a long-term process that requires an understanding of the effects of forest loss. A study in 2020 confirmed that time lags between livelihood impacts and biodiversity loss effects from deforestation can extend to up to fifty years (Sugden 2020).

What is the value of ecosystem services?

Estimates by Costanza et al. (2014) of the global value of ecosystem services in 2011 (USD 125–145 trillion) represent more than 150% of global gross domestic product (GDP). These valuations focused on a series of biomes that provide a broad range of essential ecosystem services to humans. Previous valuations estimated the contributions of specific biomes. Groot et al., for example, estimated that an average hectare of open ocean provides USD 490 per year in ecosystem services, while an average hectare of coral reefs provides USD 50,000 annually in ecosystem services (Groot et al. 2012).

According to the World Economic Forum, USD 44 trillion of economic value, or over half of the world's GDP, is moderately or highly dependent on nature, and therefore currently at risk as a result of biodiversity loss and ecosystem degradation (WEF and AlphaBeta 2020). Some countries have a higher dependency on nature than others – India and Indonesia, for example, derive a third of their GDP from sectors that are highly dependent on nature. According to Swiss Re Institute's Biodiversity and Ecosystem Services (BES) Index, this may lead to severe economic distress as a fifth of all countries, both developing and advanced economies, have more than 30% of their territory at risk of ecosystem collapse due to a decline in biodiversity. Countries with highly fragile ecosystems and high dependence on agricultural sectors, such as Kenya, Nigeria and Pakistan, are particularly at risk (Retsa et al. 2020). Despite our reliance on ecosystem services, humans continue degrading biodiversity at alarming rates, resulting in a substantial and largely irreversible loss in biodiversity (Sukhdev 2008). The loss of ecosystem services due to land use alone from 1997–2011 is estimated to be in the range of USD 4.3–20.2 trillion per year (Constanza et al. 2014).

Learn more

Global biodiversity conservation funding needs

Global Protected Areas

Previous policy efforts and estimates of funding needs for global biodiversity conservation have primarily focused on supporting the management of protected areas to prevent biodiversity loss.

Protected areas preserve existing biodiversity by controlling or eliminating human impacts on terrestrial and marine habitats. The current global protected area network, which contains 16% of terrestrial habitat and 7.4% of the oceans is estimated to only receive USD 24.3 billion annually (Waldron et al. 2020) – roughly one third of what it needs to be effectively managed. These critical funding shortfalls represent a key obstacle to effectively increasing and managing the global protected areas network and addressing international biodiversity protection goals. The CBD 2030, draft Action Target A2 recommends that "By 2030, [countries] protect and conserve through a well-connected and effective system of protected areas and other effective area-based conservation measures at least 30 percent of the planet with the focus on areas particularly important for biodiversity."

Waldron et al. (2020) analyse the economic implications and financial cost-benefit of implementing such a network covering 30% of global terrestrial and marine protected area by 2030 and proposes a suite of six scenarios, with an average annual investment of USD 140 billion, for achieving this target. McKinsey estimates that increasing the global protected area coverage – by creating or safeguarding protected areas through conservation efforts – would give benefits of USD 290–470 billion per year. It would also create 400,000 to 650,000 jobs in conservation management, 30 million jobs in ecotourism and sustainable fishing, and reduce annual CO_2 emissions by 0.9–2.6 gigatonnes annually (Claes et al. 2020).

In this book, the lower estimate for future global protected area needs is based on the Waldron et al. (2020) scenario, which allows for a compromise between biodiversity protection and productive landscapes. In turn, the upper estimate is that of the scenario that prioritises broader ecosystem integrity and viability. The annual cost of expanding the global protected area network to 30% of all terrestrial and marine ecosystems is USD 149–192 billion per year (Deutz et al. 2020).

Beyond Protected Areas

Global protected areas play a key role in preventing biodiversity loss; however, without further conservation measures they will not be sufficient to ensure the long-term sustainability of the Earth's biosphere. For instance, only 10% of existing protected areas are 'structurally intact' – that is, adequately protected from the negative influence of human activities such as agriculture, mining, construction and other sectors (Ward et al. 2020). Urban areas are expected to expand by 1.2 million km2, an area equivalent to the size of South Africa, by 2030. This expansion could result in the conversion of some 290,000 km2 of natural habitat, potentially degrading as much as 40% of strictly protected areas globally and further endangering 13% of the world's vertebrates (Seto et al. 2012; McDonald et al. 2018).

Agricultural croplands and rangelands represent the biggest challenge to biodiversity, and comprise 55–69% of the total global biodiversity conservation funding needs (Deutz et al. 2020). Land-use change is considered one of the largest drivers of global biodiversity loss and ecosystem degradation, with agricultural expansion the most common form of land-use change since 1970 (IPBES 2019). Agricultural land-use change is not only driven by the growing need for food and income, but also by inefficient production, distribution and use of food, much of which is wasted between the farm and the table. Many of these unsustainable agricultural practices occur near or within protected areas.

As a result, a comprehensive approach to biodiversity conservation is needed: one that includes direct biodiversity investments through protected areas but also considers the need for mainstreaming biodiversity conservation, in order to better manage economically productive landscapes and seascapes to maintain biodiversity integrity and key ecosystem services. This comprehensive approach must also effectively manage the negative impacts of invasive alien species on local biodiversity and support green urban transformation by measures such as controlling water pollution and protecting biodiversity in urban areas.

Total global biodiversity conservation funding needs are estimated to be USD 722–967 billion per year by 2030 (Deutz et al. 2020). Table 1 and Figure 1 show that about 76% of the annual funding needed to halt and reverse global biodiversity loss relates to the need to mainstream biodiversity conservation. This includes better management of economically productive landscapes and seascapes, tighter control of invasive species and reducing the impacts of rapid urbanisation on biodiversity.

Table 1. Global annual biodiversity conservation funding needs

Funding Needs	Target	Annual (in billion USD)
A. Dedicated biodiversity conservation funding needs		
Protected areas	Expand the global protected area network to 30% of all terrestrial and marine ecosystems	USD 149–192
Coastal ecosystems	Global conservation and restoration of critical coastal ecosystems including mangroves, seagrass, saltmarshes, and oyster reefs	USD 27–37
B. Mainstream biodiversity conservation funding needs		
Sustainable management of productive landscapes and seascapes	Global sustainable management of agricultural lands (cropland and rangelands), forests, and fisheries	USD 438–580
Invasive species	Global invasive species management	USD 36–84
Urban environments	Biodiversity conservation in urban environments and reducing water pollution	USD 72.6–73.2
		Total: USD 722–967

Source: Deutz et al., 2020

Global biodiversity funding needs by 2030

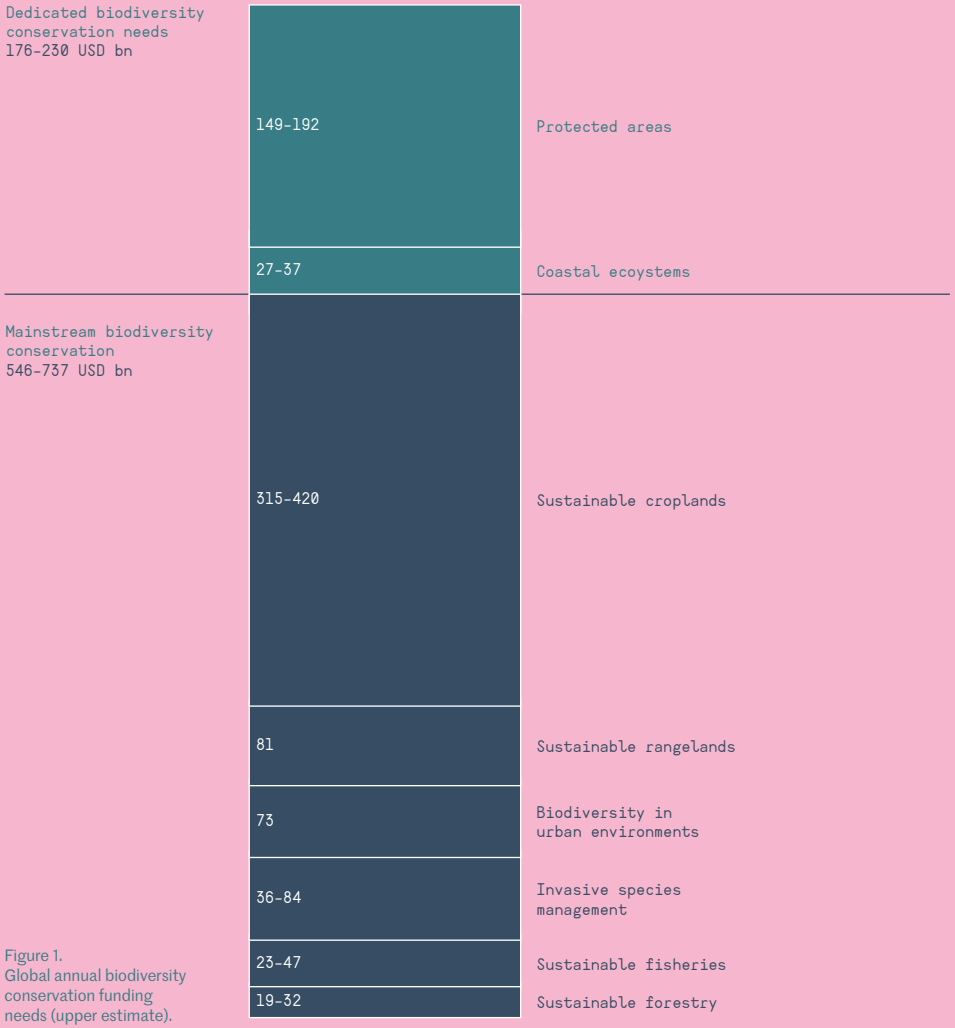


Figure 1.
Global annual biodiversity conservation funding needs (upper estimate).

Learn more

What are payments for ecosystem services (PES)?

Payments for ecosystem services (PES) is one of the most commonly used mechanisms to generate revenue for biodiversity conservation. PES schemes provide benefits to landowners who preserve ecosystem services (ES) to disincentivise them from using the land for different purposes, such as deforestation. They are used to incentivise land users to properly manage and conserve their natural environment, thus ensuring the flow of ecosystem services (Pagiola and Platais 2002).

Defining PES

PES was defined by Wunder (2005) as "A voluntary transaction where a well-defined ecosystem service is being bought by an ES buyer from an ES provider if and only if the ES provider secures ES provision (conditionality)." The three broad categories are user-financed, government-financed and compliance PES (Salzman et al. 2018). User-financed PES occurs when the direct beneficiaries of ecosystem services, such as a company or an individual, give compensation to landowners. Government-financed PES occurs when third parties on behalf of the direct beneficiaries, such as a government, offer compensation. Compliance PES is when parties dealing with a regulatory fine or restriction satisfy their regulations by compensating third-party actors to maintain ecosystem services.

PES is not a single type of policy or intervention, but a spectrum of arrangements with varying degrees ecosystem commodification, differing importance of financial incentives and a range of indirect and direct transfers of incentives (Muradian et al. 2010). Despite the generous increase in data on the geographic and financial scope of PES, there is very little data on the effectiveness of PES from an economic, social or ecological point of view.

PES Today

In the past two decades, there has been a significant increase in PES with over 550 active programmes around the globe and an estimated USD 48 billion in annual transactions (Salzman et al. 2018; OECD 2019a). Concerning area-specific PES, watershed PES was valued at about USD 24 billion in 2015, biodiversity/habitat PES was valued at USD 2.5–8.4 billion in 2016, and forest and land-carbon use PES was about USD 8.9 billion in both 2014 and 2016. However, there is still a lack of data on how PES has changed over time as there is no international standard in reporting or implementing PES. Furthermore, ecosystem services are often not well defined; conservation of habitat is considered a proxy for ecosystem services provision and there is often little differentiation between payments for ecosystem services and payments for biodiversity.

Revenue from PES is often invested in natural infrastructure, which refers to a connected network of land and water bodies that deliver ecosystem services to human populations (Deutz et al. 2020). These investments prevent costs associated with building grey infrastructure to carry out tasks that are already performed by natural infrastructure (see chapters 4 and 7).

Going forward

No matter how PES is defined, it is important to understand how it operates as a financial mechanism for biodiversity conservation and ecosystem service provision. PES schemes require a way to generate revenue, a form of institutional arrangement to transfer and manage these funds and a mechanism to deliver finance. The term 'PES', however, is often used to describe all three parts of the financing mechanism, when it more precisely refers to

the payment or incentive used as a delivery mechanism. For example, Costa Rica's national programme generated revenue from a variety of mechanisms including a tax, managed funds through a central national institution, and delivered finance through conditional, financial incentives. The national programme incorporates all three components, but the actual payments for ecosystem services are only the final delivery component of this overall process.

PES for biodiversity effectively creates incentives for biodiversity protection, as payments are made in exchange for the sustainable land management needed to maintain healthy ecosystems. Whether used as a revenue generation or delivery mechanism, the value of PES programmes derives from the fact that they can be used to channel much needed funding to high-priority ecosystem services, such as those provided by natural infrastructure assets or nature-based climate solutions. Natural infrastructure, as described here, refers to any ecosystem that provides services similar to and/or more efficient than man-made infrastructural assets. A common example is riparian forests, which can offer water filtration services. Nature-based climate solutions are solutions that use natural assets to capitalise on climate mitigation ecosystem services, such as forests or healthy soils.

The story so far...

Three of the most important global environmental treaties originated at the 1992 Rio Earth Summit: the United Nations Convention to Combat Desertification (UNCCD), the United Nations Framework Convention on Climate Change (UNFCCC) and the United Nations Convention on Biological Diversity (CBD). The CBD, a global treaty for the conservation and sustainable use of biodiversity, represents the most ambitious attempt so far by the international community to address the impacts of habitat transformation and fragmentation at a global scale. It has three main objectives: the conservation of biodiversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising out of the use of genetic resources.

At the 10th meeting of the Conference of the Parties to the CBD (COP 10) in Japan in 2010, the parties agreed to the Aichi Biodiversity Targets as a reaction to the accelerating pace of biodiversity destruction and the growing concern over what has come to be known as the 'sixth extinction' (UNEP and CBD 2011). A total of 20 global biodiversity targets were agreed, organised under five strategic goals: addressing the underlying causes of biodiversity loss, reducing the pressures on biodiversity, safeguarding biodiversity at all levels, enhancing the benefits provided by biodiversity, and providing for capacity building. The targets were to be implemented primarily at the national or subnational levels with supporting action at the regional and global scales. In 2015, the parties to the CBD agreed to align global biodiversity target implementation to the newly agreed Sustainable Development Goals (SDGs)..

Notwithstanding these efforts, the international community has fallen short of all of its targets on biodiversity protection (including the Aichi Biodiversity Targets and, so far, the biodiversity-related SDGs), and in most cases dramatically so (CBD 2020). In particular, the Aichi Biodiversity Targets were criticised for their ambiguity, lack of financing, limited political will to ensure implementation, and failure to address entrenched practices of individuals and corporations that may negatively impact biodiversity (Butchart et al. 2016).

Learn more

Aichi Biodiversity Targets

What are the Aichi Biodiversity Targets?
The CBD COP 10 in Nagoya, Aichi Prefecture, Japan, created the Strategic Plan for Biodiversity 2011–2020. This was adopted by the 193 signatories to the CBD as a reference for future biodiversity conservation and policy. It included the Aichi Biodiversity Targets, which consist of five strategic goals and 20 targets (UNEP and CBD 2011).

- **Strategic Goal A**: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society.
- **Strategic Goal B**: Reduce the direct pressures on biodiversity and promote sustainable use.
- **Strategic Goal C**: Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity.
- **Strategic Goal D**: Enhance the benefits to all from biodiversity and ecosystem services.
- **Strategic Goal E**: Enhance implementation through participatory planning, knowledge management and capacity building.

How Did the Aichi Targets Do?
None of the 20 targets were completely met by 2020. Only six targets have been partially achieved (CBD 2020). Of the 60 elements within the overarching 20 targets, seven were achieved, 38 showed progress and 13 showed no progress or were moving away from target goals. In terms of progress by country, 34% of signatories had national biodiversity targets that were on track and 3% of signatory countries exceeded their targets. Even so, only 23% of national biodiversity targets were aligned with the Aichi Biodiversity Targets and just 10% of signatories both were on track to meet national targets and had targets well aligned with the Aichi Biodiversity Targets.

In contrast, 51% of signatories are not achieving national targets at a sufficient rate, 11% showed no progress and 1% were moving away from their targets.

One of the primary difficulties in tracking progress was incomparable data between geographical regions and extremely high regional variability. For example, Target 5 aimed to halve the rate of loss of forests. There was significant progress in reducing the rate of tropical forest deforestation, but there was little progress in all other forest ecosystems, leading the CBD to conclude that Target 5 had insufficient progress.

The targets that did have partial progress were:

- **Target 9:** Controlling invasive alien species pathways and preventing their establishment.
- **Target 11:** 17% of terrestrial and inland water areas and 10% of coastal and marine areas are conserved.
- **Target 16:** Use of Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is present in signatories.
- **Target 17:** Submission, development and implementation of national biodiversity strategy plans.
- **Target 19:** Research, scientific support and technology relating to biodiversity conservation are improved and widely shared.
- **Target 20:** Signatories have mobilised the needed amount of financial resources to implement their national biodiversity strategy plans via domestic spending and international financial flows.

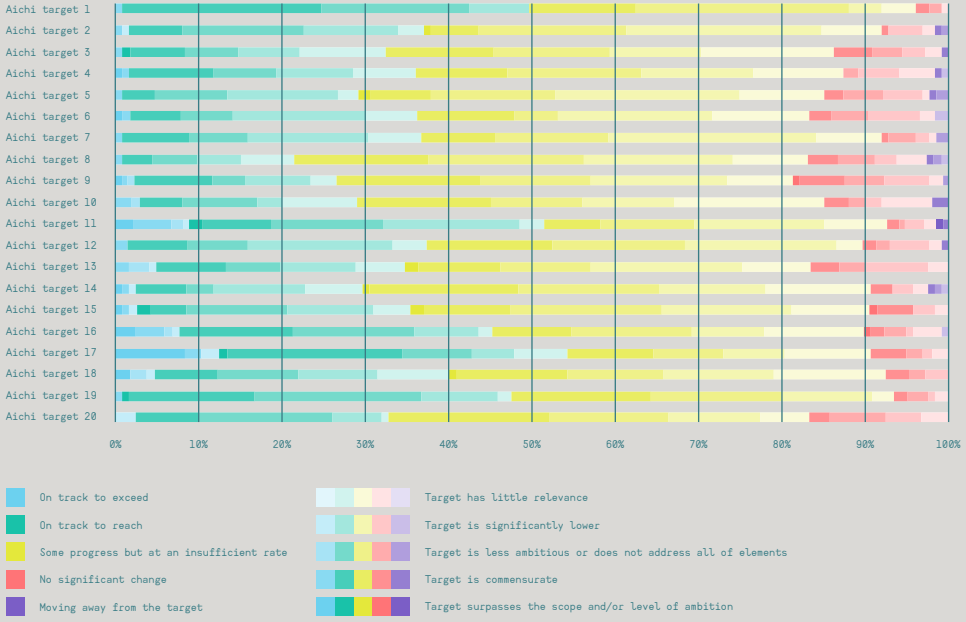
Particularly significant to this book is Target 20, which stated that by 2020 “mobilization of financial resources ... should increase substantially”. Target 20 also established that additional funding would likely be necessary for countries with fewer resources that were biodiversity rich, such as many of the small island nations of the world, but progress on this goal has been just as limited as the others.

Few countries have met the goals set out by the CBD, with only 9% of countries reporting that they were on track to meet the 2020 target in 2019, although many countries did not report data.

The indicators follow the pressure-state-response model as shown in the Figure 2 below, where pressure is defined as current environmental pressure, state as current environmental conditions, and response as the action taken.

Figure 2. This figure summarises progress on all signatories to the CBD by grouping signatories according to how their national targets currently align to the Aichi Biodiversity Targets, ranging from ‘On track to exceed’ to ‘Moving away from the target’, shown left to right, with the type of target shown top to bottom. Colour bars indicate the type of progress and colour opacity represents how commensurate the policy is with the explicit target.

Figure 2. Assessment of progress towards national targets and alignment to the Aichi Biodiversity Targets



Source: Secretariat of the Convention of Biological Diversity, 2020

Forging ahead...

Despite the failure of the international community to meet the Aichi Biodiversity Targets, it is still possible to halt and reverse global biodiversity loss, protect critical habitats and ensure a predictable flow of ecosystem services over the next 10 years (CBD 2020). In anticipation of the post-2020 global biodiversity targets, experts have drawn attention to the fact that the interdependence between ecosystems and biodiversity requires mutually reinforcing goals, and that the failure of any of these goals could undermine all others (Díaz et al. 2020).

In this context, the CBD's Fifth Global Biodiversity Outlook presents a vision of a world in which "biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people". This is now referred to as The Living in Harmony with Nature 2050 Vision (CBD 2020). The Outlook describes eight critical transitions needed to achieve the 2050 Vision covering land and forests, fisheries and oceans, sustainable freshwater, sustainable agriculture, sustainable food systems, sustainable climate action, cities and infrastructure, and One Health (that is, healthy ecosystems and healthy communities) (CBD 2020). As is clear, in order to combat current trends in biodiversity loss and achieve the 2050 Vision, policymakers will need to address the shortcomings of the Aichi Biodiversity Targets, and all sectors of society will have to collaborate and scale up their efforts to protect biodiversity globally.

The new 2030 Biodiversity Action Targets will be globally focused and linked with UN Sustainable Development Goals but are expected to be executed at the national level according to each country's unique needs. As with the goals, there is an urgent need to reduce the threats driving biodiversity loss such as invasive species, pollution, wildlife trafficking and unsustainable exploitation of natural resources.

Efforts to address global biodiversity funding needs should be linked to international climate change goals and efforts through mechanisms such as nature-based solutions. Furthermore, sustainable production and consumption of goods and services should be realigned where needed to bolster biodiversity conservation (Diaz et al. 2020). Along with measurable biodiversity conservation goals, there is an emphasis on meeting the needs of people through sustainability and benefit-sharing, as well as enabling conditions for biodiversity protection through gender equality, recognising indigenous rights and promoting participation of all stakeholders, among others.

Biodiversity conservation funding has historically been dominated by the public sector, which represents over 80% of the available financial resources (See Chapter 2). However, considering the increasing pace of biodiversity loss and extent of ecosystem degradation, government and foreign aid resources alone will not be enough to address the global biodiversity funding gap.

Businesses and financial institutions are not only dependent on biodiversity and ecosystem services for the production of their own goods and services, but also serve as some of the biggest drivers of biodiversity loss due to their operations and investments (Jahn 2017). The World Economic Forum has identified that making transformative changes in businesses, such as transitioning to sustainable supply chains, could unlock an additional USD 10.1 trillion in annual business value and 395 million jobs by 2030 (WEF and AlphaBeta 2020). Private investors are already beginning to make this shift towards sustainable investing – sustainable investment assets have grown by 34% in the past two years, now totalling USD 30.7 trillion (TNC 2019).

These trends should be a call to action for governments, producers and consumers to create more sustainable productive relationships with nature, especially within the agricultural, fisheries, and forestry sectors. In September 2020, political leaders representing over 75 countries committed to reverse global biodiversity loss through the Leaders' Pledge for Nature, in anticipation of the negotiation process of the post-2020 global biodiversity conservation targets. The pledge recognises the severity of biodiversity loss, and commits signatories to an "ambitious and transformational" framework to eliminate negative economic incentives driving biodiversity loss and to mainstream conservation across multiple economic sectors (Leaders' Pledge for Nature 2020).

Financial institutions' commitments are also increasing. For example, 26 financial institutions including Allianz, AXA, ASN Bank and Mirova have committed to increase biodiversity conservation impact measurement and reporting through the Finance for Biodiversity Pledge. Similarly commitments to sustainable production with nature-positive outcomes are gaining momentum, including from companies such as Amazon, Credit Suisse, Danone and Unilever. Global stakeholder coalition platforms such as Business for Nature, which has been successful in committing over 600 companies to reverse nature loss, are important to scale the private sector commitments and facilitate the consultation process on the CBD's post-2020 Global Biodiversity Framework and targets. There is also increasing awareness among consumers – the Union for Ethical Biotrade (UEBT) Biodiversity Barometer for 2020 stated that 82% of surveyed consumers believed companies "have a moral obligation to assure they have a positive impact on people and biodiversity" (UEBT 2020).

Current scale of finance

2

Global estimates and what has changed

Before we explore ways to scale up biodiversity conservation finance, it is first important to look at how finance is currently being delivered. Deutz et al. (2020) estimate that the global scale for financing biodiversity conservation is about USD 124–143 billion per year, with 80–85% of funding derived from the public sector. This represents a significant increase from the USD 52 billion per year of financial flows estimated in 2012 by Global Canopy in the previous edition of this book (Parker et al. 2012). Even so, estimates of global biodiversity funding needs are notably higher at USD 722–967 billion. In sum, current annual biodiversity conservation financing still produces a biodiversity financing gap of USD 598–824 billion per year by 2030 (Figure 3).

Biodiversity finance mechanisms described in this chapter are ones that act as avenues for capital to flow towards biodiversity conservation.

Public Finance

Governmental budgets and taxation: In addition to using public budgets, countries can use a number of fiscal policies such as taxes, fees, tariffs, royalties, charges, and subsidies to generate revenue to support biodiversity conservation and/or to disincentivise behaviour that may negatively impact biodiversity. This book describes taxes, fees and other fiscal measures that both national and subnational governments can impose on forestry, water, carbon pesticides and fertilisers. The estimated USD 75–78 billion in governments' domestic budgets is the main source of financing for biodiversity conservation, representing 54–60% of total funding (Deutz et al. 2020).

Natural Infrastructure: Natural infrastructure comprises networks of land and water that restore and conserve ecosystem services, which can replicate the functions of man-made infrastructure (Canzonieri et. al 2006). Conserving natural infrastructure, such as riparian forests that regulate water quality and quantity, can help safeguard a wide range of habitats of high conservation value, including riparian areas, grasslands and coastal habitats. Much of current investment flow in natural infrastructure has been related to conserving water quality, where estimates predict that a total of USD 27 billion flows towards watershed conservation programmes (Bennet and Ruef 2016; Deutz et al. 2020).

Official Development Assistance (ODA): ODA is government aid, either disbursed by countries directly or through multilateral institutions, that promotes and specifically targets economic development and welfare of developing countries. It includes concessional finance, grants and the provision of technical assistance. The amount of ODA with biodiversity as a significant marker increased from an estimated disbursement of USD 3 billion in 2007 to a current total of about USD 4–10 billion annually (Deutz et al. 2020).

Table 2. Current global biodiversity finance – public finance

Type of finance	Annual (in USD billions)	Type
Governmental budgets and taxation	74.6–77.7	Domestic public
Natural infrastructure	26.9	Domestic public
Official development assistance	4.0–9.7	International public
		Total public finance: USD 105.5–114.3

Source: Deutz et al. 2020

Private and Public-Private Finance

Biodiversity Offsets: Biodiversity offsets are regulatory mechanisms that compensate for adverse environmental impacts resulting from economic activity in a specific location. This compensation is realised by the restoration, enhancement and protection of equivalent resources elsewhere. Biodiversity offsets are the last element of the mitigation hierarchy (avoid, minimise, restore and offset), used to compensate for unavoidable damage to biodiversity caused by a development project. Biodiversity offsets aim to deliver net gains or, at minimum, no net loss of biodiversity. A total of USD 6–9 billion is invested annually in conservation through biodiversity offsets (Deutz et al. 2020).

Sustainable Supply Chains: Transitioning the private sector to more sustainable production practices involves transforming existing supply chains in alignment with corporate environmental, social and governance goals (see Chapter 6). The historical impact of global supply chains on biodiversity has been largely negative, driven by land-use change and unsustainable agriculture, forestry, fisheries and other processing practices associated with commodities. A shift towards more responsible supply chain management practices provides firms with an opportunity to safeguard revenue in the long term by ensuring the sustainability of habitats that deliver important commodities. The scale of the contribution to biodiversity conservation by certified sustainable commodities markets is difficult to

estimate, but recent research suggests that at least USD 5–8 billion is directed annually towards protecting biodiversity through these markets (Deutz et al. 2020).

Green Financial Products: Green financial products are a collection of financial mechanisms, primarily debt and equity, that facilitate the flow of investment capital into companies and projects that have a positive impact on biodiversity. This book discusses the role of financial products such as green bonds, green loans, sustainability-linked loans, and private equity funds, among others. An estimated total of USD 4–6 billion is invested annually in biodiversity conservation through green financial products (Deutz et al. 2020).

Natural Climate Solutions and Carbon Markets: Carbon markets consist of the pricing and/or trade of carbon, usually in the form of a carbon tax or cap-and-trade system. Carbon taxes charge companies for every unit of emissions they produce. Cap-and-trade programmes put a limit on total emissions but allow members within the system to auction off or buy carbon amounts from other members. Natural climate solutions are conservation, restoration and improved land management actions that increase carbon storage or avoid greenhouse gas emissions across forests, wetlands, grasslands and agricultural lands. These programmes can produce carbon credits, or offsets, which can be traded via carbon market mechanisms. Natural climate solutions can provide cost-effective solutions to reduce global emissions by 37% by 2030 (Griscom et al. 2017). A limited number of funds raised through carbon taxes have gone towards biodiversity. Similarly, most revenue that has been raised via cap-and-trade markets has been generated from programmes unrelated to biodiversity, such as renewable energy investments. Therefore, carbon markets' contribution to biodiversity conservation only amounts to USD 0.8–1.4 billion (Deutz et al. 2020).

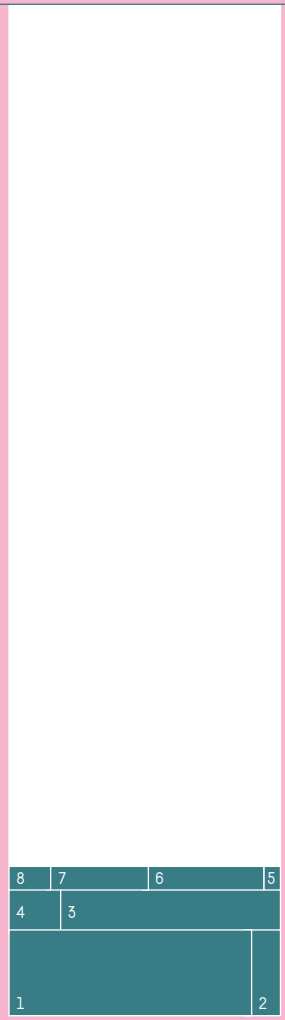
Philanthropy: Philanthropy as a source of finance includes contributions from private foundations, business-related foundations and conservation NGOs such as The Nature Conservancy or WWF. Large philanthropic foundations generate revenue through an initial endowment that is managed in perpetuity (Persson et al. 2009). The finance available from philanthropy sources is estimated at USD 2–3 billion annually (Deutz et al. 2020).

Table 3. Current global biodiversity finance — Public-private finance

Type of finance	Annual (in USD billions)	Type
Biodiversity offsets	6.3–9.2	Public-private
Natural climate solutions and Carbon markets	0.8–1.4	Public-private
Green financial products	3.8–6.3	Public-private
Philanthropy and conservation NGOS	1.7–3.5	Private
Sustainable supply chains	5.5–8.2	Private
	Total private and public-private: USD 18.1–28.6	

Source: Deutz et al. 2020

2019



Global biodiversity financing gap
824 USD bn

Global biodiversity finance
143 USD bn

Figure 3.
Current global biodiversity finance and biodiversity funding needs.

The total graphic area of Figure 3, corresponds to the upper estimate of Annual Global Biodiversity Funding Needs of USD 967 billion (Figure 2).

1. Governmental budgets and taxation	USD 75-78
2. Natural infrastructure	USD 27
3. Official development assistance (ODA)	USD 4-10
4. Biodiversity offsets	USD 6-9
5. Sustainable supply chains	USD 6-8
6. Green financial products	USD 4-6
7. Philanthropy and conservation NGOs	USD 2-4
8. Natural-based solutions and carbon markets	USD 1

Where is biodiversity funding deployed?

Around 78% of the world's biodiversity finance is generated in advanced economies, while about 22% is generated in emerging or developing economies. In terms of delivery, however, 59% of total generated biodiversity finance is spent on ecosystems within developed countries, while the remaining 41% is deployed to emerging or developing economies. Only a few major government spending programmes in the United States, Europe and China account for over 50% of generated global biodiversity finance (Luck et al. 2009). Unfortunately, even in economic regions such as the EU – that are highly developed, have relatively high levels of environmental governance, and have large amounts of biodiversity finance – the 2020 biodiversity targets were not met.

Most of the world's biodiversity exists in countries that require further financial support to implement conservation programmes. Less than 19% of all biodiversity finance, or approximately USD 9.8 billion, is transferred internationally to emerging and developing economies, in roughly even proportions to Africa, Asia, Latin American, and the Caribbean.

Overall, current financial flows have proved insufficient for countries to meet their national biodiversity targets, and the funding available for biodiversity has yet to make a significant impact on low-to-middle-income countries, which are home to the global biodiversity hotspots. Furthermore, populations in these countries have greater dependency on ecosystem services for their wellbeing and livelihoods, especially through their reliance on the agriculture, forestry, fisheries and tourism sectors. Critically, addressing the global biodiversity financing gap means not only meeting the funding needs but also effectively delivering finance to these biodiversity hotspots.

Learn more

Effectiveness of biodiversity funding

Approximately 60% of global biodiversity loss can be attributed to seven countries: Indonesia, Malaysia, Papua New Guinea, China, India, Australia and the USA (Waldron et al. 2017). Levels of biodiversity have declined in the past 50 years, but seven countries were able to achieve biodiversity improvements from 1996 to 2008: Mauritius, Seychelles, Fiji, Samoa, Tonga, Poland and Ukraine. While biodiversity conservation had a positive correlation between conservation spending, there was a significant negative correlation with GDP growth and commercial agriculture growth. Conservation spending proved to be most effective in low-income countries and effective governance was able to mitigate some detrimental effects of agricultural expansion, which contributed more to biodiversity decline when paired with growth in the national population. Conservation investment from the 109 signatories to the CBD reduced biodiversity loss by an average of 29% per country between 1996 and 2008.

Restoring 30% of converted land in priority areas for restoration could mitigate as much as 75% of extinction debt and sequester as much as 524 gigatonnes of CO_2, helping combat much of the recent damage to the natural world (Strassburg et al. 2020). Restoration also has huge benefits for the future. Restoring only 15% of land in priority areas would avert 60% of the expected extinctions over the coming decades. Land restoration is extremely cost effective when targeting high-priority areas, many of which are the exact same areas that are experiencing high rates of agricultural expansion and biodiversity loss. In addition, Dinerstein et al. (2020) argued that biodiversity conservation and climate stability goals depend on protecting 50 key ecoregions in only 20 countries, many of which intersect with indigenous community areas.

3

The overarching framework

What is biodiversity finance?

Biodiversity finance is defined by the United Nations Development Programme Biodiversity Finance Initiative (UNDP BIOFIN) as the "... practice of raising and managing capital and using financial and economic mechanisms to support sustainable biodiversity management. It is about leveraging and effectively managing economic incentives, policies, and capital to achieve the long-term well-being of nature and our society" (UNDP 2018). The goal of biodiversity finance is to create economic incentives within both public and private financial sources to preserve the world's biodiversity and stock of natural capital and subsequently guarantee a sustainable flow of ecosystem services for the future.

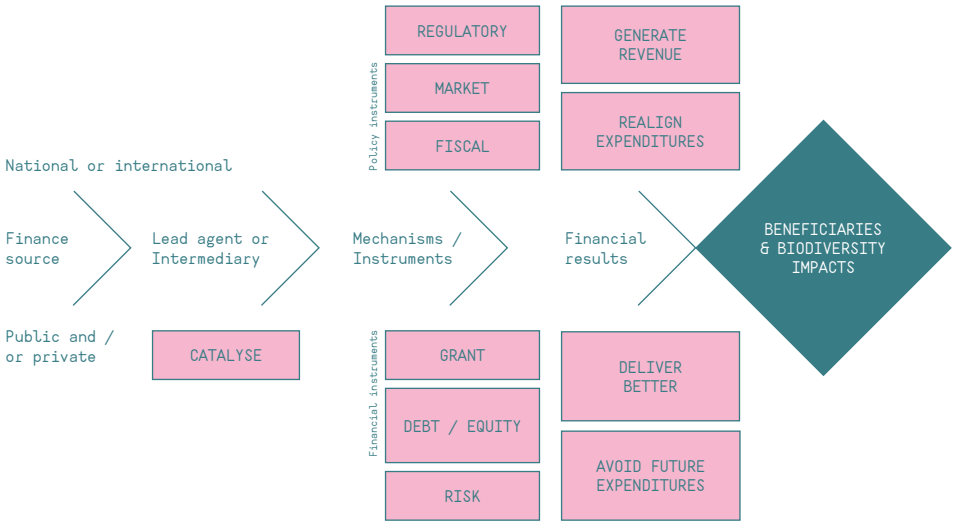
A 'biodiversity finance solution' as advocated by UNDP BIOFIN is an integrated approach to improve biodiversity outcomes and reduce negative pressure on biodiversity by the use of context-specific biodiversity finance mechanisms. Each biodiversity finance solution is built on a combination of elements that may include one or more financial instruments or mechanisms, financing sources, lead agents or intermediaries, beneficiaries or principal stakeholders, and the desired financial result (UNDP 2018).

A single biodiversity finance solution can help achieve a variety of financial results. For example, introducing and enforcing a new national or state-level 'no net loss' requirement can help governments generate additional resources for conservation through mechanisms such as biodiversity offsets. Figure 4 presents a conceptual framework of the key elements of biodiversity finance solutions and their relationship with biodiversity finance instruments or mechanisms (UNDP 2018).

Figure 5 highlights how financial results are linked to biodiversity by generating more revenue and delivering finance more effectively to achieve a positive measurable biodiversity outcome (such as the number of hectares of degraded land restored) or reducing a threat or negative pressure on biodiversity. Revenue could be generated through sustainable cacao products, for which financing could be delivered better through public guarantees, which in turn could result in a reduction in degraded land, or the eradication of negative pressures applied through unsustainable cacao production practices. The avoidance of future expenditures and the realignment of existing expenditures can reduce the negative pressures on biodiversity by addressing the drivers of biodiversity loss (UNDP 2018). Avoiding costs related to fertilisers and pesticides, accompanied by harmful agricultural subsidy reform, could introduce cost cutting and biodiversity-positive policy production practices for the public and private sector alike.

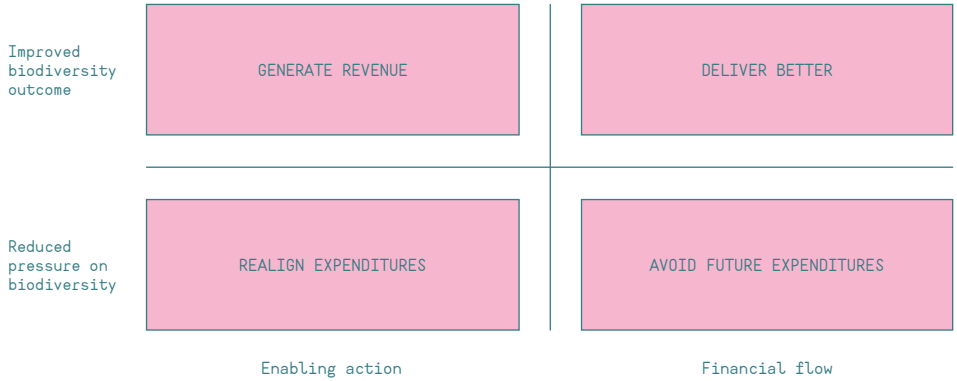
The importance of a biodiversity financial solution's mix of mechanisms is central to this book; the mechanisms described in the following chapters can be combined to achieve improved biodiversity conservation outcomes. Incorporating a biodiversity finance mechanism into a financial solution requires an understanding of conservation programme criteria, and it also requires planning to achieve effectiveness, scale and impact. In some cases, collaboration across organisations can lead to better financing outcomes. For example, green equity from a financial institution combined with a grant from a philanthropic organisation can result in a blended finance vehicle that achieves conservation outcomes that neither of the two mechanisms could have achieved on its own (chapters 4 and 5).

Figure 4. Schematic diagram of biodiversity finance solutions



Modified from UNDP BIOFIN (2018)

Figure 5. Relationship among financial results



To organise the mechanisms and concepts presented in each chapter, this book uses the UNDP BIOFIN comprehensive framework for biodiversity finance supplemented by a consideration of the catalysts that may facilitate the effective implementation of the elements of the BIOFIN framework. The resulting framework consists of the following:

1. **Generate revenue:** Increase the number of funds deployed towards biodiversity protection through public spending, private investment, or other measures that can generate or leverage financial resources allocated to biodiversity (see chapter 4).

2. **Deliver better:** Deliver results for biodiversity conservation through better resource management, improved efficiency, and greater alignment of incentives among actors (see chapter 5).

3. **Realign expenditures:** Reduce investments that have negative impacts on biodiversity and redirect those financial flows towards activities that positively impact biodiversity (see chapter 6).

4. **Avoid future expenditures:** Prevent future costs through strategic investments and policy changes that protect biodiversity today and reduce the need for larger expenditures in the long term to restore or replace lost ecosystem services (see chapter 7).

5. **Catalyse:** Enhance policy, administrative or investment measures or enabling conditions that can result in new, improved or scaled-up biodiversity finance (see chapter 8).

As described in this book, many countries and businesses already have a wide range of experience designing and implementing biodiversity-related financial mechanisms. A comprehensive list of these efforts is critical to understand their current biodiversity finance landscape and plan for future biodiversity finance solutions. However, “care should be taken in seeking to implement a biodiversity solution in a country and business without first going through the extensive assessments to understand both their levels and need of biodiversity financing” (UNDP 2018). UNDP BIOFIN has supported over 36 countries with the development of frameworks and activities to produce and implement comprehensive National Biodiversity Finance Plans (NBFPs) that outline optimum finance solutions to reach national biodiversity targets.

While it is crucially important to put in place the right policy framework for biodiversity investment, the private sector has a role to play in generating capital for and delivering capital to biodiversity conservation programmes. Investing in biodiversity conservation will therefore require collaboration across all sectors and, in order for investments to realise positive impacts, interactions between each sector must contribute to the development of a financial ecosystem for biodiversity conservation (see chapters 8 and 9).

The following chapters describe biodiversity finance mechanisms under each element of the overarching framework in more detail, including a discussion of key catalysts.

Generate

4

This chapter explores the mechanisms that generate revenue for biodiversity conservation. The mechanisms described in this section illustrate the diversity of options available to governments and the private sector to channel funding to biodiversity through debt, equity, direct payments via regulatory mechanisms, foreign and domestic support, and others.

The state of play

International and domestic public finance has been, and continues to be, the largest funding source for biodiversity. However, in recent years there has been growing interest in, and activity involving, novel approaches to financing biodiversity conservation. In connection with this shift, public, philanthropic and private sources of financing are no longer viewed as mutually exclusive alternatives. Instead, a more collaborative approach that leverages the strengths of each of these sectors and leverages existing synergies through blended finance approaches is becoming increasingly common. The structural challenge that governments must face is that the economic contribution from the world's stock of biodiversity and its delivery of crucial ecosystem services have, until recently, been undervalued or imputed no economic value at all. However, ecosystem services provided by healthy habitats provide solutions to many of today's pressing socio-environmental challenges. A 2019 study showed that the carbon capture potential of phytoplankton (37 billion tonnes of CO_2 equivalent) is equal to four times the amount of carbon captured by the Amazon rainforest and 40% of all CO_2 in the atmosphere (Chami et al. 2019). Critical to phytoplankton survival are nutrients provided by urea from migrating whales; indeed, whales themselves can sequester an average of 33 tonnes of CO_2 equivalent. From this point of view, protecting whales is a nature-based solution to mitigate the effects of carbon emissions.

The landmark work of The Economics of Ecosystems and Biodiversity (TEEB) project, and other similar studies that put a value on the ecosystem services that underpin the viability of businesses, have alerted both governments and the private sector to the risks they assume by allowing economic activity to negatively impact biodiversity. Since the 2012 publication of the predecessor to this book (Parker et al. 2012) interest in the environmental and social impacts of private investments has exploded. Evidence of increasing investor interest in financial products that deliver both economic and environmental returns can be seen in the development of private conservation investments in public-private debt, green private equity funds and sustainable public equity funds by investment management companies such as BlackRock and Vanguard. There have also been increasing calls for more rigorous metrics to assess the non-financial returns of environmental, social and governance (ESG) investments.

While investor focus has largely been on climate risk and the renewable energy sector, there is an increasing focus on the dependency of businesses on biodiversity, natural capital risk, and the negative impacts that these risks can have across supply chains. The realisation of risks associated with global biodiversity loss and the resulting impacts is a driver of public and private collaboration on the development of biodiversity financing mechanisms and the growth of global biodiversity finance

A brief history

The Convention on Biological Diversity (CBD) lays out clear responsibilities for developed countries to provide financial resources for the conservation and sustainable use of biological diversity and the equitable sharing of benefits arising from its use.

Parties to the CBD are required to cooperate in providing financial and other support, particularly for developing countries, for in-situ and ex-situ conservation, and particularly for the establishment of conservation facilities in developing countries. Critically, Article 20(2) of the Convention also requires developed country Parties to provide 'new and additional' financial resources to enable developing country Parties to meet the agreed full costs of implementing measures to meet the objectives of the Convention. What is also clear, no matter the source of funding, is that the current resources allocated to achieving the Aichi Biodiversity Targets are inadequate. The current annual finance flow for biodiversity conservation amounts to USD 124–143 billion (Deutz et al. 2020), which is a significant increase from the estimated USD 52 billion in 2012 (Parker et al. 2012). Even the larger sum falls far short of what is needed (see chapter 1). To halt and reverse the current trend in biodiversity loss, global annual biodiversity needs are estimated to be in the realm of USD 722–967 billion, requiring a more than fivefold increase in existing finance flows to meet existing needs. To that end, this chapter aims to highlight biodiversity finance mechanisms that hold the most promise for scaling up the flow of capital to biodiversity-related outcomes, thereby addressing an intractable challenge to meeting global biodiversity needs.

Criteria

Table 4 presents a conceptual framework to analyse the different mechanisms that can be used for revenue generation. The framework comprises six criteria as follows:

1. **Scale:** How much funding will be raised?
2. **Timeframe:** Over what period?
3. **Level:** At what level is finance aggregated?
4. **Payer:** Who will pay? Who should pay?
5. **Value:** Why will they pay?
6. **Direct or mainstream:** How will revenues be generated?

Table 4. Generate Revenue – Principles and criteria

Principle	Adequate	Timely	Predictable	Motivation
Criterion	**Scale** How much funding will be raised?	**Timeframe** Over what period of time?	**Level** How and where funding will be raised?	**Payer** Is finance generated from the polluter or beneficiary?
			Value Will funding go towards activity that sustainably uses biodiversity or ecosystem services?	**Direct or Mainstream** How will revenue be generated?

These criteria are based in part on the requirements set by the CBD in relation to the provision of financial resources. Article 20(2) refers to the need for financial resources to be adequate, predictable, and timely. The following pages provide an explanation of these criteria and show how these can be used to evaluate various mechanisms for revenue generation.

1. Scale

The first step in understanding revenue generation is to know how much funding could be raised by a given mechanism.

Option:

USD 200

Numeric value in billions of USD

The question of how much finance will be generated is closely related to when that funding will become available and how predictable the source of finance will be. The scale criterion will use a numeric value (in billions of USD) representing the estimated annual flows of finance by 2030. The scale will either be a single number (indicating the best estimate of finance in 2030), or a range from a low-end estimate to a high-end estimate.

2. Timeframe

The timeframe describes the period when financing from a specific mechanism is likely to scale.

Options:

Short-term (<2025)

Medium-term (2025–2030)

Long-term (>2030)

Another key component for revenue generation is that it is made available in a timely manner. Financial resources can be generated in either the short, medium or long term. It is unlikely that any one mechanism proposed in this book could deliver funding at the scale required to close the global biodiversity financing gap. Therefore, it will be essential that financial sources and timeframes are matched so that adequate financing is available when required.

3. Level

The level criterion describes whether revenue will be generated by a mechanism that is implemented by the private sector and/or by the public sector (either nationally or internationally).

Options:

Private

National Public

International Public

Multi-sector collaboration

Revenue generation mechanisms can be implemented by private organisations, local and national governments, public bodies at the international level, or through multi-sector collaborations involving one or more of the above. The level at which revenue is generated will have important implications for both the adequacy and predictability of biodiversity finance.

Private finance is defined here as revenue that is generated through a mechanism primarily implemented by the private sector. Private finance can use voluntary investment mechanisms (for example, green bonds or environmental impact bonds) or can be driven by national or international policy regulation (such as biodiversity offsets and carbon markets).

Public sector finance is defined as revenue that is generated through a mechanism managed by a public body and can be distributed nationally or internationally. National-level mechanisms raise funding that is initially generated by local or national governments from tax revenue. International mechanisms raise funding that is initially generated at a supranational level and include mechanisms such as official development assistance (ODA).

4. Payer

The payer criterion indicates whether finance is generated from the beneficiary of biodiversity and ecosystems services or the polluter that degrades them.

Options:

Polluter

Beneficiary

Biodiversity finance mechanisms have traditionally been grouped under two categories: polluter-pays or beneficiary-pays. The basic idea behind this principle is that the price of a man-made good or service should fully reflect the total cost of production, including any costs borne from degrading the natural environment. An organisation paying to offset the loss of biodiversity caused by building their new manufacturing plant is a common example of a polluter-pays mechanism. Traditionally, polluter-pays mechanisms have been enforced by some form of governmental or international regulation. Many innovative polluter-pays financing options are now emerging that fall under voluntary arrangements driven either by increased consumer awareness, corporate social responsibility or risk mitigation strategies. The other category of mechanism under this criterion is 'beneficiary-pays' in which revenue is generated from the beneficiary of biodiversity or ecosystem services.

5. Value

The value criterion indicates whether finance is generated for the use of biodiversity and ecosystem services or for some other (non-use) reason.

Options:

Use

Non-use

Biodiversity and ecosystem services are valuable to many people for many reasons. For reasons of quantification and understanding, these values are often classified in terms of use or non-use values. Mechanisms based on use values raise finance from actors that will directly use the ecosystem they are paying for (such as direct ecosystem services fees), or as compensation for the degradation of an ecosystem (such as offset markets). Mechanisms based on non-use values raise finance primarily from motivations that are not derived from the use of an ecosystem, such as philanthropy.

6. Direct or mainstreaming biodiversity

Public and/or private investors can put capital into investment structures (for example, bonds, equities, trust funds) in order to invest in financial instruments and/or projects that can generate cash flows (for example, offsets, compensation payments, sustainable products sales) that deliver a financial return to investors and positive biodiversity impacts. Mechanisms for generating revenue can generate cash flows that have a direct impact on biodiversity conservation (for example, national park usage fees and charges for establishing and managing public areas) or that mainstream biodiversity investment by creating the right incentives for investors to deploy capital in a manner that delivers biodiversity co-benefits.

Options:

Direct Biodiversity Investment

Biodiversity Mainstreaming Investment

One example of mainstreaming biodiversity investment is through the use of green bonds. Green bonds have, for the most part, not targeted biodiversity investments directly, but instead have focused on the renewable energy, real estate and transportation sectors. Indeed, 50% of the cumulative amount raised from green bonds between 2014 and 2019 has been invested in renewable energy infrastructure (IRENA 2020). By comparison, less than 1.0% of the total raised in the green debt market (USD 1.6 to 3.3 billion) was allocated towards biodiversity conservation in 2019. Mainstreaming biodiversity conservation in sectors such as renewable energy can provide additional returns and cost avoidance measures derived from biodiversity conservation to investors. For example, green bond investors in solar photovoltaic projects can be incentivised, through public financial guarantees or tax incentives, to allocate a percentage of the green bond proceeds towards natural infrastructure for wetland and grassland conservation.

A guide to revenue generation

The UNDP BIOFIN Catalogue of Finance Solutions features over 60 generic mechanisms and 165 specific finance mechanisms used for financing biodiversity conservation. This book identifies and analyses a subset of mechanisms for biodiversity finance that appear to be especially promising for scaling and may have a track record of successful implementation. Special consideration has been given to mechanisms that have been used already by governments, non-governmental organisations, or the private sector, or that are viewed as realistic alternatives given the socio-political context of their proposed implementation.

SCALE (2030)

162–168 bn

TIMEFRAME

LEVEL

PAYER

VALUE

DIRECT

Biodiversity offsets

The goal of a biodiversity offset programme is to achieve a net gain in biodiversity (or at least no net loss) when undertaking economic activities such as real estate developments, infrastructure projects, or other construction or resource extraction projects that may have a negative environmental impact (Forest Trends 2018). Offsetting is the final element of the mitigation hierarchy framework, which offers a framework for avoiding net harm to biodiversity. According to the hierarchy, developers can avoid negative impacts by considering alternative locations or construction practices, minimising any unavoidable impacts, and restoring impacted sites after development takes place (Forest Trends 2018). If these three steps are followed and environmental impacts could still result in a net loss of biodiversity, parties may resort to purchasing offsets, such that investments in off-site conservation gains help make up for on-site losses (Forest Trends, 2018).

Biodiversity offsets can be implemented in response to (a) domestic or local policy requirements, (b) financial performance standards (for example, lenders may require the application of the mitigation hierarchy), or (c) voluntary private sector policies (Deutz et al. 2020). The two types of implementation mechanisms available are permittee-responsible offsets and third-party offsets. Permittee-responsible offsets place the liability for success on the project implementer. The polluting entity contracts a project implementer to create the biodiversity offset and the project implementer is responsible for the entire offset. In third party offsets, responsibility for the success of the offset project rests with a third party, such as a conservation organisation or a mitigation bank. Most offsets fall within the permittee-responsible category.

As of 2019, total annual biodiversity offsets are estimated to represent USD 6–9 billion across the 42 countries with biodiversity offset policies in place (Deutz et al. 2020). Few low- and middle-income countries have adopted these policies. In contrast, countries where offsets are required by applicable law or regulations comprise 70% of global GDP (zu Emargasson et al. 2019). While having large potential for growth, opponents of offset programmes argue that they give firms licence to pollute by allowing them to offset their impacts after development has taken place (OECD 2013). Other issues include the challenges associated with pricing biodiversity impacts and requiring biodiversity offset purchases, technical capacity issues related to programme implementation, and governance and enforcement measures (Deutz et al. 2020). One important issue is around equivalency: since negative social and environmental impacts may differ greatly from one location to another, the development may have larger negative effects than those captured under applicable offset programmes.

Case study

The US Aquatic Resources Compensatory Mitigation bank

Mitigation banking allows development projects to trade offset credits generated from conservation activity in advance of the project's implementation (US EPA n.d.). Mitigation credits are sold to clients who need to offset unavoidable adverse effects on the environment. The range of areas where mitigation offsets have been approved varies on a country by country basis (World Bank 2020).

The US Aquatic Resources Compensatory Mitigation Program is a mitigation banking programme that targets wetlands and aquatic resources. The purpose of this mitigation banking scheme is to ensure no net loss of wetlands in the United States and keep waters clean from harmful chemical and physical debris. As of 2016, there have been USD 3.25 billion worth of mitigation credits sold through the US Aquatic Resources Compensatory Mitigation Program. These transactions have an annual growth rate of about 18% and have, in total, protected 5,233 hectares of wetland and 91,139 metres of streams (Bennett and Gallant 2017).

As defined by the US Army Corps and the Environmental Protection Agency, compensatory mitigation in the Aquatic Resources Program must include "restoration, establishment, enhancement and/or preservation of wetlands, streams, and other aquatic resources" (US EPA n.d.).

Mitigation banks either buy land or contract landowners to conduct these activities as part of their core operations. In return, the banks or landowners receive mitigation credits that can be sold on the market. Credit values are based on the ecology of the conservation area and the types of species being protected. Once a mitigation plan is decided for an area of land, it is submitted for the amount of credits to be approved. As soon as restoration begins, a credit goes up for sale.

To purchase a credit, a developer will appraise the losses at a wetland or aquatic resources site and calculate how many credits are needed to offset these losses. The developer then negotiates with a mitigation bank on credit prices, which are determined by the area in which the credit is being produced. Once a credit is purchased, a consultant from the mitigation bank monitors the offset site and reports it to the state and the bank's interagency review team.

Offsets are not purchased voluntarily; states mandate developers to purchase offsets for wetland and aquatic resource development. Impact and compensation are negotiated only between the developer and the mitigation bank, but the state approves credit supply and what mitigation banks the developer can choose from. Interagency Review Teams within mitigation banks are responsible for oversight of the bank's programmes and transactions.

Biodiversity tradable permits

Biodiversity tradable permits force developers to pay for the right to engage in construction activity that is harmful to biodiversity. They are defined by two main features: they must be transferable, and the revenue they generate must be used for biodiversity conservation (OECD 2019a). Examples of tradable permits are transferable fishing quotas or auctionable hunting permits. For auctionable permits, revenue is only generated when the permit is auctioned for the first time.

According to the Organisation for Economic Co-operation and Development (OECD), there are over 42 active tradable permit schemes relevant for biodiversity in 26 countries (OECD 2020a). For example, in Alberta, Canada, auctioning permits for sport-fishing and hunting rights generates revenue for biodiversity conservation. The price of individual permits ranges between CAD 75 and 7,500 (USD 56–5,600) and a minimum of 60% of the funds generated have been earmarked to be invested in projects for the conservation of the Rocky Mountain bighorn sheep.

Biodiversity tradable permits could also function like cap-and-trade programmes, where the government sets an appropriate total allowable catch on the fishing stock for the year and allocates fishing units to fishers. Fisheries subsequently buy or sell fishing units to each other. In Chile, the amendment of the Fisheries Law determined that for fully exploited species, such as the jack mackerel or hake, up to 15% of the annual total allowable catch could be auctioned. In 2019, at least 23 countries had at least one individual transferable quota programme for fisheries in place (OECD 2020a).

SCALE (2030)

N/A

TIMEFRAME

LEVEL

PAYER

VALUE

DIRECT

SCALE (2030)

25–40 bn

TIMEFRAME

LEVEL

PAYER

VALUE

DIRECT OR MAINSTREAMING BIODIVERSITY

Natural climate solutions and carbon markets

Most compliance carbon markets arise from regulatory requirements and are often established as carbon taxes or levies, which place a price on a measurable unit of greenhouse gas emissions, or as a cap-and-trade system, where governments set a maximum allowable amount of emissions per sector and then allow companies to trade emission amounts in regulated markets. In cap-and-trade programmes, high emitters purchase carbon credits from low emitters in markets where the total amount of emissions is fixed per sector. Companies reduce their emissions as much as possible, and then 'buy' or 'sell' units of carbon emissions depending on how successful they are at reducing emissions. Projects can range from switching to renewable energy and capturing greenhouse gases to protecting habitats that sequester CO_2 and its equivalents.

Voluntary carbon markets – those that are a result of corporate social responsibility goals or efforts to reduce environmental and economic risks – can be structured in a similar way to compliance carbon markets. In voluntary carbon markets companies set voluntary mitigation goals or purchase carbon offsets (Forest Trends n.d.). They have been experiencing a significant spike in demand, growing by 53% in volume and 49.5% in value from 2016 to 2018 (Donofrio et al. 2019).

While lowered emissions can have indirect benefits to biodiversity through lowering the impacts of climate change, direct biodiversity benefits can be realised through investments in nature-based solutions (NBS) and natural climate solutions (NCS). Nature-based solutions, as defined by the International Union for Conservation of Nature (IUCN), are activities that protect, sustainably manage and restore natural or modified ecosystems (IUCN 2019). The European Investment Bank publication Investing in Nature: Financing Conservation and Nature-Based Solutions and the Nature-Based Solutions Handbook from the EU's ThinkNature platform both offer specific guidelines on how nature-based solutions can be implemented, and how revenue potential can be estimated from conservation projects (European Investment Bank 2018; EU Think Nature 2019).

NCS comprise projects that take advantage of ecosystems' carbon reduction services. They are nature-based solutions that have positive outcomes in terms of emissions reductions and biodiversity conservation. NCS are estimated to provide cost-effective solutions that can reduce global emissions by 37% by 2030 (Griscom et al. 2017). An example of NCS is forest carbon projects that increase absorption of greenhouse gas emissions through both the soil and forest cover (Deutz et al. 2020). Conserving and protecting carbon-sequestering habitats includes protecting marine and terrestrial forests such as riparian forests, mangroves and seagrass. NCS are most effective for biodiversity and carbon when emission mitigation strategies equally weigh climate and biodiversity goals. Doing so can enable NCS projects to generate an estimated 95% of projected biodiversity benefits and approximately 80% of projected carbon sequestration targets, as compared to projects that focus on one outcome over the other (de Lamo et al. 2020).

Increasingly, governments and the private sector have been investing in regulatory frameworks and technology that can enable increased implementation of NCS. Forest Carbon Partners, for example, works with large landowners or indigenous communities to develop forest carbon projects, which these stakeholders then implement. To date, Forest Carbon Partners has planned 15 projects since 2012, and has sold credits generated from these products in the California carbon market (World Bank 2020). Technology is also playing an increasingly important role in guiding the efficient implementation of NBS and NCS investments. For example, Pachama, RESTOR and Silvia Terra are start-ups that combine satellite imagery and artificial intelligence to identify specific forest project features and their carbon capture potential. These advances help investors and NBS and NCS project developers to compare forest carbon credits and maximise their positive biodiversity impacts.

CDP, a UK-based non-profit, conducted a survey of 543 companies from around the world, and found that at least 84% of these companies had implemented some type of NCS to offset emissions. Although carbon market transactions have channelled a limited amount of financing, USD 0.8–1.4 billion, towards biodiversity conservation, use of this mechanism shows positive momentum (Deutz et al. 2020). Between 2016–2018, the number of offsets generated through forestry and land-use projects increased by 264% in volume (Forest Trends n.d.).

Learn more

REDD+, past and future

Global forest cover is disappearing at an alarming rate, despite heightened efforts to mitigate forest loss. In 2019, tree cover loss increased by 43% in 2019, with 91% of losses between 2001 and 2015 being driven by deforestation in tropical forests (NYDF 2019). In response to these trends the Reduced Emissions from Deforestation and Forest Degradation (REDD) programme was introduced by the UN Framework Convention on Climate Change (UNFCCC), with the goal of providing countries who engaged in forest conservation activities with compensation to create a positive incentive for forest protection efforts (Scholz and Schmidt 2008).

REDD became REDD+ when the UNFCCC moved to incorporate conservation, restoration and sustainable forestry goals in addition to existing emission reduction ones (Graham 2016). Country participants in REDD+ efforts receive support from bilateral and multilateral funding for designing, implementing, monitoring and evaluating their programmes.

Key activities under REDD+ relate to the reduction of emissions from deforestation and degradation, conservation of forest carbon stocks, implementation of sustainable forestry management, and enhancement of forest carbon stocks (Framework Convention on Climate Change 2016).

Under REDD+, a country must undergo three phases: readiness, implementation and results-based finance (Lujan and Silva-Chavez 2018). Readiness and implementation are preliminary steps before compensation is approved. The country develops a REDD+ strategy and implements policies in support of this. Funding for REDD+ comes from a range of public and private sources such as the Green Climate Fund or the UN-REDD programme. As of 2018, 88% of countries that passed the readiness stage have "completed or established forest inventories" with over half of the country plans containing more than one REDD+ activity (FAO 2018). The UNFCCC has concluded, based on four countries' submissions of REDD+ data, that the programme resulted in a reduction of 6.28 billion tonnes of CO_2 between 2009 and 2015 (FAO 2018).

Challenges to scaling the REDD+ programme include lack of capacity surrounding programme monitoring, limited inclusion of certain forest-dependent communities, and limited participation of the private sector in the planning process. In the future, private sector partners should assess ways in which they can redress their supply chains to bolster national REDD+ plans.

Debt-for-nature swaps[2]

Introduced by WWF in 1984, debt-for-nature (DFN) swaps are transactions in which contributing countries or entities agree to purchase and cancel a portion of a recipient country's (discounted) debt obligation in exchange for the recipient country's commitment to invest an agreed amount in conservation and/or to make similar conservation commitments. DFN proceeds can be used as initial capitalisation for environment funds. For example, Seychelles partnered in 2016 with The Nature Conservancy to restructure USD 21.6 million of the country's sovereign debt. With these funds, Seychelles repaid loans to the Seychelles Conservation and Climate Adaptation Trust, which helps implement marine protected areas. The purpose of this DFN swap was to enable Seychelles to protect 30% of its coastal economic zone by 2020 and fund climate adaptation efforts (TNC 2020).

The United States has been the largest player in the DFN market, forgiving USD 1.8 billion, or 64%, of the total DFN debt market, and generating USD 400 million for conservation in 21 countries (Sommer et al. 2020). In several cases, there is evidence that DFN swaps have contributed to lower rates of deforestation. DFN swaps in other high-income nations totalled USD 1 billion in debt swapped with USD 500 million raised for conservation.

Positive momentum has been limited in large part due to the transaction costs associated with DFN swaps. Challenges include the length of time that interest rate and debt restructuring negotiations typically take (UNDP 2017). Although DFN swaps have raised relatively small amounts of finance compared with other mechanisms, there may be growing opportunities to deploy them as low- to middle-income countries invest in reducing their infrastructure gaps. New lending structures may be able to use DFN swaps to incentivise more sustainable infrastructure investments. In particular, as the effects of the economic crisis precipitated by the COVID-19 pandemic push countries to renegotiate their foreign debt, DFN swaps may provide a way for countries with high debt burdens to restructure their obligations in a way that incentivises sustainable economic activities.

The Finance for Biodiversity Initiative has suggested introducing nature performance bonds. These are green financial products that might work similarly to debt-for-nature swaps, where the debt of a lending company can be restructured in exchange for commitments to conservation investments. The difference is that nature performance bonds can be issued and restructured where performance outcomes are related to nature and climate goals (Finance for Biodiversity 2020).

[2] Estimates of the potential of Biodiversity-related fees and charges in 2030 have been included in the estimates of the government budgets and taxation mechanism.

SCALE (2030)

>0.3–1 bn

TIMEFRAME

LEVEL

PAYER

VALUE

DIRECT

SCALE (2030)

31–93 bn

TIMEFRAME

LEVEL

PAYER

VALUE

DIRECT OR MAINSTREAMING BIODIVERSITY

Green financial products

A variety of debt and equity financial products and services can be used to raise capital for projects or companies that deliver positive biodiversity returns in addition to financial returns for investors. Investment products in this category vary in their location on the risk-return spectrum, giving investors a diversity of options to finance biodiversity conservation. They are often structured similarly to traditional financial instruments according to their funding and repayment schedule. Equity investments are also used to deploy capital in a manner that delivers financial and biodiversity returns, notably through a variety of thematic private equity funds, incubators, venture capital firms, and exchange-traded funds (ETFs).

Green financial products include green bonds, green lending (including sustainability-linked loans and green loans) and green equity. Green bonds are comparable to conventional market bonds in that an issuer of a green bond pays the principal and interest back to the lender over a designated period of time, but the proceeds of the bond issuance are designated for environmental projects or assets. Likewise, green lending operates similarly to conventional lending: a bank provides a green loan to a borrower, which then repays the financing with interest over an agreed period. Finally, green equity involves public or private investments in projects or assets that generate a return for investors.

Green financial products can channel funding towards projects related to land, ocean conservation and sustainable resource management. Green financial products only contribute an estimated USD 4–6 billion annually to biodiversity conservation (Deutz et al. 2020). As of late 2020, there has been limited use of green financial products for biodiversity conservation, partially due to difficulty in pricing benefits or evaluating returns on biodiversity and ecosystem services.

Despite these difficulties, the market for green financial products has grown rapidly. But to scale up their contribution to conservation, these markets need to adopt and implement standard guidelines, such as the EU Taxonomy for Sustainable Finance, which aims to help investors, firms, borrowers and project developers channel investments towards more climate-friendly activities (IEEP 2020).

Green financial products: green equity

Green equity comprises public and private equity and is a subset of impact investing, which seeks social and environmental returns in addition to financial returns, also referred to as the ‘triple bottom-line’. Public equity is the biggest asset class in the sustainable investment universe, representing 51% of assets under management. However, until now it has a limited track record in delivering financing for biodiversity conservation (GSI Alliance 2018). In 2019 the annual USD 2–3 billion impact investments in biodiversity conservation represented less than 0.5% of the total private equity impact investments market. Conservation, however, represents a small fraction of both types of investments (GSI Alliance 2018). Nevertheless, the next 25 years will see new generations of high- and ultra-high-net-worth individuals, cumulatively representing USD 30 trillion in net worth, who are expected to raise demand for a range of triple bottom-line investment opportunities (Deutz et al. 2020).

To meet this demand, institutional investors can invest in and screen current portfolios for biodiversity-friendly traded stocks, mutual funds, or exchange-traded funds, referred to as ‘public equity’, that are measured against financial as well as ESG goals. Green equity in this case refers to the biodiversity funding products available on public markets, and the way in which investors invest in them (see chapter 7 for more detail).

Private equity funds are raised from accredited investors and are invested into companies and/or special purpose vehicles to acquire private equity stakes in selected entities. Biodiversity-related funds invest in businesses with a positive biodiversity impact or in thematic assets, such as sustainable forestry, that offer biodiversity benefits. An example is Mirova, which manages a range of funds dedicated to natural capital and nature-based solutions, including the Land Degradation Neutrality (LDN) Fund. In this way, Mirova is able to finance projects that combine profit with purpose: ecosystem conservation, restoration and sustainable livelihoods for local communities. HSBC Pollination Climate Asset Management is a joint venture between HSBC’s Global Asset Management and the Pollination Group was established in April 2020, and aims to establish a series of natural capital funds with USD 1 billion raised for its first fund. These funds will focus on carbon reduction and sustainable agriculture and on water conservation goals. It aims to raise an additional USD 2 billion funds to generate carbon credits, and to eventually raise several billion dollars from institutional investors to mainstream ESG investments towards preserving natural capital.

Case study

Mirova's natural capital work

Over the last 5–10 years, Mirova, the asset management company dedicated to sustainable investing and an affiliate of Natixis Investment Managers, has developed an expertise in natural capital investing. With the creation of the Land Degradation Neutrality Fund and the acquisition and integration of Althelia Ecosphere (renamed Mirova Natural Capital), Mirova's natural capital platform covers a variety of sustainable investing fields, both terrestrial and marine. As part of this investment fund family, the company launched a climate fund (ACF) in 2013. The fund was established with the intent to invest in projects that reduce deforestation, mitigate climate change, protect biodiversity and provide sustainable livelihoods to rural communities. ACF funded 10 projects.

One example of this was the fund's USD 7 million investment in the region of Madre de Dios, Peru, to finance the long-term conservation of 591,119 hectares of threatened natural forest. The investment was made alongside the Peru-US debt swap fund 'Fondo de las Americas' (FONDAM), which contributed USD 2 million to the project and offered its expertise in cacao-based agroforestry projects. Within the protected region are Tambopata National Reserve and Bahuaja-Sonene National Park, which contain critical biodiversity hotspots and provide ecosystem services like water cycle regulation and carbon sequestration. Like many other forests, these areas were under threat of conversion and degradation from unsustainable land-use practices such as slash-and-burn agriculture, inefficient pastoral systems, and illegal mining.

As such, the focus of the ACF was to use agroforestry to enable the production of 'deforestation-free' cacao in the region, improving the environment and farming community livelihoods. The investment financed 400 small farmers to switch to more biodiversity-friendly practices, as well as biological monitoring, scientific research and surveillance within the protected areas themselves.
As a result, 4,000 hectares of cocoa trees are controlled by a smallholder cooperative that works for optimal harvesting, processing and commercialisation of the crop. At full scale, Mirova predicts that the project will produce at least 3,200 tonnes of certified deforestation-free organic and Fairtrade cacao every year.
In addition, the project is certified under the Verified Carbon Standard and the Carbon, Community and Biodiversity Standards at the Gold level to avoid over 4 million tonnes of carbon emissions over the seven-year investment period.

Another relevant example is Mirova's Biodiversity Fund Brazil (ABF), which aims to reduce deforestation in the Amazon by providing private investment to replace the recent decrease in donations to the Amazon Fund from northern European countries. The fund aims to deploy USD 100 million in blended finance into sustainable activities. These include investments in agroforestry, like the ACF, but also into protected areas, new biodiversity services structures, finance and technology.
The fund raised USD 15 million at first close (Environmental Finance 2020a).

Green financial products: green bonds

Green bonds are issued by a variety of public and private players, such as governments, corporations, intergovernmental institutions, financial institutions and development agencies. Green bonds are classified via nationally or internationally agreed upon standards and industry guidelines. Certification most often comes from the Climate Bonds Initiative, the Climate Bond Standard and the International Capital Market Association's Green Bond Principles. Green bond issuances doubled between 2007 and 2018 and totalled USD 271 billion in 2019 (Bloomberg NEF 2020a). As of 2019, green bond issuances are the highest in the United States, China and France, which collectively account for 44% of 2019 global issuances (Climate Bonds Initiative 2020). While financial institutions still account for the bulk of green bond issuances, 2019 saw a year over year doubling in green bond issuances from non-financial corporates, with the largest contribution originating from the energy and buildings sectors. In 2018 and 2019, sovereign green bonds represented 13% of the green bond market issuance and are one of the fastest-growing categories for financing land use (25%), renewable energy (25%) and transport (25%) green projects (Climate Bonds Initiative 2020).

Despite growth in green bond issuances, their contribution to biodiversity has been small. Deutz et al. (2020) estimated that in 2019, only 0.5–1.0% of total capital raised via green bonds was directly or indirectly allocated towards biodiversity protection measures. Considering that the green bond markets are projected to reach USD 1 trillion by 2030, private and public conservation actors must take advantage of an increased appetite for green bond fundraising to mainstream capital into biodiversity conservation (Chahine et al. 2020). For example, Central Arkansas Water, a US-based water utility, issued the first municipal green bond whose proceeds will be used to buy and protect forests that can protect clean water sources (Gartner 2020).

Green bonds are a promising revenue generation mechanism for biodiversity because they can complement sustainable land use and other biodiversity projects. However, many biodiversity conservation projects are too small for the green bond market. To make these conservation projects better suited for green bonds, project developers must ensure coordination between all stakeholders and possible bundling of projects into larger investment opportunities (Chahine and Liagre 2020).

Case study

Republic of France Green Sovereign Bond

Sovereign green bonds account for more than 10% of the global green bond volume and are among the key drivers of green bonds issuance for greening public infrastructure and public services (Climate Bonds Initiative 2019). The Agence France Trésor (AFT) is the national manager of France's debt and treasury (Agence France Trésor 2017). In January 2017, AFT issued the first French sovereign green bond, making France the first country to issue a sovereign green benchmarking bond. This was achieved through the creation of a green framework for its sovereign Obligations Assimilables du Trésor (OAT) bonds with the objective of providing liquidity and high standards for investors through green issuances (Agence France Trésor 2017). The creation of the Green OAT framework laid out the foundation for future green sovereign issuance by France.

AFT's Green OAT bond issuance was a record-breaking USD 7.6 billion (EUR 7 billion) bond, with a 25–year tenor (Environmental Finance 2018). The capital raised through this issuance will be divided among the targeted investment areas outlined below according to pre-selected allocations requested by each French ministry for its programmes (Agence France Trésor 2020). Since the initial offering, there have been multiple follow up issues, increasing the total capital raised to EUR 25.3 billion as of April 2020. These bonds have cumulatively raised EUR 3.13 billion for activities related to biodiversity conservation by September 2020.

The objective of the bond is to support the financing of green sectors in the following areas: building, living resources, transport, energy, adaptation and pollution (Agence France Trésor 2020).

Expenditure of the capital raised through this project will be tracked and managed by the Ministry of Finance. The AFT produced the Green OAT framework, which outlines how the country would scale Green OAT issuances as it would a traditional bond. The framework is oriented towards issuing sovereign bonds that assist in meeting the national objectives of:

- Climate change adaptation
- Climate change mitigation
- Protection of biodiversity
- Reduction of soil, air and water pollution.

Case study

The Seychelles Blue Bond

In 2018, the World Bank helped the government of Seychelles issue the world's first Blue Bond. Seychelles is a small island nation, where fishing is the second largest sector behind tourism. Goals of the blue bond include helping the nation build a sustainable blue economy, assisting it through the transition to more sustainable fishing practices, and protecting ocean biodiversity.

Seychelles' Blue Bond mobilised USD 15 million of private investment, which was supported by World Bank credit guarantees and a concessional loan, which lowered the bond's interest rates, allowing Seychelles to save over USD 8 million in interest payments over the bond's maturity schedule. The bond has a coupon of 6.5% and will be redeemed in three equals (Jackson 2019). The World Bank's concessional loan allowed the Seychelles government to only pay a coupon rate of 2.8%.

The funding generated by the bond will help make the blue economy the Seychelles depends on more sustainable by both protecting marine biodiversity and financing the transition to a sustainable economy. The bond will provide grants for fisheries management activities and loans to encourage further investment in areas like post-harvest value adding opportunities and jobs in the protection of ocean resources.

Allocation of funds for individual projects (either grants or loans) will be through the Blue Grants Fund and Blue Investment Fund, both of which are managed by the Seychelles Conservation and Climate Adaptation Trust and the Development Bank of Seychelles (World Bank 2018). These funds will support other publicly funded sustainable fisheries projects and implementation of the Seychelles Marine Spatial Plan for its Exclusive Economic Zone.

Blue bonds have huge potential for mobilising the private sector to support the blue economy. Beyond the Seychelles Blue Bond, blue bonds have also been issued by the Nordic Investment Bank and other banks. If even a portion of the funding raised for green bonds (a market size of nearly USD 200 billion) could be raised for blue bonds, significant marine conservation efforts could be realised.

In September 2020, the Bank of China issued its first blue bond worth USD 950 million, the first issued by a commercial bank (Davis 2020). The funds raised by the bond will be used to finance or refinance marine-related green projects in ocean conservation, renewable energy, sustainable water and wastewater management projects, both onshore and offshore. In November 2020, the China Industrial Bank followed this initiative with an issuance of a three-year USD 450 million bond to support marine pollution prevention and sustainable blue economic development in Asia. These bonds set the stage for further blue bonds in Asia, where the blue economy is the foundation of many countries' economic activity (Davis 2020).

Case study

The Conservation Fund Green Bond

Based in Arlington, Virginia, The Conservation Fund (TCF) is a US environmental non-profit that focuses on conservation initiatives that "make environmental and economic sense" (The Conservation Fund 2020). Within the TCF is the Working Forest Fund, which has issued the only green bond dedicated to conserving working forests in the United States. Working forests are conservation areas that allow for wood and forestry product harvesting while guaranteeing the forest's overall growth (The Conservation Fund 2020). The goal is to halt deforestation in key areas while preserving forestry jobs.

In September 2019, TCF issued USD 150 million worth of 10-year green bonds dedicated to financing the Working Forest Fund, with Goldman Sachs acting as underwriter. The anticipated impact of these green bonds will be spread across five projects that protect 128,576 acres of forestland, protect 337 miles of streams and sequester nearly 30 million tonnes of CO_2. The Working Forest Fund aims to conserve 2 million hectares of high conservation value forests (The Conservation Fund 2020).

Proceeds from the green bonds will help implement sustainable management plans in the form of conservation easements. The plans will be developed on forestlands that TCF purchases and then transfers to a third party or government agency for long-term management. Once the third party assumes control, it can harvest timber and other forestry products but must ensure that tree growth exceeds tree harvesting.

Projects are assessed by TCF's Chief Financial Officer and General Counsel and are approved by the Conservation Acquisition Committee along with TCF's Board of Directors (Sustainalytics 2019). Land purchased under the Working Forest Fund is subject to conservation easements, which are legally binding requirements that allow the transfer of property but severely restrict development rights.

Green loans, sustainability-linked loans, and credit facilities

Green loans, like traditional loans, represent the private borrowing of an entity to provide direct funding for green projects, assets or general corporate sustainability strategies, all of which are based on voluntary investments in conservation. Green loans are most often issued by banks and can be used to finance a specific project on sustainability or a programme that aligns with a company's ESG goals. These loans do not access capital markets like green bonds and usually have a shorter lifetime. Green loans follow the Green Loan Principles, which are comparable to the Green Bond Principles of the International Capital Market Association. The total number of green loans has steadily increased over the past six years, reaching a USD 89.6 billion issuance in 2019. However after the adoption of the Green Loan Principles (GLP) in 2018, only 7% of the total market have been properly labelled as 'green' as most borrowers who follow the green loans use-of-proceeds requirements are not adhering to the GLP core guidelines (Bloomberg NEF 2020b). Like their green bond counterparts, only a small percentage of green loans have been directed to projects that benefit biodiversity. Komaza, a Kenyan start-up that works with smallholder farmers, provides green loans to farmers to support sustainable forestry. Farmers are incentivised to grow their own trees and reduce the pressure on natural forests. In addition to green loans, free seedlings and financial support for working capital costs, farmers also reap the benefits of their final harvest. By providing farmers with financial support and a new income source, which totals USD 1,500 per half-acre plot, Komaza is able to provide a consistent disincentive to deforestation (Environmental Finance 2020b).

Sustainability-linked loans (SLLs) are similar to green loans in terms of repayment but differ in intention and use of proceeds. SLLs can be used for general corporate strategy rather than for the financing of specific projects related to its sustainability targets. The terms of the loan are connected to the borrower's sustainable performance targets, which are agreed between the lender and borrower. Key principles of SLLs are (a) the loan is related to the borrower's corporate social responsibility profile, (b) the loan is based on performance targets agreed upon between the lender and borrower, (c) borrowers report on their progress on the agreed-upon targets and other needed information, and (d) external review of the loan and its progress is conducted. Globally, sustainability-linked loans reached a volume of USD 121.5 billion in 2019. Compared to green loans, sustainability-linked loans are newer but have already outpaced the green loan market in volume in 2019 and 2020.

UPM is a Finnish pulp and paper maker that uses renewable materials, produces recyclable products, and owns 500,000 hectares of forests in Finland. In 2020, UPM borrowed EUR750 million (USD 828 million) from BNP Paribas through a five-year SLL that ties interest rate reductions to performance indicators. These indicators include a net-positive impact on their forests' biodiversity and a 65% reduction in CO_2 emissions from fuels and electricity by 2030 (Hurley 2020). Enel, the multinational energy group, established a sustainability-linked financing framework to introduce their first EUR1 billion (USD 1.2 billion) SLL and revolving credit facility in October 2020. The SLL is linked to Enel increasing its current 52% of installed renewables capacity to at least 60% by 2022. The SLL also includes conservation targets for investing in environmental impact assessments, monitoring systems, bird and fish protection programmes and land remediation activities (Enel Group 2020).

Case study

Indonesian Tropical Landscape Finance Facility

The Indonesian Tropical Landscape Finance Facility (TLFF) is a multi-stakeholder partnership involving several international entities including the UN Environment Programme (UNEP), World Agroforestry (ICRAF), and private entities such as BNP Paribas, ADM Capital, and Partners Group's PG Impact Investments. It seeks to finance projects and companies in Indonesia to promote green growth and sustainable rural livelihoods. To achieve this, the facility consists of a lending platform and grant fund that support projects related to sustainable agriculture and renewable energy. A long term offtake agreement with Michelin, the French multinational tyre manufacturer, was a vital part of reducing the risks to investors.

The Indonesian TLFF generates revenue to support its activities through two mechanisms. For its lending platform, revenue is obtained by securitising long-term loans issued by the TLFF through medium-term notes that are sold to institutional investors. The grant fund, on the other hand, relies on donations from philanthropic organisations. In February 2018, the TLFF completed its inaugural transactions, issuing a sustainability bond of USD 95 million for the financing of natural rubber production and the rehabilitation of degraded land. The financed project is intended to help protect Bukit Tigapuluh National Park by supporting a buffer zone (Environmental Finance 2019). This structure combined concessionary capital in a blended finance structure in the form of guarantees and reduced coupons that reduced risk for investors in the issued notes.

A USD 120 million second tranche for this project is projected to be issued in the future.

The various founding partners in the TLFF manage different parts of the facility. The TLFF secretariat is supported by UNEP and ICRAF. This entity reports to the TLFF Steering Committee, and it supports the lending platform managed by ADM Capital and the grant fund managed by the UN Office for Project Services. The medium-term note programme, which structures and sells notes to institutional investors, is arranged by BNP Paribas.

The TLFF uses two methods of delivery for projects it supports. Its lending platform issues long-term loans to projects in the sustainable agriculture and renewable energy space. On the other hand, its grant fund offers technical assistance and grants to cover early-stage costs of projects. As in the natural rubber production project, often both of these finance mechanisms are combined to support the execution of a project.

Learn more

Sustainable ocean economy

In total, goods and services from the ocean amount to USD 2.5 trillion per year in the form of fishing, transportation, energy, tourism and more (WRI 2018). Further benefits are derived each year from the fact that the world's oceans sequester nearly 25% of global CO_2 emissions and absorb 93% of climate heat (Credit Suisse 2020a). However, the strain that human practices are placing on ocean economies will result in further loss of natural resources and biodiversity. Key markers of losses in biodiversity from irresponsible ocean management include a loss of 20% of the world's coral reefs, a loss of 20% of the world's mangroves, and the fact that 33% of marine mammals are now threatened and 66% of the world's oceans are experiencing cumulative pressures from human activity (IPBES 2019).

Sustainable ocean management and fisheries investment can secure marine services and products for future generations. Sustainable ocean economy programmes acknowledge the need to harvest ocean goods but in a way that preserves marine ecosystems, such as marine protected areas, managed to conserve biodiversity by governments or public-private partnerships (CPIC 2019). In the case of fisheries, only 7% of current global fish stocks are able to sustain additional catch, while experts have recommended reducing global fishing volumes by up to 50% (FAO 2018; Credit Suisse 2020a). Fisheries provide income to millions of families and represent the main source of protein for approximately one billion people. However, there is a severe lack of investment to help fisheries transition to more sustainable management practices. The investment gap in the sector is estimated to be USD 200 billion. To close this gap will require investment from outside the public sector, which currently dominates marine conservation funding efforts (Sumaila et al. 2012; OECD 2019c).

In addition to unsustainable fishing practices, it is estimated that 8 million tonnes of plastic enter our oceans annually (Ocean Conservancy 2020) posing multiple threats to marine life ranging from fatalities due to ingestion or entanglement to transporting invasive marine species and disrupting ecosystems.

The international community should encourage the development of investible Blue Economy strategies that are both profitable and sustainable. Investor interest already exists – 75% in one study stated they believe the sustainable Blue Economy is investible while 45% of asset managers said that their clients are asking for sustainable Blue Economy investments (Credit Suisse 2020a). Some of these investible products are already being created. Credit Suisse, in partnership with Rockefeller Asset Management, launched the Ocean Engagement Fund in September 2020, which raised USD 212 million in the first month. The fund specifically addresses investment needs under SDG 14, one of the SDGs attracting the least amount of private capital. It aims to proactively engage with portfolio companies to steer them away from practices that harm the ocean, and encourage projects that mitigate the effects of climate change and lessen biodiversity loss by targeting three key themes: ocean conservation, pollution prevention and carbon transition (Credit Suisse 2020b).

Case study

Mirova's Sustainable Ocean Fund

Mirova's Sustainable Ocean Fund (SOF), a public-private partnership with Conservation International and the Environmental Defense Fund, works to attract private investment in the sustainable ocean economy. The SOF is dedicated to implementing ocean-friendly practices in developing countries and small island states. Projects include supporting fisheries to maintain sustainable levels of marine fish stocks, providing financial incentives for low-impact aquaculture, responsible seafood supply chains, wastewater management, and more. The Environmental Defense Fund projects that an additional USD 51 billion per year in profits could be derived from fisheries if sustainable fishing practices were implemented, a near 115% increase.

The SOF initially began with pledges from a variety of large institutional players, such as the European Investment Bank, AXA Investment Managers, Inter-American Development Bank, and Caprock Group. In addition, USAID's Development Credit Authority facility committed a USD 50 million risk-sharing guarantee to attract further private investment into the fund (see chapter 5). With USAID's support, the SOF is expected to deploy USD 100 million, of which 40% will be allocated in Latin American countries, 30% in African countries, and 30% in Asian countries. In early 2020 the fund achieved its final close at USD 132 million dollars in capital commitments towards this goal.

Other funds focused on the sustainable ocean economy and marine conservation have cropped up to play similar roles. In 2020, the United Nations Multi-Partner Trust Fund for Coral Reefs was launched, aiming to deploy USD 500 million to protect coral reefs over the next 10 years (UNEP 2020a). The fund draws resources from multiple foundations and UN agencies, along with private investment from Mirova and others. In 2020, BNP Paribas Asset Management also launched the Easy ECPI Global ESG Blue Economy UCITS ETF, the first blue economy exchange-traded fund. The index's USD 40.8 million (EUR 35 million) fund invests in 50 companies that are selected for their participation in five blue economy categories: coastal livelihood, energy and resources, fisheries and seafood, pollution reduction, and maritime transport (Segal 2020; Environmental Finance 2020c).

Structured notes

A structured note is a type of security that has many of the characteristics of a debt security but includes a derivative component, where investment returns are tied to the performance of an underlying asset, stock, or index. In general, structured notes target accredited investors and are subject to lighter regulation than publicly traded securities, which makes them more customizable and reduces the transaction costs associated with structuring and issuing securities. As they can be tailored to meet a variety of market demands, structured notes are favoured by investment banks and other financial institutions with sophisticated structuring expertise. For example, Credit Suisse and Mirova Natural Capital collaborated on the Credit Suisse Nature Conservation Notes, an innovative structured note designed to provide exposure to Mirova Natural Capital and the projects it invests in to private banking clients. These projects aim to reduce carbon emissions from deforestation and promote sustainable agriculture and land use projects in the tropics.

Another example of structured notes targeting conservation outcomes is Credit Suisse's Low Carbon Blue Economy Notes offering, launched at the end of 2019. The assets underlying the Notes are World Bank bonds supporting projects designed to promote strong governance of marine and coastal resources for sustainable fisheries and aquaculture, make coastlines more resilient, establish coastal and marine protected areas, and improve solid waste management to reduce pollution in waterways and oceans. In addition, the Notes offer investors a sustainable equity upside participation through exposure to a low carbon equity index.

As is well known to practitioners, differences in scale are endemic to the biodiversity financing space. In addition to making it possible for private banking clients to put capital into funds that, due to their minimum investment size, would be out of reach to them by pooling their capital into a special purpose vehicle that acts as a limited partner in a fund, often the problem of scale differences comes up in a different context. In many cases, worthy conservation projects cannot tap into mainstream investment capital because the projects' capital needs are smaller than the minimum investment size of potential investors. In cases such as these, structured notes may allow these differences to be bridged by aggregating or pooling projects into a structure that meets the minimum size requirements of investors. In this way, structured notes may enable for-profit investments in biodiversity conservation that might not have occurred but for the customization allowed by these versatile financial products, while at the same time creating jobs for local entrepreneurs who can pool these projects and manage the associated investments.

Case study

WWF Thailand's FLR349 Agroecology Fund

Monoculture maize farming is the biggest driver of deforestation in Thailand, often encroaching on forests in watershed areas. Small farmers often find themselves trapped in a cycle of debt where illegally expanding into the forest can appear to be the only way out.

To combat this problem, WWF Thailand co-manages the FLR349 agroecology fund to support farmers to transform chemically-intensive monocultures into more sustainable mixed farms. Farmers are trained to mix perennial trees, fruit trees, vegetables and herbs in a system that effectively provides both a carbon sink and a water reservoir. This results in diverse and healthy crops, helping farmers reduce their cost of living while still generating income.

The fund is financed through donations from businesses and individuals who want to make a tangible impact by supporting a transition to sustainable agriculture. The fund supports farmers in this transition with the help of Thailand's Ministry of Natural Resources and Environment, which provides legitimate land use rights to the farmers. The fund plans to scale up to managing 8000 hectares within five years and intends to continue to expand beyond that with increasingly commercial investment. From 2017 to 2019, the fund provided direct benefits, including seedlings, to 670 smallholder farmers and trained 2,000 more on sustainable agriculture techniques.

Biodiversity-related fees and charges[3]

Biodiversity-related fees and charges are revenue-raising mechanisms that also incentivise pro-conservation behaviour in businesses and individuals (OECD 2020b). A fee or charge differs from taxes in that with fees or charges a payment is made to a public entity in order to receive some specific benefit in return, such as access to a natural park or the right to fish. On the other hand, taxes are non-voluntary payments used to finance government budgets. According to the OECD Policy Instruments for the Environment (PINE) database, roughly USD 2.3 billion was generated per year between 2012 and 2016 through biodiversity-related fees and charges. While most of this revenue did not have a specific biodiversity component, many affected activities were related to biodiversity protection, such as fishing fees and natural park tickets (OECD 2019a). Often, the revenue from fees and charges is specifically destined to be used in related biodiversity initiatives to avoid the use of funds for non-conservation related purposes.

Fees and charges can also assume the form of government concessions, where governments allow private companies to run a park or conservation area and collect the ensuing biodiversity fees.

Within the PINE database, 189 different fees and charges are being tracked within 48 countries (OECD 2020b). Future issues to tackle within biodiversity-related fees and charges are mainly related to reporting on revenue collected from these mechanisms. Only 48 countries are submitting information and the available data do not capture the total amount of biodiversity fees. According to the PINE database, USD 1.2–2.3 billion is generated each year within biodiversity-related fees and charges (OECD 2020b). Estimates of the potential of biodiversity-related fees and charges in 2030 have been included in the estimates of government budgets and taxation below.

SCALE (2030)

1.8–4.9 bn

TIMEFRAME

LEVEL

PAYER

VALUE

DIRECT

[3] Estimates of the potential of Biodiversity-related fees and charges in 2030 have been included in the estimates of the government budgets and taxation mechanism.

SCALE (2030)

103–155 bn

TIMEFRAME

LEVEL

PAYER

VALUE

DIRECT OR MAINSTREAMING BIODIVERSITY

Government budgets and taxation

Currently, the largest source of finance for biodiversity and ecosystem protection is domestic government spending. Finance raised from domestic budget allocation is the contribution of national and subnational governments to domestic biodiversity conservation and ecosystem services provision. It is important to note that whilst many of the other mechanisms discussed here could be used domestically, this mechanism refers specifically to the allocation of finance from government budgets. Relating to biodiversity protection, this can be through establishing and maintaining protected areas, making tax revenue from national parks dedicated to conservation, funding public-led conservation projects and executing environmental laws. These efforts implicitly recognise the nature of biodiversity as a public good.

The current scale of domestic finance is around USD 75 to 78 billion per annum, or roughly 54–61% of the total public spending on biodiversity (Deutz et al. 2020). Tax revenues are expected to increase in many developing countries, some of which may be dedicated to biodiversity conservation. Taxes and fees can pledge revenues to positive social and environmental outcomes, which biodiversity could benefit from. Fines, fees, penalties and tradable permits are some mechanisms that could be used to generate domestic finance for conservation (see chapter 7). Even though there are a variety of finance mechanisms for governments, public resources are still limited, and there is intense competition to address other global challenges, such as renewable energy, public health, food security, and more (UNDP 2018).

It is highly unlikely that domestic public budgets for biodiversity alone have the potential to scale up enough to close the biodiversity financing gap by 2030.

While domestic budgets alone cannot stop biodiversity degradation, governments can cooperate with financial institutions to stimulate investments, mobilise resources via de-risking tools, or create regulatory market frameworks conducive to incentivising biodiversity finance (OECD 2019a). The public sector also has a role in redirecting expenditures away from biodiversity-damaging activities, such as fossil fuel and certain agricultural subsidies, or promoting biodiversity-positive expenditures in non-core biodiversity agencies such as health, education or public works.

Official development assistance (ODA)

Official development assistance (ODA) is financing provided on concessional interest rates or terms by national governments, development banks and international organisations to developing countries to promote development. Due to the large overlap between environmental and developmental goals, ODA often delivers finance for the environment. A small percentage of ODA does have the primary goal of supporting the conservation or sustainable use of biodiversity. The OECD tracks all reported ODA flows, and has specifically tracked ODA for biodiversity since 1998. Beginning in 2006, the OECD made reporting on biodiversity activities financed through ODA mandatory, with members of the Development Assistance Committee required to report on biodiversity targets called 'Rio Markers' (OECD 2017). These markers identify biodiversity conservation as a 'primary' or 'significant' outcome for an ODA programme.

Similar to domestic budget allocation, biodiversity-related aid arises primarily through contributions from national governments' general budgets and can flow as bilateral aid or through multilateral institutions such as the Global Environment Facility (GEF) or UN programmes.

Most biodiversity-related ODA (73%) is delivered into the areas of environmental protection, forestry, water supply and sanitation, agriculture, and fishing, and approximately one third goes to African countries. ODA is crucial to scale biodiversity projects in countries that lack the capital to do so. Key challenges to strengthening ODA delivery include a lack of reliable metrics to determine the biodiversity allocation of complex aid programmes and difficulties in ascertaining the biodiversity benefits of aid (Stepping and Meijer 2018). ODA for biodiversity is USD 4–10 billion per year (Deutz et al. 2020). While this ODA has historically been quite well-targeted when addressing biodiversity goals, its future effectiveness depends on how it is used. ODA is necessary, but not sufficient to finance biodiversity conservation at the level that is needed, which means ODA is best used to provide catalytic financing for other sources of finance. ODA can serve an important role in de-risking, encouraging and setting precedents for other types of investment in biodiversity.

SCALE (2030)

8–19 bn

TIMEFRAME

LEVEL

PAYER

VALUE

DIRECT OR MAINSTREAMING BIODIVERSITY

SCALE (2030)

3–8 bn

TIMEFRAME

LEVEL

VALUE

DIRECT OR MAINSTREAMING BIODIVERSITY

Philanthropy and conservation NGOs

Philanthropy includes contributions from private foundations, business-related foundations and conservation NGOs, who also benefit from philanthropy themselves. Several business-related foundations contribute to conservation through donations under their corporate social responsibility initiatives. A number of large philanthropic foundations generate revenue for biodiversity through an initial endowment that is managed in perpetuity. One example is the USD 459 million commitment led by the Ford Foundation and 17 other philanthropic foundations. This provides with resources to sustainably manage natural habitats (Ford Foundation 2018).

These contributions, however depend on the success of commercial investments. Conservation NGOs on the other hand generate revenue from a variety of sources including membership fees and government contributions. The amount of funding available for conservation activities from philanthropy is limited and is unlikely to be meaningfully scaled. Only 3% of US philanthropic capital is allocated to environmental causes (Tazawa 2019). Nevertheless, foundations and NGOs increasingly provide visibility and strategic focus that may catalyse the investment of other forms of capital not otherwise available.

While philanthropic grant-making totals can be difficult to estimate accurately, they have been estimated to be in the range of USD 2–4 billion. Jeff Bezos, the founder of Amazon, pledged USD 10 billion to fight climate change through his Earth Fund, which includes a USD 10 million commitment for reforestation (Tett 2020). The first recipients of funding from Bezos' Earth Fund include the Environmental Defense Fund, which received USD 100 million to complete and launch MethaneSAT, a satellite that tracks methane pollution. Fifteen other NGOs, including The Nature Conservancy, the World Resources Institute, and the World Wildlife Fund, also received portions of the total USD 791 million granted to work on nature-based climate solutions (Mufson 2020). This 'green pledge' represents the largest single environmental donation by a philanthropist and could affect future conservation giving trends.

Bloomberg Philanthropies' Vibrant Oceans Initiative launched in 2014 with an initial commitment of USD 53 million in Brazil, Chile and the Philippines (Bloomberg Philanthropies n.d.). The initiative partners with coastal communities, non-profits, local and national governments, policymakers, and academic groups to advance evidence-based conservation practices and implement data-driven fisheries management policies. In 2018, the initiative was expanded to include 10 fisheries-dependent target countries, funded via a USD 86 million investment.

Natural infrastructure and payments for ecosystem services (PES)

SCALE (2030)

105–139 bn

TIMEFRAME

LEVEL

PAYER

VALUE

DIRECT

Natural infrastructure is a term that refers to a network of land and water bodies that deliver ecosystem services to human populations (Deutz et al. 2020). Financial flows from payments for ecosystem services (PES) programmes can be used to invest in natural infrastructure, which may provide a range of ecosystem services that more sustainably deliver the services that utilities, such as water treatment plants, carry out (Abel et al. 2017). Not all ecosystem services involve economic returns.

PES in fact represents a variety of mechanisms that can be used to conserve biodiversity. These mechanisms may fund conservation that provides climate mitigation benefits, as in REDD+ programmes, or they can fund ecosystem services that mimic the services that grey infrastructure provides. Ecosystems such as riparian forests can provide water quality and quantity regulation, and in doing so might provide more a more cost-effective alternative to grey infrastructure investments (Deutz et al. 2020).

Based on Forest Trends' State of the Watershed Report, Deutz et al. (2020) have estimated that USD 26.9 billion has been allocated to payments for natural infrastructure related to watersheds (Bennett and Ruef 2016; Deutz et al. 2020). Of all valued and paid-for ecosystems, payments to protect watershed ecosystems have been the most mature, featuring high transaction value and geographical distribution.

A 2015 survey of 378 watershed programmes conducted by Forest Trends revealed that 139 programmes are funded by public subsidies, 197 get their funding from user fees or funds, and 20 programmes receive funding from environmental markets, out of which the majority of funding has come from public subsidies (Bennet et al. 2015). The other 22 are funded by government schemes that purchase water rights to conserve watersheds or replenish groundwater (Bennett and Ruef 2016).

The Australian state of Queensland and HSBC recently announced they would be the first purchasers of publicly and privately produced reef credits. These credits quantify the value of conservation activity undertaken to improve the quality of water flowing into the Great Barrier Reef (EcoVoice 2020). These investments, in addition to similar investments made by the US Army Corps of Engineers to protect coastal ecosystems that prevent coastal flooding, show that investments in conserving biodiverse habitats can have direct benefits to communities, either through protecting ecotourism revenue or protecting natural resources (Deutz et al. 2020).

Case study

China's Sloping Lands Conservation Programme

China introduced the Sloping Lands Conservation Programme (SLCP) in response to a drought along the Yellow River in 1997 and massive floods along the Yangtze River in 1998 (Liu and Lan 2015). SLCP introduced fixed payment incentives that compensated rural households for converting sloped arable land to forest or grassland that could mitigate the effects of future flooding, while alleviating adverse effects on households' livelihoods (Liu and Lan 2015). China's State Forestry Administration implements the programme, with its finances being managed by the Ministry of Finance, while regional and local government officers are in charge of enforcing the programme at the household level (Leshan et al. 2018).

Since its inception, the programme has gone through four stages between 2002 and 2020, which were: (1) a pilot stage that covered 382 thousand hectares in three provinces between 1999 and 2001, (2) a full implementation stage that covered 14.7 million hectares and 25 provinces between 2002 and 2007, (3) a retreat phase in which new conversions ceased and payment rates were cut in half between 2008 and 2014, and (4) a new round stage, in which an additional 2.8 million hectares was added to the programme as well as an addition of new poverty alleviation objectives (Leshan et al. 2018).

Between each phase, the format for the PES programme varied. In the first stage and the first three years of the second stage, payments were made in-kind through grains from the National Grain Reserve (Leshan et al. 2018). Payments shifted to cash after 2004, when China's grain surplus was no longer of national concern (Leshan et al. 2018). Some households still received in-kind payments in the form of tree seedlings, for example. Payments were provided over two, five, or eight years, based on whether households were planting grasslands, commercial trees or biodiversity-friendly 'ecological' trees, respectively (Leshan et al. 2018). The programme's grain subsidies, seed funds, maintenance fees and special funds cost the central government approximately USD 69 billion between 2002 and 2012. Of this amount, the government contributed USD 52 billion in the form of direct payments to households (Leshan et al. 2018).

Studies as early as 2005 showed that the programme was able to realise environmental benefits related to soil erosion control as well as a reduction in silt run-off in converted areas (IIED 2012). Furthermore, China's afforestation policies have significantly affected the country's net greenhouse gas emissions. China contributed about 27% of global CO_2 emissions in 2017, but recent studies show that China's growing forests sequestered up to 45% of the country's anthropogenic emissions from 2010 to 2016 (Wang et al. 2020). Having said this, some studies have shown that the survival rate of planted tree species can be quite low, reducing the positive impact they can have. Furthermore, while commercial trees might offer some protection from silt run-off and sequester carbon, they do not necessarily have positive biodiversity effects (IIED 2012).

Case study

PES in Costa Rica as a driver of forest conservation

In 1996, Costa Rica introduced measures to compensate landowners for tropical forest conservation, and to provide incentives for communities to slow down the country's fast deforestation rates (Porras et al. 2012). Since 1998, the National Forestry Finance Fund (FONAFIFO) has become the central administrator of the programme and manages its performance through local offices.

Four main objectives guide the programme: (1) carbon sequestration, (2) biodiversity protection, (3) water regulation, and (4) landscape beauty (Porras et al. 2018). The government of Costa Rica distributes direct cash payments to PES contract holders based on the type of conservation work that contract holders undertake, which includes forest protection, reforestation, regeneration and agroforestry (Porras et al. 2012).

Programme funding has come from a fuel tax, a water tax, loans, and agreements with private and semi-private companies (Porras et al. 2018). Revenue from the 3.5% fuel tax is a fixed annual amount linked to carbon emissions, which averages at USD 12–15 million of annual funding for the programme (Porras et al. 2018; Malavasi and Kellenberg n.d.). The programme receives 25% of water fees. Finally, private sector stakeholders who are interested in forest and/or water protection have also provided funding (Porras et al. 2018). The majority of funding comes from government allocations.

Overall, the programme has had successful environmental and social outcomes. Since its inception, the programme has signed 16,500 contracts with private landowners and restored 1,250,000 hectares of forest land (Porras et al. 2018; Malavasi and Kellenberg 2014). Participation of indigenous, small landowners and women-owned properties has increased since the programme's inception as they have been given priority in application. Moving forward, issues must be resolved that relate to access to funding and better targeting of communities who rely on forest land but do not have nationally registered property rights.

Conclusion

Current scale of finance

As shown in Table 5, recent estimates suggest that 2019 financial flows into biodiversity conservation were somewhere in the range of USD 124–143 billion, corresponding to 0.12–0.14% of global GDP (Table 5 and Figure 6). Recent efforts have provided values for global biodiversity conservation financing using alternative data or methodologies.

In April 2020, the OECD's Comprehensive Overview of Global Biodiversity Finance report estimated global biodiversity finance at USD 78–91 billion per year based on available 2015–2017 data. The OECD estimate provides a detailed overview of public domestic and international public expenditures from the OECD Creditor Reporting System, OECD Policy Instruments for the Environment, the Clearing-House Mechanism CBD portal, UNDP BIOFIN biodiversity expenditure reports, and the Classification of the Functions of Government datasets.

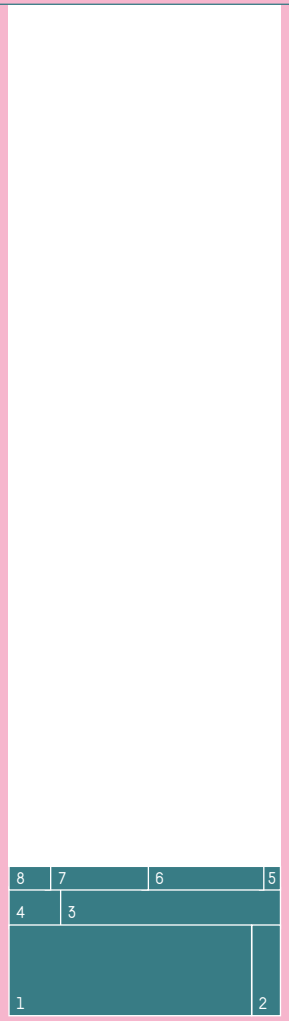
In 2020 UNDP BIOFIN calculated that global annual public investment in biodiversity had increased from around USD 100 billion in 2008 to about USD 140 billion in 2017, with an average of USD 123 billion invested annually (± 1 billion) over this period. This UNDP BIOFIN estimate also focused on government spending and used a statistical model to project global spending based on a sample of 30 countries' biodiversity expenditures over 2008–2017. Therefore, there is potential for under-reporting of the total global biodiversity conservation investments to date.

Table 5. Current and future public and private financing for biodiversity conservation

Mechanisms that increase capital flows into biodiversity	Type of finance	2019 lower limit – upper limit USD bn/yr	2030 lower limit – upper limit USD bn/yr
Government budgets and taxation	Public	75–78	103–155
Natural infrastructure	Public Private	27	105–139
Sustainable supply chains	Private	5–8	12–19
Biodiversity offsets	Public Private	6–9	162–168
Official Development Assistance (ODA)	Public	4–10	8–19
Green financial products	Public Private	4–6	31–93
Philanthropy and conservation NGOs	Private	2–3	3–8
Nature-base solutions and carbon markets	Public Private	0.8–1	25–40
Total:		**124–143**	**449–640**

Notes: Values are adjusted to 2019 USD. Detailed methodology is available in the appendix in Deutz et al, 2020.

2019



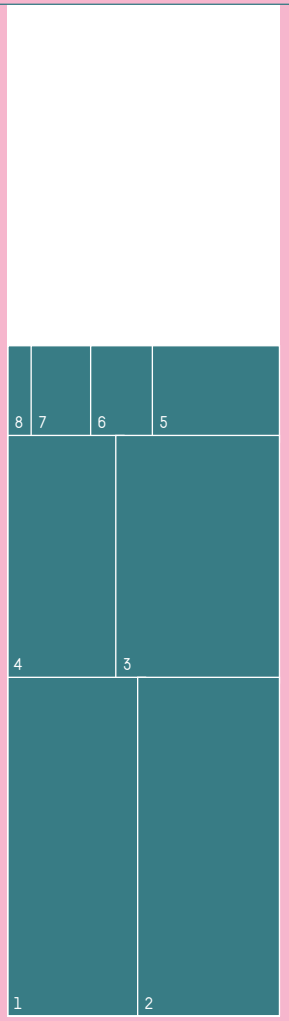
Global biodiversity financing gap
824 USD bn

Global biodiversity finance
143 USD bn

1. Governmental budgets and taxation	USD 75-78
2. Natural infrastructure	USD 27
3. Official development assistance (ODA)	USD 4-10
4. Biodiversity offsets	USD 6-9
5. Sustainable supply chains	USD 6-8
6. Green financial products	USD 4-6
7. Philanthropy and conservation NGOs	USD 2-4
8. Natural-based solutions and carbon markets	USD 1

Figure 6.
Current and future global biodiversity finance and the global biodiversity conservation financing gap

2030



Global biodiversity financing gap
327 USD bn

Global biodiversity finance
640 USD bn

1. Biodiversity offsets	USD 162-168
2. Governmental budgets and taxation	USD 103-155
3. Natural infrastructure	USD 105-139
4. Green financial products	USD 31-93
5. Nature-based solutions and carbon markets	USD 25-40
6. Official development assistance (ODA)	USD 8-19
7. Sustainable supply chains	USD 12-19
8. Philanthropy and conservation NGOs	USD 3-8

Future scale of finance

Looking ahead to 2030, the global annual financial flows towards biodiversity conservation could be scaled-up to a total USD 449–640 billion. Where exactly total expenditures fall in that range will be driven primarily by effective policy reforms and incentives to catalyse the growth of private and public-private investments for biodiversity conservation.

Figure 6 shows the high-scale potential growth of global biodiversity finance projected to 2030, representing an increase in the order of 3.6–4.5 times 2019 annual financial flows. This figure shows the current and future scale of biodiversity finance. The size of each bar indicates the average amount that could be raised through each mechanism.

Notwithstanding the potential increase in global biodiversity finance flows, the estimated annual financing gap for global biodiversity conservation by 2030 would be USD 273–327 billion (Deutz et al 2020). This means that the global biodiversity funding need would likely not be met by 2030, unless governments can also commit to scale up the global reform of harmful subsidies to biodiversity and the private sector improves financial risk management practices towards biodiversity conservation (see chapter 6).

An estimated 87% of current finance comes from domestic and international public finance. Finance under domestic public budgets, development assistance (ODA) and philanthropy could be scaled up to USD 219–321 billion per annum by 2030. This could be achieved through increased political will and policy reforms that focus on increased biodiversity conservation funding. This increase will primarily come from national government budgets, but also from other categories of ODA providers committing to double aid with an increased focus on the efficiency of biodiversity finance. There is already precedence for governments meeting these commitments. The CBD recorded that bilateral ODA for biodiversity increased by 76% from 2015 to 2018 compared with 2006 to 2010, with 10 parties effectively doubling their ODA contributions (CBD 2020a).

As biodiversity finance is scaled up, by 2030 more resources (50–51%) are likely to come from innovative public-private mechanisms such as biodiversity offsets, natural climate solutions and carbon markets, as well as mechanisms to scale private sector investment such as sustainable supply chains and green financial products.

Biodiversity offsets offer an avenue through which impacts to biodiversity from development activity must be paid for and directed to conservation. There are currently 42 countries with established biodiversity offset policies. However, only nine of these countries have implemented a significant number of offset projects. If national policies and international standards are strengthened and enforced in these 42 countries, biodiversity offsets have the potential to address 2.9 to 11.6 million ha of residual adverse development impacts annually and to generate USD 42–168 billion in conservation funding per year by 2030.

For mechanisms such as natural climate solutions and carbon markets, green financial products, and sustainable supply chains, arguably the most effective form of support would be the application of government effective regulation and policy to catalyse private investment.

Natural climate solutions and carbon markets, can be scaled up to USD 25–40 billion per annum if investments in natural climate solutions are able to increase by USD 22.9–34.3 billion, REDD+ programmes increase by USD 2.7 billion, and state and national carbon market compliance programmes from Australia, Canada, Colombia and the United States increase by USD 1.2–2 billion. The growing demand for credits for offsetting carbon is already visible with the transactions on the voluntary carbon markets reaching a seven-year high in 2018. As more companies and governments commit to net-zero targets, a continuous demand should arise for credits from conservation, restoration, and improved management of forests, wetlands, grasslands and agricultural lands. Some USD 22.9–34.3 billion could be driven by governments with nationally determined contributions that incorporate natural climate solutions as part of their overall climate goals. Today, two thirds of all countries have included natural climate solutions as a mitigation or adaptation strategy in their nationally determined contributions, although natural climate solutions currently receive just 6% of public climate mitigation funding. The potential contributions from the Chinese Certified Emissions Reductions for the energy sector and the Carbon Offsetting and Reduction Scheme for the International Aviation sector could potentially increase the estimated USD 25–40 billion by mainstreaming investments to include forest and land-based carbon emission reductions. The new Chinese government carbon-neutral commitment by 2060 is an ambitious but critical pledge by a country that is the world's largest carbon dioxide emitter, with 28% of the global carbon emissions (Hook 2020).

One of the key areas of growth will be in green financial products, through green debt products such as green bonds, green loans, and sustainability-linked loans. The size of the overall global bond markets increased from USD 87 trillion in 2009 to over USD 115 trillion in mid-2019, driven by the growth of bond issuance in the public (47%) and private non-financial sectors (14%), primarily in emerging markets. Of this, green debt represents a small (<0.5%) segment of the global bond markets. Of the USD 257.7–271 billion

green bond issuances in 2019, only USD 1.6–3.3 billion (<0.7%) of investments were allocated toward biodiversity conservation while 81% targeted the energy (31%), buildings (30%) and transportation (20%) sectors. By 2030, USD 19–76 billion could be driven by regulation and international standards for allocating financing to biodiversity conservation through green debt products, which could follow from a push to mainstream biodiversity conservation through investments in renewable energy, transportation, agriculture and other assets (Deutz et al. 2020).

Finally, the historical impact of global supply chains on biodiversity has been largely negative, driven by land-use change and unsustainable agricultural, forest, fisheries and other practices associated with commodities. However, a shift towards more responsible supply chain management practices offers an opportunity to generate revenue from sustainable commodities production and/or avoid harm by improving sustainability practices (see chapter 7). The scale of certified sustainable commodities markets' direct contribution to biodiversity conservation is expected to increase to at least USD 12–19 billion annually by 2030.

Deliver

5

This chapter explores the mechanisms that deliver finance for biodiversity conservation. As funding increases, the public and private sectors will need to use appropriate "measures that can enhance cost-effectiveness and efficiency in budget execution, achieve synergies, align incentives, and favour a more equitable distribution of resources" to deliver funds targeted at closing the biodiversity funding gap (UNDP 2018).

The state of play

Currently, finance for biodiversity is delivered in a fragmented manner with limited coordination among international, national, and local investors and project managers. National governments, with the help of multilateral or bilateral aid organisations, are the main delivery networks for conservation finance. Moving forward, all sectors of society should work together to ensure that countries' cross-sector biodiversity spending is on track to achieve national goals, and that national, private and civil society providers of conservation finance minimise the gap between their actual allocation of financing and their budgeted plans.

Government or official development assistance (ODA) funds that national governments receive for conservation, can be delivered to projects through grants, concessional debt or microfinance. Public financing can also be channelled from earmarked public budgets or ODA funds or facilities dedicated to conservation. Additional delivery mechanisms for conservation finance can be products for allocating private and/or public budgets to be delivered to conservation projects, for encouraging additional revenue generation, or for better monitoring of conservation finance. Governments, ODA providers, NGOs and a small number of private sector donors and lenders have provided catalytic capital support through concessionary loans, guarantees or other forms of assistance that enable investments in biodiversity conservation.[4] Multilateral ODA provided by organisations such as the GEF have played a critical role in de-risking private investments in conservation through concessionary loans conditional on biodiversity or capacity-building outcomes, grants, and technical assistance for national governments. Either public managers or recipients of funds, as well as other sources for conservation financing, can ensure their delivery through using financing structures such as results-based or conditional payments to ensure that investments reach their desired outcomes. The private sector can also play a greater role in ensuring the smooth delivery of capital to impactful conservation projects as their awareness of business risks related to biodiversity loss increases.

[4] Catalytic capital is defined as debt, equity, guarantees, and other investments that accept disproportionate risk and/or concessionary returns relative to conventional investments in order to generate positive impacts and enable third-party investment that otherwise would not be possible (Tideline 2019).

A brief history

Delivery of conservation finance has historically been and should continue to be aligned to countries' National Biodiversity Strategies and Action Plans (NBSAPs), which signatories of the Convention on Biological Diversity (CBD) are required to develop and integrate into relevant sectoral or cross-sectoral plans, programmes and policies. To date, 191 signatories to the CBD have developed at least one NBSAP. Initial submissions lacked specified targets and desired results, which might have improved countries' budgeting processes. Furthermore, out of the 170 NBSAPs submitted and revised under review, only 25 countries have either drafted or implemented resource mobilisation strategies within their NBSAPs (CBD 2020b).

Another CBD initiative that provides guidance on delivery for conservation is the CBD Programme of Work on Protected Areas (PoWPA), created at COP 7 in 2004. This initiative enabled countries to identify gaps in national protected area networks and establish an ecologically representative network of protected areas. A total of 108 countries have submitted their PoWPA action plans, and since 2004, thousands of new protected areas have been established in connection with the PoWPA process.

Today, we see a more collaborative approach that builds on the strengths of both public and private sectors and seeks to use novel financial mechanisms. The term 'blended finance' refers to "...the strategic use of public finance for the mobilization of additional finance towards sustainable development" (OECD 2019a), often by combining public and philanthropic capital with private, return-seeking capital into the same financing. The goal is to leverage mission-driven capital into development by reducing private investors' risks and/or improving their returns, thus changing the risk-return profile of an investment just enough to meet profitability requirements of private investors. Delivery mechanisms that help with risk mitigation are proving to be critical for biodiversity finance – 46% of all projects, 67% of all bonds or notes, and 12% of all funds issued or launched from 2017 to 2019 used guarantees or risk insurance (Convergence 2020). Between 2012 and 2015, blended finance structures used by development finance institutions mobilised USD 81 billion in private financing (OECD 2018a), with most of their transactions focusing on renewable energy, financial services and agriculture (OECD 2020a). By comparison, blended finance channelled only an estimated USD 3.1 billion to biodiversity from 2000 to 2018 (Convergence 2019).

Criteria

The diagram below presents a framework that can be used to analyse and understand the different options for the delivery of biodiversity finance. The framework uses five criteria as follows:

1. **Level:** At what level will funding be delivered?
2. **Leverage:** How much new investment can this mechanism enable that wouldn't otherwise be possible?
3. **Theme:** What activities can be financed?
4. **Performance-based:** Is the provision of funding linked to performance?
5. **Direct or mainstreaming biodiversity:** How will revenue be generated and delivered?

Table 6. Deliver better – principles and criteria

Principle	Effective / Efficient	Target	Appropriate
Criterion	**Level** At what level (national, subnational or project) is biodiversity finance likely to be delivered?	**Leverage** How much additional investment can this mechanism catalyse?	**Theme** What type of activities and investments are appropriate for this particular mechanism?
	Performance-based Is the provision of public funding linked to specific outcomes or performance?	**Direct / Mainstreaming** Will funds be delivered directly into biodiversity conservation? Or mainstreamed through other sectors with biodiversity co-benefits?	

The following pages provide an explanation of these criteria and how they can be used to understand mechanisms for the delivery of biodiversity finance. A further consideration for the delivery of finance is how much biodiversity is delivered per unit cost, that is, its efficiency. These considerations, although not visually represented with an icon, are discussed for each mechanism.

1. Level

The administrative level at which finance for biodiversity and ecosystem services is delivered is an important consideration for all countries.

Options:

National Subnational Project

National-level delivery mechanisms typically involve the integration of financial resources into national budgets, using the government's existing financial architecture to implement a programme at a national level.

Subnational-level delivery mechanisms provide funding for the coordinated planning of conservation at the district, region and province levels, or other similar subnational jurisdictions.

Project-level might not be integrated into government levels and might instead deliver capital to other public and private entities for conservation activities within specific locations and time-frames.

2. Leverage

The leverage criterion describes the degree to which a delivery mechanism may facilitate private and public-private investment and, in doing so, may enable financing activity that would otherwise not have been possible.

Options:

Low Medium High

Delivery mechanisms that have low leverage may not attract additional private or public investment toward biodiversity, but may support better delivery, efficiency and effectiveness of existing funds. Mechanisms that have leverage, such as political risk insurance or a repayment guarantee to protect private investors, have the ability to transform a financing transaction with little or no appeal for investors into a significant financing with large amounts of private capital for clear and convincing benefits to biodiversity.

3. Theme

The theme criterion outlines the activities that would be appropriate to receive finance under a given delivery mechanism.

Options:


Conservation


Sustainable use


Capacity building


Technology transfer

Biodiversity and ecosystem service interventions can be grouped into four themes:

Conservation refers to the deployment of capital, or creation of activities for the deployment of capital, to protect ecosystem services and the habitats that create them.

Sustainable use focuses on the provision of ecosystem goods, but in such a manner that the provision of ecosystem services and conservation of biodiversity are maintained (for example, agroforestry, sustainable commodities).

Capacity building activities focus on supporting countries and communities in their ability to carry out biodiversity and ecosystem service protection. It can include activities that support improved governance of protected areas market development and certification standards for sustainable supply chain commodities.

Technology transfer refers to the improvement of technical knowledge related to ecosystem conservation and the sustainable use of natural capital and genetic resources.

4. Performance-based

This criterion answers the question of whether the provision of funding is based on performance related to biodiversity conservation and ecosystem service provision.

Options:

Non-performance-based


Performance-based

To a certain degree, all delivery mechanisms are related to performance in the sense that there is an expected outcome from funding. For example, grants given in support of capacity building activities are based on the expected result that capacity will be built. Performance-based delivery as discussed here, however, means that delivery of finance is conditional upon the already executed or expected ecosystem services and/or biodiversity conservation. While non-performance-based budgeting is still expected to yield some positive results through financial incentives, performance-based delivery explicitly ties elements of contractual conditionality for payments. Performance-based mechanisms can drive desired outcomes either at a resource allocation or payment level. We discuss here two subsets of performance-based delivery: results-based budgeting and pay-for-success.

5. Direct or mainstreaming biodiversity

Delivery mechanisms have the potential to either enable direct biodiversity conservation expenditures or to mainstream biodiversity conservation through creating the right incentives for investors to consider the potential biodiversity co-benefits of their projects. Mainstreaming biodiversity conservation requires including biodiversity conservation in the design and implementation of mechanisms and/or projects, thus ensuring that investors gain biodiversity co-benefits from their activities.

Options:


Direct biodiversity investment


Biodiversity mainstreaming investment

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DIRECT OR MAINSTREAMING BIODIVERSITY

Unconditional grants

A grant is defined as a transfer made in cash, goods or services for which no repayment is required (OECD 2009). Given the difficulties in capturing the benefits that arise from the global public good aspects of biodiversity and ecosystem services, a large proportion of biodiversity finance transactions are funded, in whole or in part, through grants. While grants could be used for a wide variety of biodiversity needs, financial resources that are delivered as grants are likely to be limited, so their use should be targeted. Furthermore, despite the fact that grants do not require repayment, their provision is often contractually contingent upon the recipient of the grant being able to show proof of outcomes, or the recipients being amenable to being evaluated and receiving technical assistance.

Grants are typically targeted towards activities that provide a public good that has no (or negative) financial returns for the recipient. Grants have the potential to fulfil an important role in supporting other forms of finance delivery. Likewise, they may fund much-needed capacity building and institutional strengthening and, as biodiversity conservation projects are implemented, grants may afford project managers the ability to make substantial progress in the early stages of development without financial risks.

Grants can help stimulate other financial flows as well if they are used for providing technical assistance. The GEF, for example, leveraged about USD 6.3 from the private sector in green blended financing for every USD 1 GEF invested in 2013–2014. This includes its Risk Mitigation for Land Restoration project, which attracted USD 120 million in co-financing in addition to GEF's USD 15 million initial investment (GEF 2020).

Performance-based payments

Performance-based payments can incentivise sustainable land-use practices that closely align the interests of service providers, clients or other beneficiaries. Payments are awarded based on three types of conditionality: directly ex post for a unit of ecosystem service or biodiversity verifiably provided (for example, payments for tonnes of carbon sequestered), directly ex ante for a proxy for ecosystem services or biodiversity (for example, hectares of forest conserved), or indirectly for the implementation of policies and measures that protect ecosystems (for example, payments to support capacity building or the costs of enforcing laws against timber extraction). The relative efficiency of the latter two approaches depends on the strength of the relationship between the proxy measure or policies and the level of ecosystem service or biodiversity that those actions provide.

Results-based budgeting can inform performance-based payments through allocating payments to predetermined objectives and expected results for national budgets. The development of such budgeting, which is a more 'advanced' type of conservation budgeting, can help justify resource requirements by linking them to expected performance criteria (UNDP 2018).

Pay-for-success (PFS) is a subset of performance-based payments where investors are paid back only after the project achieves certain agreed outcomes (Fry 2019). As projects are implemented, outcomes are measured against key impact metrics as agreed between the parties prior to the implementation phase. The beneficiaries of the project, usually governments, repay investors in relation to these outcomes. As a result, investors are rewarded for performance while beneficiaries are protected against project failure by making reduced payments (or no payments at all) in the event of under-performance (Flanagan and Woolworth 2019). Importantly, PFS contracts can partially or completely transfer the financial risk of under-performance from public budgets to private investors, who assume the upfront transaction costs of negotiating, structuring and documenting the deal, and hiring the service provider. Financial flows in PFS arrangements, therefore, depend on the objective assessment of project performance metrics against contractual terms (Knoll 2019).

LEVEL

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PERFORMANCE-BASED

DIRECT OR MAINSTREAMING BIODIVERSITY

Case study

Coastal marine biodiversity management results-based budgeting in Guatemala

In Guatemala, five municipal governments partnered with UNDP BIOFIN to implement a pilot results-based budgeting approach for coastal marine biodiversity management. Through this approach, the municipalities sought to institutionalise budgeting processes at the local level that incorporate biodiversity development and protection outcomes. A High-Level Technical Direction Committee united decision makers across multiple public agencies in Guatemala to direct the efforts to further institutionalise the allocation of public resources for coastal marine biodiversity through results-based budgeting processes. To achieve the desired objective of increasing budget allocations to coastal marine biodiversity management, the partnerships executed an intervention strategy focused on building capacity for results-based budgeting, increasing municipal awareness on the management of coastal marine biodiversity and creating avenues to exchange experiences among municipal governments. In using this three-pronged approach, an initial budget allocation of USD 297,300 for Coastal Marine Biodiversity Management was assigned by the five municipalities in 2018. In 2019, the budget allocation was increased by 53% to USD 456,300 (UNDP 2019a).

Concessional debt

Concessional loans are a form of lending extended by creditors at below-market terms with the aim of providing liquidity to borrowers that wouldn't be able to afford market-rate debt. They are often characterised by discounted interest rates and favourable repayments terms, and, in some cases, can be convertible to grants. In the event that a conservation project cannot access commercial debt, a concessional loan may enable the borrower to access funding well before it is able to generate enough revenue to service the debt (European Investment Bank 2018). Concessional debt is an important delivery tool for conservation because it allows conservation projects to receive funding prior to or in absence of sufficient revenue generation. It can also increase other lenders' willingness to offer credit to borrowers because it lowers the total amount of funds needed and the risks associated with large amounts of debt.

Concessional debt may either be extended to support ecosystem-friendly activities or the element of concessionality can be made dependent on the delivery of ecosystem services and biodiversity conservation. Similar to guarantees, concessional loans can effectively reduce the overall interest rate of a financing if other lenders provide market-rate loans. Concessional loans are most suitable for investments that have at least some level of financial return, while still being below a threshold that would attract commercial investment (Parker et al. 2009). As such, concessional loans can be used to support projects in nascent biodiversity and ecosystem service markets, and where countries need financial support to fund their ecological transitions. Enterprise challenge funds can distribute concessional finance by subsidising private investments in ecosystem protection where some amount of commercial viability is predicted to come alongside conservation activities (UNDP n.d.).

The International Development Finance Club has noted that concessional finance has already played a larger role in green financing in 2018 for international organisations compared with previous years (IDFC 2019). National development banks, multilateral development banks and development finance institutions thus have the potential to extend these trends to investments in protecting biodiversity, which currently only represent 1% of climate-related multilateral development bank financing (World Bank 2019a).

LEVEL

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DIRECT OR MAINSTREAMING BIODIVERSITY

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PERFORMANCE-BASED

DIRECT OR MAINSTREAMING BIODIVERSITY

Green microfinance

Microfinance is the provision of financial services (credit, savings and insurance) to poorer households and communities or small- and medium-sized enterprises that are unbanked, that is, not served by a bank or similar financial institution. Microcredit involves offering small loans to groups or individuals as working capital to establish or scale-up a business or, in some cases, to help build up assets or protect against risks (Agrawala and Carraro 2010). Lack of financing is often a major hurdle for poorer communities to transition to more sustainable livelihoods.

Microfinance institutions (MFIs) have seen massive growth over the last decade. As of 2018, 140 million borrowers used MFI services, compared with fewer than 100 million in 2009 (Guichandut and Pistelli 2019). Amounts borrowed reach into the hundreds of billions of USD, with an average growth rate of 11.5% from 2013 to 2018 (Guichandut and Pistelli 2019). The bulk of microfinance transactions occur in South Asia, Latin America and the Caribbean. The Indian microfinance industry achieved 42.9% year-over-year growth, for example, in the first quarter of 2020 in comparison to 2019 (Economic Times 2019).

Microcredit currently constitutes the best-developed microfinance mechanism for delivering biodiversity finance and so is the focus here. By financing this transition, as opposed to directly financing conservation, lenders hope that reconversion to unsustainable activities upon the maturity of the loan is less likely. For example, microcredit can support communities whose income streams have been impacted by protected areas through funding their transitions to more environmentally friendly economic activities.

The potential of microlending to create positive outcomes for biodiversity and the environment has yet to be fully realised. Microcredit can help low-income families in biodiversity hotspots manage through economic shocks, which might otherwise encourage them to resume unsustainable practices that may be more profitable in the short term. However, microfinance is still developing, and to focus it on environmental and biodiversity concerns often requires the collective efforts of more than simply the microfinance institutions.

Private protected areas

Private protected areas (PPAs) can contribute to biodiversity stewardship by supplementing the national and subnational networks of protected areas managed by governments, resulting in a larger area under protection overall. They may also foster connectivity of protected areas, facilitating the movements of migratory animal species as well as gene flow of non-migratory animal species and of plants. Also, PPAs may conserve types of habitat and microhabitat not typically represented in national and subnational networks of protected areas. Finally, PPAs may involve new stakeholders not traditionally associated with protected area management (Gloss et al. 2019).

According to IUCN, PPAs must meet the general conservation standards of protected areas, include recognisable and durable protection, and be governed by a private or non-governmental entity. There is no reliable data on the number or extent of PPAs globally, largely since many governments do not define, recognise or regulate PPAs. Still, certain governments have presided over remarkable growth in PPAs in recent decades. Brazil, for one, had an 80% increase in PPA establishment from 2000 to 2010, most of them within the highly endangered Atlantic Forest (Mata Atlântica), which lost well over 90% of its forest cover following Brazil's settlement by Europeans (Stolton et al. 2014).

Unlike in public conservation areas, managers of PPAs can face substantial challenges to their ownership or management rights. In order to provide some measure of predictability and stability to PPAs, a variety of countries regulate private conservation activities. Some countries include conservation concessions in national law, which grant non-state actors the exclusive management control of state-owned land that was not previously under conservation management, usually for purposes of biodiversity conservation and scientific research. In cases such as these, where the managers are not the owners of the land, thoughtful regulation of this conservation mechanism is particularly important (Stolton et al. 2014). Expanding protected areas through PPAs is critical to realising CBD targets and biodiversity goals. A study in 2020 showed that 100% of the United States' endangered tetrapod species could be protected if protected areas are expanded into key public and private lands (Clancy et al. 2020). However, this will require thorough coordination between landowners, especially at the subnational level.

PPAs can also be used to protect the property rights of indigenous communities, who in turn require funding for the conservation activity they may undertake in PPAs that are protected for the sake of conservation.

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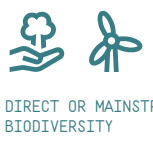


DIRECT OR MAINSTREAMING BIODIVERSITY

LEVEL

LEVERAGE

THEME

PERFORMANCE-BASED

DIRECT OR MAINSTREAMING BIODIVERSITY

Conservation easements and tax credits for land conservation

A conservation easement is a voluntary agreement between a private landowner and a third-party actor, such as a land trust or government agency, under which the third party acquires a set of ownership rights in a property from the landowner. These easements may restrict the landowner's right to develop the property in a variety of different ways. Some easements may completely restrict any type of development while others may allow additional construction with restrictions on building size (Rissman et al. 2007). The terms of the easement are legally binding and often are granted by the landowner in exchange for direct payments or result in favourable tax treatment (Rissman et al. 2007; Gloss et al. 2019). Crucially, the transfer of rights under a conservation easement is permanent.

Conservation easements are a highly flexible mechanism, allowing landowners and third parties to negotiate which use and development rights are transferred pursuant to the easement and which rights are retained by the landowner. As a result, individual easements tend to be heterogeneous, even within the same jurisdiction (Rissman et al. 2007). Conservation easements are well suited for use in biodiversity protection activities in those jurisdictions in which they exist under the law. In the United States, conservation easements are one of the most effective and most widely used mechanisms for land protection. The US National Conservation Easement Database has mapped an estimated 60% of all easements in the United States, currently representing over 130,000 easements and totalling 24.7 million acres in 2020.

Case study

Biodiversity tax incentives for South Africa's protected areas

South Africa, considered one of the world's megadiverse countries, identified protected area expansion as a key tool to ensuring the long-term sustainability of its biodiversity and the health of its ecosystems. Recognising the importance of biodiversity conservation for its social and economic development, the South African government launched the Fiscal Benefits Project Section 37D to pilot private protected areas and ultimately provide a tax incentive for landowners declaring their properties protected areas (Stevens 2018).

With roughly 75% of South African land under private ownership in 2018, the national government sought to engage landowners to participate in biodiversity conservation. Prior to the Fiscal Benefits Project, landowners were solely responsible for the management and costs associated with maintaining protected areas. Through its tax incentive approach, the government of South Africa offered tax breaks for those who were willing to manage and declare protected areas within their property. With this tax incentive, South Africa enabled increased cash flows for protected area management and provided financial recognition to private landowners that engaged in long-term conservation, such as ecotourism hubs and private game reserves. Overall, the tax incentive is estimated to mitigate the biodiversity finance gap in South Africa by 10% (Stevens 2018).

Case study

Ecotourism

Ecotourism is a form of tourism that involves travel to natural areas, many of them protected areas and some quite remote, in a manner that supports the conservation of the natural area and is sensitive to the needs of, and potential impacts on, nearby communities (UNEP, 2002). Since ecotourism is highly dependent on local biodiversity quality, ecotourism delivers a portion of its revenues to proper biodiversity management, and also encourages tourists to donate to wildlife protection. Community-based tourism also encourages locals to incorporate conservation at the community level to protect their mode of income. Another aspect of ecotourism that distinguishes it from ordinary tourism is that, as it is the stated purpose of most ecotourism operations to benefit the areas where they operate, ecotourism depends on the implicit or explicit consent of local communities and their leadership. In terms of biodiversity, bringing tourists into previously undisturbed habitats can negatively affect the local flora and fauna, but this may be offset (at least in part) by tourist fees that directly benefit biodiversity.

Despite these impacts, there is evidence that ecotourism fosters participant engagement in conservation practices (Massingham, 2019). The way in which an ecotourism package is managed affects the way that resulting tourists engage with conservation, whether through behavioural changes or policy support.

Ecotourism is also highly context dependent. Ecotourism hubs within Chinese and Cambodian forests have been successful at reducing deforestation, but the same hubs in the Himalayas showed no change (Brandt et al., 2019; Lonn et al., 2019). In regions of high deforestation pressure, ecotourism often improves forest conservation. However, in regions of low deforestation, ecotourism may actually stimulate forest loss due to bringing tourism into pristine habitats. Regardless, ecotourism is on the rise and has the potential to mitigate biodiversity loss.

Guarantees

Guarantees are agreements in which a guarantor agrees to cover the loss, either in full or in part, of a third-party financing transaction in the case of non-repayment or loss of value (Johnston 2019). This type of instrument is often used by development finance institutions and concessionary funders to provide credit support to projects that otherwise may be unable to secure private investment. Through the use of a guarantee, the guarantor provides explicit financial backing to a loan or equity issuer and subsequently de-risks transactions where the risk-return profile is initially unappealing to private investors. Through the provision of a guarantee, a transaction is able to attract capital at more favourable rates, often making projects viable. Guarantees can address challenges faced by biodiversity conservation project developers and are likely to result in greater acceptance in the use of the tools of private finance in biodiversity protection. Ultimately, these factors are likely to increase the generation of funding to support biodiversity.

A review of blended financing transactions between 2017 and 2019 revealed that guarantees were used in 33% of transactions and mobilised the greatest amount of private capital investments when compared with other blended finance instruments (Convergence 2020). The use of guarantees can help attract private investment in conservation by improving the risk-return profiles of projects related to biodiversity conservation. In cases where investments in biodiversity protection are deemed too risky, the use of guarantees from conservation focused entities can help catalyse private capital investments by reducing their down-side risk. Guarantees have mainly been used to mobilise capital from financial institutions, with 50% of blended finance transactions seeking capital from this type of investor using guarantees (Johnston 2019). However, they can also be used to catalyse investments from asset managers, corporations and investment funds.

Historically, guarantees have been particularly prevalent in the energy and infrastructure sector. Even so, there have been other successful case studies of guarantees being used for agricultural projects and sustainable land-use initiatives that can have positive biodiversity impacts (Guarnaschelli 2018). Specifically, there is potential to use guarantees to diminish funding risk by reducing the impact of credit and political context concerns that might prevent private capital from flowing toward biodiversity conservation projects.

LEVEL

LEVERAGE

THEME

DIRECT OR MAINSTREAMING BIODIVERSITY

Case study

USAID loan guarantees for Mirova's Climate Fund

In 2014, as part of the UN pledge to curb deforestation, USAID's Development Credit Authority committed to a 10-year loan guarantee worth USD 133.8 million to Mirova's climate fund ACF (USAID 2015), which supports projects on REDD+, sustainable land use, and other conservation and sustainable use activities. With USAID's loan guarantee, USAID assumes 50% of risk in ACF REDD+ investments and further reduces other risks within the ACF, such as carbon price volatility. USAID's support not only helps Mirova Natural Capital contribute to forest management through the ACF but also helps attract large-scale private investment into the fund. After the loan guarantee's approval, ACF raised USD 120 million in its second round of financing, including EUR 25 million from the European Investment Bank (REDD-Monitor 2016).

Over the loan guarantee's 10-year lifetime, Mirova projects that ACF REDD+ investments will reduce carbon emissions by 100 million tonnes CO2eq through tropical forest protection projects (USAID 2015). If successful, USAID's loan guarantee will be an example of how a large organisation willing to use its credibility and balance sheet can facilitate financing activity that might not or would not have occurred without its support. This is achieved at negligible upfront cost to itself with a longer-term cost only in the event of a default by the guaranteed party. The transaction also illustrates how sustainable finance practitioners can leverage a guarantee to secure substantial commitments of private capital for biodiversity conservation.

Conclusion

The mechanisms discussed in this chapter can enable the effective delivery of generated capital. However, different delivery mechanisms will have varying levels of efficacy depending on the generation mechanisms. Some delivery mechanisms make revenue generation mechanisms, and their related investments in biodiversity conservation, more viable. Many of the delivery mechanisms described in this chapter such as performance-based payments or concessional debt have the potential to incentivise investment from the private sector. Other delivery mechanisms are able to encourage more private investments in the short term by decreasing investment risks. It is important to differentiate between generation and delivery mechanisms that invest in biodiversity directly and those that cater more towards mainstreaming biodiversity investment. For example, in the context of mainstreaming biodiversity investments, delivery mechanisms can incentivise the allocation of investment proceeds towards biodiversity conservation interventions through green bond investments in renewable energy or agriculture.

Table 7. Better delivery: what could work where?

Generate revenue	Governmental budgets and taxation	Biodiversity offsets	Natural infrastructure	Green financial products – Green equity	Green financial products – Green debt
Deliver better					
Unconditional grants					
Performance-based payments					
Concessional debt					
Green microfinance					
Private protected areas					
Guarantees					
	Direct biodiversity investment			Mainstreaming biodiversity investment	

The diagram above illustrates how the delivery mechanisms described in this chapter can play a catalytic role for, and work more efficiently with, certain generation mechanisms, based on the available track records of biodiversity conservation investments. A darker colour indicates greater potential for a particular delivery mechanism to catalyse financing in the corresponding generation mechanism.

Realign

6

Realigning expenditures involves a series of policy, fiscal, business and financial measures that reorient existing capital flows to activities that reduce negative impacts or increase positive outcomes for biodiversity. Public policy measures include reforming, redirecting and removing subsidies harmful to biodiversity by governments. Private sector measures include environmental and social risk management practices, including sustainable supply chain finance, and environmental and social impact assessments. Although scaling mechanisms for generating revenue for positive biodiversity outcomes is critical (see chapter 5), the estimated USD 598–824 billion global biodiversity financing gap will not be closed by 2030 unless governments and businesses prioritise the reform of harmful subsidies and strengthen environmental and social risk management measures.

The state of play

Approximately USD 44 trillion of annual economic value generation – over half the world's GDP – is moderately to highly dependent on nature and its ecosystem services (WEF 2020a). Three of the most nature-dependent industries – the construction, agriculture, and food and beverage sectors – represent over 15% of global GDP, while other moderately dependent industries generate another 37% (WEF 2020b). The emergence of the COVID-19 pandemic has evidenced how other relevant industries, including aviation and hospitality, can be extremely exposed to biodiversity loss risks, in this case, associated with the outbreak of a zoonotic disease. The combination of businesses' dependencies on biodiversity and the continuous degradation of ecosystems, has positioned loss of biodiversity as a primary risk to global economies. The World Economic Forum's Global Risk Report in fact identified biodiversity loss as one of the top five global risks in both likelihood and impact (WEF 2020b). Paradoxically, governments annually spend five to seven times more on subsidies, some of which are directly harmful to biodiversity, than the estimated annual USD 124–143 billion of global finance flows to biodiversity conservation.

The threat of biodiversity loss should stimulate governments and businesses to identify and reform harmful policies and practices in order to reverse biodiversity loss. But this will require public and private organisations to simultaneously analyse how their operations are materially dependent on biodiversity and take action to mitigate their negative externalities (OECD 2019a).

In recent years, a growing number of tools to quantify an organisation's impact on biodiversity have become available. Much as in the way governments use GDP as a metric to measure their economic production, governments are now able to use natural capital assessments to better understand and measure the contribution of natural capital towards their national policy objectives. From 2014 to 2016, for example, the Netherlands developed the Natural Capital Atlas to monitor geographic information on ecosystem services and natural capital within the country's borders (van Bodegraven 2018), creating a system of National Natural Capital Accounts to map ecosystem services and their social benefits.

Recognising the interconnectedness of climate change and biodiversity loss, businesses can similarly evaluate natural capital assets within their respective spheres of influence, particularly in relation to their operations and investment decisions. ENCORE is a tool developed by the Natural Capital Finance Alliance and the UNEP Finance Initiative allowing financial institutions to screen their portfolios for natural capital risks and integrate them within their investment risk management procedures (ENCORE 2020). Another tool, the Integrated Biodiversity Assessment Tool, uses the World Database on Protected Areas, IUCN's Red List of Threatened Species, and the World Database of Key Biodiversity Areas to assess how certain activities may conflict with nature within areas of high biodiversity value (IBAT 2019). In addition, the Natural Capital Protocol addresses a business's dependence on natural capital, with recent additions explicitly addressing biodiversity dependence. A four-step process addresses how to frame dependencies, pick the correct scope of analysis, choose the correct valuation method and develop next steps (Natural Capital Coalition n.d.).

Biodiversity indexes that combine a range of measurements in a score can be used as a baseline for companies setting up their science-based targets (SBTs). For example, the Global Biodiversity Score, a corporate biodiversity footprint assessment tool, uses the Mean Species Abundance index to link a company's economic activity to negative impacts on local biodiversity and ecosystems. These indexes can be disclosed to investors or regulatory agencies with specifics on how data was gathered and analysed, and the data's level of accuracy (Lammerant et al. 2020; CDC Biodiversité 2020). Despite the availability and ongoing refinement of methods and tools, policy implementation and enforcement still fall substantially short of what is needed. Moreover, most of the tools available are directed towards diagnostics, with little information available on how to effectively reform and realign expenditures.

A brief history

The Aichi Biodiversity Targets addressed the underlying causes of, and possible remedies for, biodiversity loss, including the need for a fundamental policy shift that leads the public and private sectors to eliminate current and future drivers of biodiversity loss. Target 3 declared that all "incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts," to be replaced by "positive incentives for the conservation and sustainable use of biodiversity" (CBD 2010a). Target 4 described the collaborative role of the public and private sector to transform existing business practices through "achieving or implementing plans for sustainable consumption and production" (CBD 2018).

The broad consensus is that the international community has completely failed to meet Aichi Target 3. According to the CBD, an overwhelming majority of countries showed insufficient progress in implementing Target 3, with no significant changes in national policy and even, in some cases, actions that moved these countries away from the objectives of Target 3 (CBD 2016). An assessment of Target 4 found comparable poor results, with the majority of countries demonstrating insufficient progress. These results are remarkable given the growing awareness of the risks that biodiversity loss poses to our global economy, notably among multinational enterprises.

Notwithstanding the international community's failure to meet the Aichi Biodiversity Targets, there has been progress on other fronts. The Equator Principles, a risk management framework for large banks in project finance that was launched in 2003, helps financial institutions assess and manage environmental and social risks and has been adopted by 105 financial institutions from 38 countries (Equator Principles 2020). In September 2020, 26 financial institutions representing USD 3.5 trillion signed the Finance for Biodiversity Pledge, which aims to commit financial institutions to set targets for, report on and pressure world leaders to support actions to limit and reverse nature loss (Burberl and Verberk 2020).The European Union (EU) recently announced its EU Biodiversity Strategy for 2030, which explicitly commits members to focus on biodiversity, set targets to restore degraded ecosystems, protect 30% of land and oceans in Europe and commit 10% of the EU's long-term budget to biodiversity goals. The EU strategy also explicitly calls on members to "phase out subsidies harmful to biodiversity" and ban subsidies that exacerbate illegal, unreported and unregulated fishing.

Developments such as these have led a number of observers to conclude that both the public and private sectors are, at long last, moving decidedly towards stronger biodiversity risk management standards than the public sector, with some arguing that the private sector now has greater momentum than the public sector. But private sector progress on these objectives is slow due to weak institutional frameworks, unsophisticated methodologies and limited data collection or use. Many are calling for new laws and regulations that level the playing field and provide the incentives for all firms – and not just the early movers on sustainability initiatives – to proactively manage biodiversity risk.

To respond to this capacity gap, WWF, the UNEP Finance Initiative, UNDP and Global Canopy, along with other sponsors and investors, are collaborating on the Task Force on Nature-related Financial Disclosures (TNFD) to help align global finance with long-term sustainability objectives such as those articulated in the Aichi Biodiversity Targets and the SDGs. The TNFD is expected to build upon the work of existing initiatives, including the Task Force for Climate-related Financial Disclosures (TCFD), which established methodologies for assessing climate change-related risks (TCFD 2020). The work of the TNFD should help firms understand the scale of their exposure to biodiversity-related risks (Global Canopy and Vivid Economics 2020) and provide a reporting and monitoring framework that is adopted by financial institutions.

Criteria

The diagram below presents a framework to analyse and understand the different options for the realignment of finance harmful to biodiversity. The framework uses five criteria as follows:

1. **Scale:** How much money could be realigned?
2. **Timeframe:** Over what period of time?
3. **Level:** At what level is finance realigned?
4. **Direct or mainstreaming biodiversity:** How will funds be realigned?
5. **Reducing negative/improving positive:** What is the purpose of the realignment?

Table 8. Realign expenditures – principles and criteria

Principle	Adequate	Timely	Target	Motivation
Criterion	**Scale** How much funding could be realigned?	**Timeframe** Over what period of time?	**Level** Is finance realigned through the private sector, national governments, international governmental organisations, or multi-sector collaborations?	**Reducing negative/ improving positive** Is realignment based on reducing negative or improving positive impact to biodiversity?
		Direct / Mainstreaming Will finance be realigned to directly invest in biodiversity conservation, or will it be mainstreamed through investments in other assets and sectors targeting biodiversity co-benefits?		

1. Scale

The first step in understanding realignment options is knowing the scale of financial resources that could be realigned towards positive biodiversity outcomes or away from negative impacts on biodiversity.

Option:

USD 12–20 billion

Numeric value in billions of USD

The scale criterion uses a numeric value (in billions of USD) representing realignment of finance by 2030. The scale is represented by a range from an estimated lower limit (which assumes narrow policy intervention) to an upper-limit estimate (with significant policy intervention).

2. Timeframe

The timeframe describes the period when financing from a specific mechanism is likely to scale up.

Options:

Short-term (<2025)

Medium-term (2025–2030)

Long-term (>2030)

Another key component for realignment is that finance for biodiversity and ecosystem services is realigned in a timely manner. Financial resources can be realigned in either the short, medium or the long term (as defined above).

3. Level

The level criterion describes whether financial resources will be realigned by a mechanism implemented by the private sector, the public sector (either nationally or internationally), or both sectors.

Options:

Private

National Public

International Public

Multi-sector collaboration

Private sector realignment is defined as the reorientation of financial flows through mechanisms exclusively implemented by private actors. Conversely, public sector realignment is solely implemented by public entities.

4. Direct or mainstreaming biodiversity

Negative financial flows to biodiversity can be directly realigned towards investments that target positive biodiversity outcomes. On the other hand, realignment mechanisms that mainstream biodiversity conservation are those that include biodiversity conservation as a co-benefit amongst the many other goals of sustainable investments in sectors such as sustainable agriculture, sustainable infrastructure and renewable energy.

Options:

Direct biodiversity investment

Biodiversity mainstreaming investment

Direct biodiversity investments realign financial resources that have negative impacts on biodiversity in such a way that they can yield positive biodiversity outcomes, as in the case of funding that is shifted from subsidising activities harmful to biodiversity and towards activities with direct, positive biodiversity impacts.

Biodiversity mainstreaming measures may achieve biodiversity co-benefits through sustainable investments and resource allocation in sectors that are, at least in relative terms, biodiversity-friendly, such as sustainable agriculture and renewable energy.

5. Reducing negative/increasing positive

Options:

Reducing negative

Increasing positive

Many financial mechanisms exist that direct funds to industries and activities harmful to biodiversity. The mechanisms described in this chapter have the potential to reduce the level of expenditures that harm biodiversity (reducing negative) or to increase the amount of financing that results in positive biodiversity outcomes (increasing positive). Mechanisms such as sustainable supply chains and accounting for biodiversity risk in financing activities both reduce negative financial flows and increase positive financial flows towards biodiversity.

A guide to expenditure realignment

Reform of harmful subsidies

Subsidies are unrequited government financial contributions given to producers "on the basis of the levels of their production activities or the quantities or values of the goods or services which they produce, sell or import" (OECD 2001). Subsidies take many forms, including tax exemptions, consumption support, government-funded research and lowering the costs of inputs. A subsidy harmful to biodiversity is one that harms biodiversity compared with the case where the subsidy does not exist (OECD 2003).

Globally, governments use subsidies to support both domestic producers and consumers with the goals of providing socio-economic benefits and satisfying larger government objectives, such as reduced poverty among farmers or affordable fuel for low-income groups (OECD 2017b). However, many subsidies are under scrutiny for their deleterious effects on the environment, particularly those in the agriculture, fisheries and forestry sectors (OECD 2017b). International environmental agreements largely support subsidies reform. Two primary examples are the Aichi Biodiversity Targets, which advocated phasing out all harmful subsidies, and the SDGs 14 and 15, which many countries interpreted as calling for subsidy reform (IPBES 2019; United Nations 2015). The EU Biodiversity Strategy for 2030 commits members to "require greater cooperation with partners [in] phasing out of subsidies harmful to biodiversity" (European Commission Communications 2020).

Subsidies are not inherently harmful to biodiversity and many subsidies programmes could, in fact, be modified to improve the state of biodiversity (See chapter 7). Harmful subsidies, on the other hand, may incentivise behaviours such as land-use change, sub-optimal land management and inefficient natural resource management like overfishing (IPBES 2019). Reforming harmful subsidies requires careful planning to identify and mitigate distortionary effects that risk disadvantaging some groups over others and providing support to those projected to be most negatively affected. Subsidies can also have unintended consequences despite well-meaning intentions. A famous example is the indirect land-use change impacts of biofuels, where more carbon emissions are released due to expanding croplands for biofuels.

In terms of how subsidies should be reformed, the international consensus is that subsidies should be decoupled from production levels (OECD 2005).

Yield-based subsidies have underpinned food system growth but are, in many cases, resource inefficient and can lead to soil degradation, depletion of fish stocks and deforestation (Food and Land Use Coalition 2019). Subsidies instead should incentivise biodiversity conservation and allow producers the flexibility to implement environmentally friendly practices, such as organic farming and integrated land- and water-use planning (FAO 2019). Equally important is eliminating subsidies that encourage illegal and unreported commodity trading, which is prevalent in fisheries. In this case, support that lowers the costs of inputs (for example, fuel) and vessel upgrades are the most likely to promote illegal, unreported and unregulated fishing (Martini and Innes 2018).

Learn more

Why we need to reform subsidies harmful to biodiversity

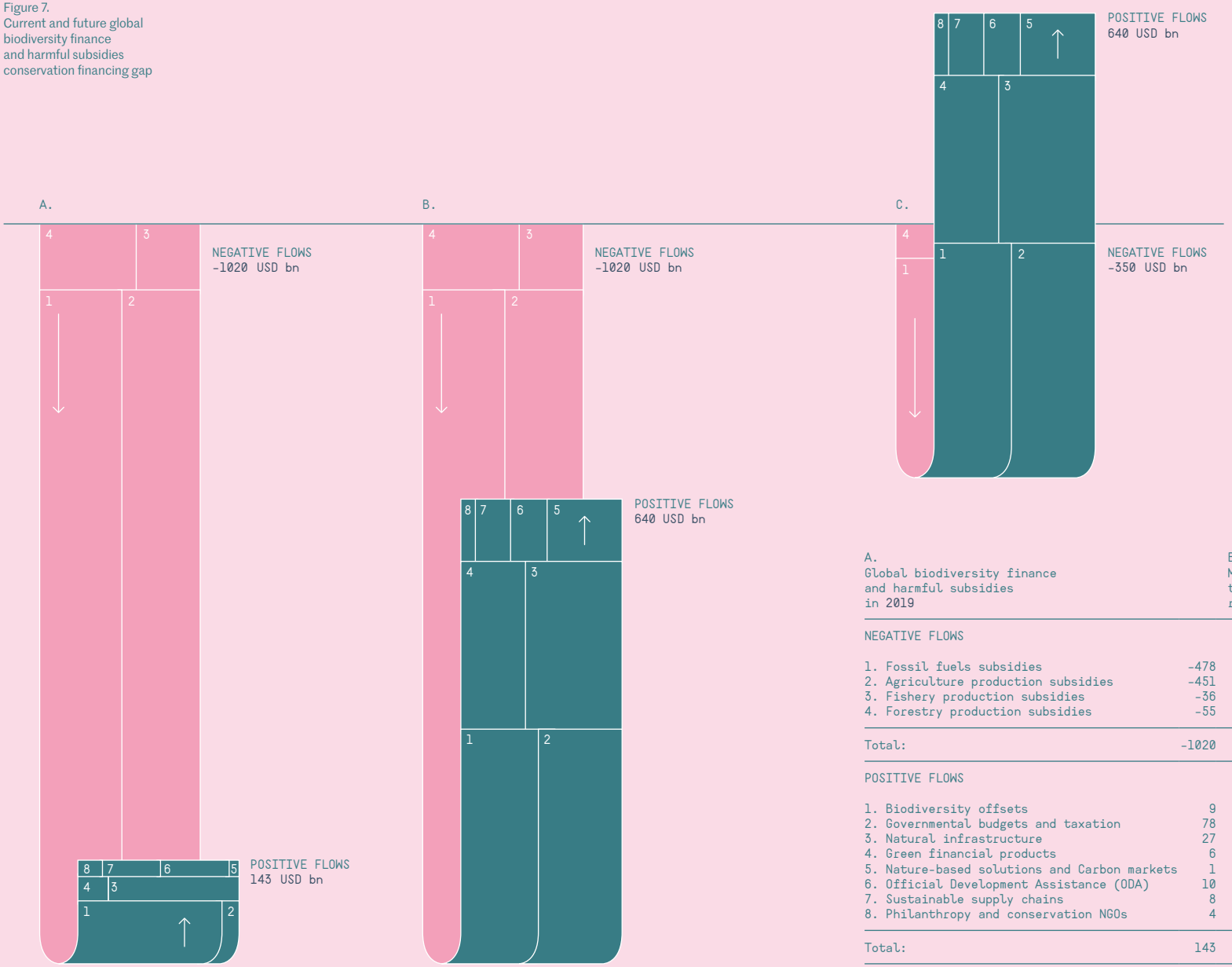
Subsidies harmful to biodiversity not only result in production practices detrimental to plant and animal species, but they also create a vicious cycle in which human activity degrades the very natural capital assets upon which businesses' profits depend. Agricultural production relies on insect pollination and soil quality, both of which require insect and flora biodiversity (PwC and WWF 2020). However, agriculture is responsible for most land-use change, which is the number one contributor to environmental degradation (IPBES 2019). Subsidies contribute to this pattern of environmental degradation by devaluating the cost of natural resources, reducing incentives to innovate to more sustainable methods, creating a reliance on natural capital as opposed to other forms of capital, and the like. Reforming subsidies harmful to biodiversity therefore provides governments with opportunities to make existing production practices more sustainable both for social and environmental benefits, and to mitigate future risks associated with continuous ecosystem degradation.

Reforming harmful subsidies can also lead to new economic opportunities through the introduction of new, more sustainable production practices. Biodiversity richness naturally provides pollination and pest control, and the gradual loss of these key species has led to a 50% decrease in agroecosystem benefits (Dainese et al. 2019). Microscopic biodiversity within soils is especially beneficial to soil health and prevents soil-based diseases (Sánchez-Moreno 2018).

Reform is crucial in developing countries with significant dependencies on agriculture, forestry and fisheries. In 2019, subsidies in agriculture, fisheries and forestry that are potentially harmful to biodiversity amounted to an estimated USD 274–542 billion annually, exceeding the current biodiversity finance by a factor of two to four. If fossil fuel subsidies are considered in these calculations, subsidies harmful to biodiversity would be in the range of USD 670–1020 billion per year, exceeding current positive finance by a factor of five to seven.

Reforming all subsidies that are potentially harmful to biodiversity by 2030 will be a daunting challenge. Nevertheless, targeting the reform of the most harmful subsidies will significantly reduce annual negative financial flows towards biodiversity. If this is achieved by 2030, governments could decrease expenditures considered most harmful to biodiversity by USD 274–670 billion, an amount that dwarfs the realignment potential of most mechanisms (see Figure 7).

Figure 7.
Current and future global biodiversity finance and harmful subsidies conservation financing gap



A. Global biodiversity finance and harmful subsidies in 2019		B. Most harmful subsidies to biodiversity not reformed by 2030	C. Most harmful subsidies to biodiversity reformed by 2030
NEGATIVE FLOWS			
1. Fossil fuels subsidies	-478	-478	-82
2. Agriculture production subsidies	-451	-451	-221
3. Fishery production subsidies	-36	-36	-20
4. Forestry production subsidies	-55	-55	-27
Total:	-1020	-1020	-350
POSITIVE FLOWS			
1. Biodiversity offsets	9	168	168
2. Governmental budgets and taxation	78	155	155
3. Natural infrastructure	27	139	139
4. Green financial products	6	93	93
5. Nature-based solutions and Carbon markets	1	40	40
6. Official Development Assistance (ODA)	10	19	19
7. Sustainable supply chains	8	19	19
8. Philanthropy and conservation NGOs	4	8	8
Total:	143	640	640

SCALE (2030)

0–230 bn

TIMEFRAME

LEVEL

DIRECT OR MAINSTREAMING BIODIVERSITY

REDUCING NEGATIVE/ IMPROVING POSITIVE

Harmful subsidies reform: agriculture

As of 2019, total agricultural subsidies potentially harmful to biodiversity were estimated at USD 451 billion, of which USD 100–230 billion were considered most harmful to biodiversity. The agriculture sector may currently be the single largest contributor to biodiversity loss globally due to the associated land-use changes, water and land pollution, and land degradation (IPBES 2019). These effects result from a variety of intensive unsustainable practices that involve overuse of inputs, soil exhaustion and deforestation. The practice of clearing forests and other natural habitats to make way for intensive agriculture, often in the form of soy and oil palm plantations, tree monocultures for timber and pulp, and pasture for beef, is especially pernicious in the tropics, where much of the Earth's biodiversity is found. Overall, the sector contributes to nearly 25% of greenhouse gas emissions (IFRI 2019) and 80% of global deforestation (Kissinger et al. 2012). In addition, agriculture accounts for 70% of water withdrawals, with water pollution largely resulting from fertiliser run-off, groundwater salinisation and agrochemical contamination (FAO 2017).

In 2019, USD 230–451 billion was directed to potentially harmful agricultural subsidies (OECD 2020a). If this trend continues, agriculture will result in a 70% loss of terrestrial biodiversity and 40% loss of freshwater biodiversity by 2050 (Food and Land Use Coalition 2019). Realigning to biodiversity-positive or neutral subsidies in agriculture would both preserve biodiversity and protect ecosystem services that underpin the agriculture sector – such as insect pollination, which is valued at USD 153 billion per year and sustains 71 of the 100 most commonly used crops (PwC and WWF 2020).

The most common approach to making agriculture subsidies more environmentally friendly is through decoupling production from government support, so targeting pollution instead of farmer's profits. In the EU's Common Agricultural Policy (CAP), decoupling agricultural support from yield amount and input use caused a 20% decline in nitrogen fertiliser use and 17% decrease in nitrous oxide emissions from 1990 to 2015 (World Bank 2018). Despite the progress in specific indicators, the CAP has not been successful in halting biodiversity loss in farming. Measuring progress has also been difficult due to the inconsistency and unreliability of information (European Court of Auditors 2020). Following on from this, 40% of the CAP budget will be allocated to fund climate-resilient agriculture, efficient resource use and policies on environmentally conscious food systems, according to the EU Biodiversity Strategy for 2030 (European Commission Communications 2020).

There is evidence that shifting support away from production also improves agriculture efficiency. After New Zealand eliminated all agricultural subsidies in 1986, agricultural employment grew and the country's meat industry became the second-most efficient in the world (CBD n.d.). To guarantee the reform and realignment of the USD 100–230 billion most harmful agricultural subsidies to biodiversity by 2030, countries would need to commit to a compound annual reduction of at least 6.3% over the next 10 years. This would result in a remaining USD 0–221 billion in agricultural subsidies that are potentially harmful to biodiversity by 2030.

Case study

Reforming harmful subsidies to support biodiversity in Kyrgyzstan

Agriculture is a critical sector and an important source of livelihoods in Kyrgyzstan, employing 32% of the population and contributing 14.2% of the country's GDP in 2018 (FAO 2019b). Private farms dominate agriculture (60%) followed by private household plots (38%) and state farms (2%). Most production involves subsistence farmers in grain and livestock production, and the country's main exports are tobacco and cotton.

Kyrgyzstan has a number of subsidies for increasing agricultural productivity, namely subsidised inputs (fertiliser, pesticides and seeds), subsidised loan interest rates for agricultural producers, subsidised utility tariffs (water and electricity), subsidised management and maintenance costs for irrigation systems, income tax exemptions, value added tax (VAT) exemptions, and land taxes that benefit producers and food processors. In total, agricultural subsidies in Kyrgyzstan totalled USD 300 million in 2017, according to UNDP BIOFIN.

UNDP BIOFIN developed a policy and institutional review that revealed some agricultural subsidies were leading to inappropriate land-use practices and inadequate water management measures, causing biodiversity degradation. Examples included overgrazing or uncontrolled grazing, conversion of high-mountain wildlife habitat to new pasture and hayfields, and land-use change of agricultural land to other types of economic activities. At the time of writing, approximately one third of Kyrgyzstan's pastureland was degraded.

Three cases contained evidence of subsidies directly contributing to negative environmental externalities. First, VAT exemptions contributed to agrochemical overuse, which, in turn, reduced soil quality and caused fertiliser run-off into non-agricultural areas and water bodies. Second, government support led to high-yield seed varieties supplanting endemic crops, thereby reducing the variety of crops and the genetic diversity of crop species. Third, subsidised water tariffs led to unsustainable water use, depleting water resources but also causing soil fertility loss, waterlogging, salinisation and soil erosion.

In response to the environmental effects of its subsidies, the government of Kyrgyzstan proposed in its 2019–2023 Green Economy Development Program that all agricultural support must be reviewed to confirm the extent of their environmental impacts. Both an interagency working group and UNDP BIOFIN are collaborating with the government to identify the most harmful subsidies and help frame new policies that support a transition to green rural agriculture. The focus currently is upon replacing VAT exemptions for agrochemicals, subsidised loans and subsidised water rates with new fiscal policies.

Case study

Reforming agricultural subsidies to support biodiversity in Switzerland

In Switzerland, 36% of species are endangered and almost 50% of wildlife habitats are threatened. Agriculture is one of the major contributors to the loss of biodiversity in Switzerland, with agricultural land occupying roughly one third of the country's land area, the majority of which shows signs of over-intensive water and land use. In response, Switzerland enacted its 2014–2017 Agricultural Policy (AP 2014–2017) to better align agricultural subsidies with positive biodiversity outcomes (OECD 2017c).

Switzerland began greening its agriculture sector in the 1990s, when it authorised ecological direct payments that provided compensation for biodiversity-friendly farming activities. In 1996, a proposal backed by 75% of voters led to Article 104, which required Swiss agriculture to meet four pillars: food production stability, use of methods that protect soil and potable water resources for the future, responsible landscape management, and sustainable rural areas. An additional agricultural law in 1999 made direct payments dependent on 'proof of ecological performance' (PEP). Since then, Swiss farms have been required to adhere to PEP requirements in exchange for direct payments.

To better align its agriculture sector with the objectives of Article 104, the Swiss Federal Office of Agriculture collaborated with the Farmer's Union, WWF, other environmental NGOs and economic organisations to create AP 2014–2017. The reform introduced two new PEP frameworks, including one for 'highly valuable biodiversity areas', and incorporated biodiversity criteria for a new type of landscape payment. The reform also revised per-hectare and livestock payments, both of which comprised the bulk of farmer income support. Removing these payments was initially met with resistance from the Farmer's Union and conservative parties. In response, the majority liberal parties compromised by adding market reforms to encourage more trade liberalisation for farmers. The popular vote on Article 104 also bolstered the liberal parties' argument that citizens wanted agriculture to be more consistent with strong environmental standards and biodiversity protection. The Swiss government further initiated transition payments to mitigate severe farmer income loss and gather public farmer support for the reform (OECD 2017c).

It is too early to know what the effects of AP 2014–2017 on biodiversity will be, but there are positive indications so far. The amount of land qualifying as 'ecological compensation areas', or reserved for restoring ecosystems, met the AP goal by 2014. The total amount of agricultural support set aside for AP 2014–2017 was USD 14.5 billion, which is slightly higher than Switzerland's previous agricultural expenditure and also higher than most OECD countries.

SCALE (2030)

0–16 bn

TIMEFRAME

LEVEL

DIRECT OR MAINSTREAMING BIODIVERSITY

REDUCING NEGATIVE/ IMPROVING POSITIVE

Harmful subsidies reform: fisheries and aquaculture

As of 2019, total fisheries subsidies that are potentially harmful to biodiversity were estimated at USD 36 billion, of which USD 16 billion are considered most harmful to biodiversity. According to the FAO (2020), the proportion of global fish stocks within biologically sustainable levels declined from 90% in 1974 to 66% in 2017. Subsidies to fisheries can lead to global fish stock depletion by supporting variable and fixed costs in fishing operations, which externalise operator risks and encourage overinvestment (OECD 2018d). The OECD (2018d) found that fisheries subsidies most harmful to biodiversity are fuel subsidies, subsidies for vessel construction and modernisation, subsidies for port construction and renovation, price and marketing support, fisheries development projects, and foreign access fishing agreements. While several of these subsidies result in overfishing practices, some subsidies also have additional indirect effects, such as incentivising illegal, unreported and unregulated fishing and excess waste (IPBES 2019).

Unchecked or unsustainable growth in the aquaculture sector can also lead to overproduction (FAO 2018). Subsidies such as investment grants can artificially boost production, leading to irreversible damage to nearby ecosystems like the massive conversion of mangroves to shrimp farms in Asia. Unchecked aquaculture production can also lead to the destruction of mangrove forests, soil salinisation or acidification, water pollution and changes to hydrological patterns, among other negative effects.

Fisheries policies must discontinue support that promotes overfishing, overcapacity and illegal, unreported and unregulated fishing (OECD 2018e). Over 50% of harmful subsidies in these sectors are originated in emerging markets, therefore donors and international organisations should support developing countries to undertake thoughtful reforms that deliver both economic and environmental benefits (OECD 2019b). To guarantee the reform and realignment of the USD 16 billion most harmful fisheries subsidies to biodiversity by 2030, countries would need to commit to a compound annual reduction of at least 5.1% over the next 10 years. This would result in a remaining USD 0–20 billion in fisheries subsidies that are potentially harmful to biodiversity by 2030.

Harmful subsidies reform: fossil fuels

As of 2019, total fossil fuel subsidies were estimated at USD 478 billion, of which USD 396 billion are considered potentially the most harmful to biodiversity (OECD 2020a). Four major categories of subsidies stimulate overproduction in the industry, namely: (1) direct transfer of funds, (2) induced transfers or price supports, (3) tax expenditures, other revenue foregone, and under-pricing of goods and services, and (4) transfers of risk (UNEP 2019). While the total declined from 2018, the OECD's analysis indicates that 44 advanced and emerging economies increased their support for fossil fuels by 38% year on year (OECD 2020a). Furthermore, the overall decline in fossil fuel subsidies was attributable to the fall in global oil prices in 2019 (OECD 2020a).

Fossil fuel subsidies can result in various direct and indirect negative effects on biodiversity. Direct effects are usually from fossil fuel extraction and transport. The more destructive effects, however, are likely to be indirect, with increased greenhouse gas emissions impacting climate and habitats. These long-term climate-related impacts are difficult to predict and subject to several other factors.

Indonesia offers a promising example of fossil fuel subsidy change – in 2013, the government provided rice subsidies to mitigate the impact of energy price increases (UNEP 2019). Similarly, Morocco in 2014 reallocated funds to social and health programmes as well as growth sectors such as renewable energy (UNEP 2019). The G20 and the EU have been instrumental in achieving progress in fossil fuel subsidies reform, with the latter setting a 2025 target date for ending aid to high-CO_2 emission production such as the coal industry (OECD 2019a). Even so, it is undeniable that any fossil fuel subsidy reform will run into significant political barriers, especially among subsidies that are targeted to bring affordable gas and oil to lower-income groups. After the Ecuadorian government removed gasoline subsidies in 2019, the 25% increase in gasoline prices led to 12 days of violent protests. To guarantee the reform and realignment of the USD 396 billion most harmful fossil fuel subsidies to biodiversity by 2030, countries would need to commit to a compound annual reduction of at least 14.8% over the next 10 years. This would result in a remaining USD 0–82 billion in fossil subsidies that are potentially harmful to biodiversity by 2030.

SCALE (2030)

0–396 bn

TIMEFRAME

LEVEL

DIRECT OR MAINSTREAMING BIODIVERSITY

REDUCING NEGATIVE/ IMPROVING POSITIVE

SCALE (2030)

N/A

TIMEFRAME

LEVEL

DIRECT OR MAINSTREAMING BIODIVERSITY

REDUCING NEGATIVE/ IMPROVING POSITIVE

Ecological fiscal transfers

Intergovernmental fiscal transfers are mechanisms for redistributing tax revenues between different levels of government, generally from national and regional governments to local ones. The amount of national funding redistributed to local governments is determined by criteria including population, land area, GDP, geography, and level of development.

Ecological fiscal transfers (EFTs) represent a type of fiscal transfer that integrates environmental indicators within fiscal transfer calculations to reward investments in conservation and protected areas (UNDP 2016). Intergovernmental transfers make up nearly 60% of subnational expenditures outside the OECD and a third of expenditures within (UNDP 2016). In most cases, environmental factors are not considered despite their tangible benefits for local jurisdictions. EFTs can advance conservation initiatives by both compensating for the opportunity costs in conservation investments. Without them, local governments are much more likely to use their fiscal transfers to invest in other activities such as conventional agriculture, industry, and construction to maximize short-term revenue generation rather than environmental benefit.

While few examples of well-developed ecological fiscal transfer programs exist so far, successes in Malaysia, Brazil, Portugal and France proved that the concept is viable. EFTs are especially needed when the criteria for funding depends on protected area statistics. Using EFTs to support protected areas (PAs) preserves biodiversity hotspots at a resolution that national-level programmes cannot achieve, potentially protecting microhabitats that are ecologically important to local actors even if they are not recognized the same way by national actors.

Learn more

Ecological fiscal transfers in Brazil, Indonesia and India

Brazil has been one of the world's leaders in EFTs since the early 1990s. The ICMS (Imposto sobre Circulação de Mercadorias e Serviços Ecológico, or ICMS Ecológico) is an innovative scheme dedicated to accounting for environmental indicators within national fiscal transfers to the states. The scheme is based on the general ICMS tax, which is similar to a value-added tax. In the case of the ICMS Ecológico, funds are allocated to compensate for land-use restrictions and encourage conservation (Cassola 2010). The state of Paraná in Brazil began using EFTs in 1989. The level of transfers to municipalities is determined by an index that accounts for size of protected areas, size of the municipality, the protected area's management category, and the quality of the area (Loft et al. 2016). This keeps track of biodiversity, quality of water resources, and how the protected area is managed and contributes to the community. The programme was well-received in Paraná, with the number of municipalities receiving benefits from the biodiversity index increasing by 179% in eight years. Over that same period, the extent of conservation areas increased by 165% (Cassola 2010).

India includes forest cover in their formula for determining federal tax revenue distribution. In 2014, India's Finance Commission declared that 7.5% of fiscal transfer weight would be ascribed to forest cover, determined by biannual surveys from the Indian Forest Service (Busch and Mukherjee 2018). In 2015–16, the first post-reform year, an estimated USD 5.7 billion was transferred to states on the basis of forest cover (Reserve Bank of India 2016). This provided a sizable fiscal incentive to protect existing forests and restore former forests. There are no significant effects on India's forest cover as of now, but a more rigorous analysis over a longer period of time is necessary to reveal any substantial results (Busch and Mukherjee 2018).

Indonesia had a previously established fiscal transfers framework but began including environmental indicators within the allocation calculation in August 2019. The EFTs operate under the TAPE (Provincial Ecological Fiscal Transfer) programme, which transfers funds from the provincial to the district level, and TAKE (District Ecological Fiscal Transfer), which transfers funds from the district level to the village level. TAPE funds are allocated according to two sets of criteria. The first provides funds based on the total level of forest cover in the area, and the second provides additional funds based on the level of change in forest cover (Keift and Efriyanti 2020). Total fiscal transfer delivery grants in Indonesia came to USD 56 billion in 2019, which may create incentives for significant regional support for maintaining and increasing forest cover in the coming years (Keift and Efriyanti 2020).

Environmental and social risk management

The private sector can play a greater role in biodiversity conservation through integrating environmental and social risk management into its operations. Operationalising environmental and social risk management for financial services as well as non-financial industries should help achieve the 4th Aichi Biodiversity Target, which addresses businesses' responsibilities to protect biodiversity and is due to be updated in 2021. In addition to the estimated USD 670–1,020 billion per year in potentially harmful subsidies for the agriculture, fisheries, forestry and fossil fuels sectors, by one estimate 50 of the world's largest banks invested over USD 2.6 trillion in 2019 into the sectors most harmful to biodiversity, averaging about USD 52 billion per bank (Portfolio Earth 2020). A review of 1,800 companies found that more than 13% of them created more environmental damage than they generated profit, while nearly 33% of these companies caused environmental damage equivalent to a quarter of their profits (fDi Intelligence, 2020).

Biodiversity investment risk management can mitigate investment or lending portfolio exposure to companies that are highly dependent on production practices that degrade biodiversity or have other significant negative impacts on nature. Doing so will avoid future costs that could result from habitat loss, especially as the physical threat of biodiversity degradation upon businesses and society becomes more urgent. In addition, this presents an opportunity to generate USD 10 trillion and 395 million jobs in new business opportunities by 2030 (WEF and AlphaBeta 2020). For the finance sector, this means mainstreaming biodiversity risk analyses into ESG investment and lending practices. For companies that provide goods and services, this means evaluating their supply chains and production practices to make them more sustainable and efficient. There is no formalised index or metric for biodiversity risk, like carbon emissions for climate change risk, but efforts such as the Integrated Biodiversity Assessment Tool, which cross references the three most respected biodiversity databases, are providing first steps into quantifying companies' support to biodiversity.

Environmental and social risk management might be affected by the standards set by major investors and lenders, but it is ultimately driven by firms' decisions to transform their supply chains. Supply chains constitute the organisations, people, activities and resources that enable production, consumption and logistics related to global products and services industries.

Sustainable supply chains

As investors and policymakers become more aware of the need for sustainable supply chains, a range of financing tools for business model transformations are emerging. Private financial institutions, multilateral development banks and development finance institutions can provide concessional financing to incentivise producers along a supply chain to engage in more sustainable production practices. Governments can facilitate this transition through laws that prohibit harmful supply chains. For example, the UK government in August 2020 proposed a new law that bans companies from selling products harvested on illegally deforested land. And in West Africa, the largest cocoa and chocolate sector companies were conveneed by the World Cocoa Foundation and IDH The Sustainable Trade Initiative to collaborate with the governments of Ghana and Cote d'Ivoire. This collaboration resulted in the Cocoa & Forests Initiative, where companies work pre-competitively to end deforestation and forest degradation in the cocoa supply chain.

Supply chain finance describes financial products that support trade transactions by providing liquidity for firms' working capital requirements (BSR 2017). BSR, a non-profit that brings together a group of 250 member companies on issues of corporate responsibility, identifies three financial solutions to enable sustainable trade norms: (1) sustainable payables finance, (2) sustainable trade loans, and (3) smart contract solutions (BSR 2017). Sustainable payables finance involves buyers integrating their ESG performance criteria into their supply chain finance programmes such that suppliers receive rewards and/or tangible benefits for strong sustainability performance (BSR 2017). Sustainable trade loans are loans used to pay suppliers of goods and services for their procurement of sustainably sourced, manufactured or converted raw materials. Finally, smart contract solutions take advantage of blockchain technology to offer self-executing contracts between buyers and sellers that increase transparency and traceability across supply chains. Financial institutions can also offer concessional financing for suppliers to engage in more sustainable production practices. For example, Sustainable Investment Management, a London- and Rio de Janeiro-based financial institution, created a Responsible Commodities Facility that provides subsidised credit lines to soy farmers who pledge to avoid conversion of the Brazilian Cerrado, or savannah (Kingsbury 2019).

Investors can also make positive change in supply chains. Barclay's Biodiversity Landscape provides an assessment of multinational companies highly exposed to biodiversity risks associated with unsustainable cattle palm oil, soy and timber production and supply chains (Ogundiya et al. 2020).

SCALE (2030)

>12–19 bn

TIMEFRAME

LEVEL

DIRECT OR MAINSTREAMING BIODIVERSITY

REDUCING NEGATIVE/ IMPROVING POSITIVE

Learn more

Impacts of supply chain commitments on the forestry sector

Between 2014 and 2018, a total area of forest approximately equivalent to the area of the United Kingdom was lost every year across the planet (NYDF 2019). New deforestation hotspots have emerged in the past five years. Latin America drives much of the accelerating growth in deforestation, with tree cover losses in the Brazilian Amazon alone increasing by 88% between May 2018 and June 2019 (NYDF 2019), and African forests increasingly under threat. Commercial agriculture and forestry expansion are currently the main drivers of deforestation, with large-scale commercial forestry accounting for 40% of tropical deforestation between 2008 and 2010 (FAO 2020). The increasing profitability in agriculture can, at first glance, rationalise land-use change of forests, but ultimately falls short of a financial justification when including all of the ecosystem services provided by intact forests.

Firms and countries are increasing efforts to use production practices that minimise effects on forests. This includes governments implementing production compliance standards, and the private sector independently improving the sustainability standards of their production. The Consumer Goods Forum adopted a 2020 deadline to zero net deforestation in 2010. In 2014, the New York Declaration on Forests (NYDF), a non-binding declaration that includes 200 public and private endorsers, committed to eliminating deforestation from agricultural commodity supply chains by 2020 (Thomson and Rogerson 2020). Unfortunately, Global Canopy's Forest 500 annual report found that little progress has been made in this area in 2019, with some companies even reducing their deforestation commitments (Thomson and Rogerson 2020).

Such a lack of progress highlights the need for public and private organisations to better enforce deforestation commitments, as well as a multi-stakeholder approach to introduce sustainable supply chains.

Governments can also stem deforestation by reducing their consumption of commodities sourced from converted biodiversity hotspots. Forest Trends notes that the EU, China, India, Russia and the United States were the largest buyers of commodities with the most significant impacts on biodiversity in 2014, and could benefit from policies and national frameworks to reduce such demand (Lawson 2014). As of 2019, total forestry subsidies potentially harmful to biodiversity were estimated at USD 55 billion, of which USD 28 billion are considered most harmful to biodiversity. To guarantee the reform and realignment of the USD 28 billion most harmful forestry subsidies to biodiversity by 2030, countries would need to commit to a compound annual reduction of at least 6.3% over the next 10 years.

Learn more

Access and Benefit Sharing (ABS)

The 2014 Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity provides a global framework for implementing the third objective of the CBD: "the fair and equitable sharing of benefits arising from the utilization of genetic resources". This agreement allows access to genetic resources guaranteed by biodiversity to only be shared according to agreements and consent of local communities, which leads to biodiversity protection (CBD n.d.). Ultimately, while some flora and fauna have potential for commodity production, especially in biomedical fields, the CBD promotes these resources to be equally shared by the community and interested stakeholders. The Nagoya Protocol enhances legal certainty and transparency for both users and providers of genetic resources – which are essentially all organisms and their parts – and of traditional knowledge associated with their use. The access and benefit sharing (ABS) concept developed by the CBD and further specified by the Nagoya Protocol combines conservation and sustainable use of biodiversity with academic and commercial pursuits by balancing interests of users and providers of genetic resources. Many developing countries and emerging economies regard ABS as a realistic opportunity to generate value from biodiversity, support the domestic research landscape and create new value chains that benefit the wellbeing of the population and support biodiversity conservation measures.

The EU formalised ABS legislation in 2014 that requires genetic resources and their traditional knowledge to be shared upon mutually agreed terms with local communities when those assets are "used in research and development for their genetic properties and/or biochemical composition" (EU No 511 2014).

ABS has the potential to expand into larger biomedical, agriculture and medicinal uses through digital sequence information, which will help make more genome sequencing data available for public use (Land et al. 2020). To unleash its full potential and leverage tangible impacts, however, provider countries need to establish effective regulatory frameworks, develop national valorisation strategies, and negotiate enforceable ABS contracts with the users of genetic resources and associated traditional knowledge. At the beginning of 2020, 124 countries across the world recognised this opportunity for sustainable development and ratified the Nagoya Protocol. At present, many national ABS strategies and regulations are being developed or undergoing revision.

Biodiversity conservation is currently part of the ABS framework, though it may be removed in future ABS policy negotiations. In this case, all agreements will pertain to genetic resource exchange and not biodiversity. However, biodiversity loss has not successfully been mitigated under ABS policies as many countries still extract from diverse habitats despite their ABS obligations. Critics argue that ABS by itself is not the correct mechanism or framework for managing cross-discipline, multi-party negotiations needed to protect biodiversity (Laird et al. 2020).

Biodiversity investment risk management

SCALE (2030)

N/A

TIMEFRAME

LEVEL

DIRECT OR MAINSTREAMING BIODIVERSITY

REDUCING NEGATIVE/ IMPROVING POSITIVE

To integrate biodiversity investment risk management into operations, financial service firms should account for the cost of biodiversity losses in their risk analysis processes. Doing so can ensure that investors mainstream biodiversity as they evaluate their investment portfolios to minimise risks related to nature loss. Financial institutions can implement biodiversity risk management practices in their portfolios through positive and negative screening, the adoption of norms and standards, corporate engagement, divestment, and ESG integration.

Positive and negative screens use a set of criteria to assess a portfolio's revenue models and associated production practices. If companies are highlighted through a positive screen – that is, their core operations are beneficial for biodiversity – they will be included in an investor's portfolio (Braverman 2019). Negative screens for biodiversity risk are the opposite in that they result in exclusion from a portfolio. Both positive and negative screens can be implemented separately, or as part of a screen that weighs biodiversity risk as part of larger ESG concerns (Schroeders 2017). Adopting norms and standards can catalyse more rigid sustainability standards to receive funding. Either firms adopt internal policies or government regulations require these actions (PRI 2018). In either case, firms and invested companies must maintain transparency on meeting biodiversity performance indicators and share a willingness to engage in biodiversity to clarify the risks and opportunities within biodiversity among investors (PRI 2020a).

Financial institutions can also directly engage with executives or board members to drive better environmental outcomes. In extreme situations, investors and lenders can consider divestment from these firms if companies do not comply with biodiversity targets (Maiden 2019). Finally, ESG integration requires that financial institutions use available information on a company's ESG outcomes, in line with the way that they analyse financial, market and operational risk to make investment or lending decisions (Deutz et al. 2020).

An example of a specific issue that ESG management can combat is illegal wildlife trade, a practice both harmful to biodiversity and the root of many zoonotic disease outbreaks like COVID-19. Traffickers exploit services provided in the private financial sector, such as purchasing estate, to launder funds. This can be prevented by thorough risk assessment and mitigation. While biodiversity investment risk management has yet to become a major component of ESG risk management, firms are beginning

to understand and respond to the interdependencies between biodiversity degradation and the financial performance of their portfolio companies. Investors and lenders with material exposure to risky sectors and risky companies must re-evaluate their investments and consider the potential these firms have to earn a return or service their debt if their natural capital base continues to decline. Substantial biodiversity loss and ecosystem collapse can lead to increased credit, liquidity, market and operational risk. In order for any of these risk management tools to be effective, firms must set meaningful targets for their portfolios, which balance investment returns with material risks posed by biodiversity loss as well as their fiduciary duty to their clients. Advancing these risk management tools further requires consistent asset and company-level data on biodiversity, which helps both to standardise expectations among investors and to better identify biodiversity risks within portfolios (PRI 2020a).

Case study

Biodiversity conservation targets in a retail bank

ASN Bank (ASN) is a Dutch retail bank focused on socially responsible and sustainable investments. As part of its sustainability policy, ASN created a biodiversity pillar and established a goal of generating a net-positive effect on biodiversity for its investments by 2030. As part of this effort, ASN, in conjunction with consulting groups CREM and PRé Sustainability, created the Biodiversity Footprint for Financial Institutions (BFFI) methodology to measure the biodiversity impacts of its investment portfolio (CREM and PRé Consultants 2016).

The BFFI framework analyses the biodiversity impact of company investments by mapping the impacts of the company's operations at the sectoral and geographic levels. This mapping exercise is conducted with information available from third-party databases. The environmental impacts of these sectors are cross-referenced through using an environmental supply-use database on the geographies in which it operates. Through this process, the BFFI is able to estimate the 'environmental pressure' exerted by the company. This information is in turn used in a life cycle analysis model to quantitatively determine the relationship between environmental pressure and impact on terrestrial, freshwater and saltwater biodiversity (CREM and PRé Consultants 2016). The quantitative impact analysis is further complemented with a qualitative assessment to identify areas where the actual footprint may be higher or lower than calculated using the life cycle analysis methodology.

As part of their efforts to expand the use of the BFFI methodology by other institutions, the bank has established Partnership Biodiversity Accounting Financials (PBAF), an initiative for financial institutions to conduct biodiversity impact calculations of their operations. Furthermore, the bank is in the process of automating the BFFI biodiversity footprint calculation to encourage wider-scale adoption of the methodology.

Learn more

Mainstreaming biodiversity through investment risk management

Legacy inefficient production practices increase the risk a firm faces from having relatively unadaptable or unmodifiable production practices. This is especially relevant where transition risks, or the risks of businesses underinvesting in transitioning to more sustainable supply chains in response to new environmental regulations, impact business continuity. For example, changes in regulations pertaining to pollution mitigation, sourcing and/or waste management, might lead to companies with high transformation risk incurring significant material losses (DNB and PBL 2020). In turn, greater transformation risk can result in greater reputational risks, where negative environmental impacts may influence investor or public sentiments (DNB and PBL 2020). Integrating biodiversity risk management into standardised ESG practices necessitates having the data to understand the materiality of risks posed by biodiversity loss as well as cultural shifts that force firms to adopt progressive risk management practices.

Firms can account for biodiversity financial risk through using tools such as materiality maps or other ESG risk management processes. For example, the Sustainability Accounting Standards Board's materiality map provides a basic framework for investors and lenders to evaluate the total ESG risks of a sector per specific criteria. While useful, materiality maps might understate biodiversity-related risks because they aggregate ESG risks into single conclusions that might otherwise obscure an investment's ecological impact. To highlight biodiversity impacts on their own, new frameworks can either give greater weight to biodiversity impacts, based on the firm's dependency on nature, or focus on biodiversity alone. In the future, standardising key performance indicators and data collection related to a firm's impact on biodiversity can facilitate greater mainstreaming of biodiversity financial risk management. There are transition risks for economies and people when accounting for the physical biodiversity risks in ESG management, but the greater the physical risk the more urgent a transition is. Moreover, delaying a transition heightens the physical risks and, in turn, continuously heightens the transition risk even more (Colas et al. 2019).

The Dutch Central Bank's analysis of biodiversity-loss risk exposure highlights how better data and clear methodologies can bolster the business case for mainstreaming biodiversity risk assessments. Of the investments made by financial institutions in the Netherlands, 36% are dependent on one or more ecosystem service (DNB and PBL 2020). The bank's model highlights physical, transition and reputational risks resulting from biodiversity loss (DNB and PBL 2020). They calculate physical risk through assessing national financial institutions' exposure to ecosystem services such as pollination (DNB and PBL 2020).Transition and reputational risk are then dependent on companies' negative impacts on biodiversity (DNB and PBL 2020). While this model will benefit from further iterations and improvements as firms' reporting of company-level biodiversity risk becomes more sophisticated, their biodiversity risk calculation methodology can serve as an example for other financial institutions.

Learn more

Zero-deforestation investments

Financial institutions can catalyse change in the companies that they invest in or lend to through engaging with these companies to lower the biodiversity risk related to activities such as deforestation. In 2020, 254 investors representing USD 17.7 trillion of assets signed a statement requesting that companies disclose commodity-specific no-deforestation policies and related commitments, assess and minimise operational and supply chain risk related to deforestation, establish transparent monitoring systems, and produce annual reports on deforestation (PRI 2020b).

Spurred by rapidly accelerating deforestation and increased forest fires, the statement was signed by a large number of institutional investors including Aviva Investors, HSBC Global Asset Management, and Legal and General Investment Management. Such investors, because of their size and global presence, have significant leverage to influence the choices that companies make about production and supply chain sustainability (PRI 2020b). For example, 34 asset managers representing USD 4.6 trillion instituted a 120–day work ban in Brazil in response to a 34% annual increase in Amazon deforestation and an attempt to pressure the government to take better accountability of their forests (Thind 2020).

SPOTT– Sustainability Policy Transparency Toolkit – is a free, online platform supporting sustainable commodity production and trade developed by ZSL with support from inter alia Credit Suisse, who continue to act as a technical advisor. By tracking transparency against more than 100 sector-specific indicators, SPOTT incentivises corporate good practice, including reducing by over 200 of the world's largest commodity producers and traders. Investors, buyers and other key influencers use SPOTT assessments to inform stakeholder engagement, manage ESG risk and encourage transparency, including managing investment risks potentially associated with deforestation across multiple industries.

While awareness is increasing among investors, there has not yet been a major shift in how the asset management industry manages biodiversity risks and impacts within its own investment portfolios. ShareAction, a UK-based organisation that advises investment managers on environmental and social matters, has found that none of the world's 75 largest asset managers has a dedicated policy on biodiversity, and that only 11% have policies that require portfolio companies to minimise their impacts on biodiversity (Cooper 2020). A 2019 study on current zero-deforestation commitments found that global pledges could be strengthened if: (a) a larger share of the global market for deforestation-risk commodities participated in such practices, (b) focus expanded beyond effects on specific biomes such as the Brazilian Amazon, (c) pledges did not include 'net-deforestation' and instead focused on 'gross-deforestation' targets, and (d) clearer targets and deadlines are set for realising commitments (Garrett et al. 2019).

Learn more

Renewable energy infrastructure investments

Infrastructure construction can result in biodiversity loss through increasing pollution, blocking migration routes for animals, altering hydrological regimes, and making it easier for illegal hunters to access protected habitats (WWF n.d.). Renewable energy infrastructure projects can also have negative effects on biodiversity when implemented without considering ecosystem impacts. A recent study revealed that 2,206 fully operational onshore wind, hydropower, and solar power generation facilities, as well as 922 facilities under development, were built within the boundaries of 886 protected areas, 749 key biodiversity areas contributing significantly to terrestrial, freshwater and marine ecosystems persistence and functioning, and 40 distinct wilderness areas in North America, Western Europe and Southeast Asia (Rehbein et al. 2020). Mining for materials needed by renewable energy infrastructure overlaps with 8% of protected areas, 7% of key biodiversity areas and 16% of remaining wilderness (Sonter et al. 2020).

In the coming decades, investments in large infrastructure projects such as the Belt and Road Initiative will increase and renewable energy investments will be scaled up, especially in developing countries, and so more safeguards to prevent biodiversity loss will be required (Narain et al. 2020). Given that the renewable energy market is growing, with USD 3.2 trillion needed per year to finance a low-carbon energy transformation, financial services firms supporting the infrastructure market's growth must incorporate biodiversity and ecosystem services impacts into their investment due diligence processes. In its 2017 monitoring report, the Compliance Advisor/Ombudsman (CAO) alerted the International Finance Corporation (IFC) for not having sufficient standards for evaluating their investments' environmental and social impacts (CAO 2017). Between 2000 and 2014, 26% of eligible CAO complaints stated that IFC projects led to land pollution and negative biodiversity effects (CAO 2017). These results illustrate the importance of environmental due diligence and monitoring for infrastructure investments. Without meaningful investment monitoring and associated penalties for negative environmental impacts, the positive effects of low-carbon infrastructure can be outweighed by the negative effects of ecosystem loss.

Private financial services firms can follow a similar model to the one used by IUCN, which partnered with Électricité de France, Energias de Portugal and Shell Group to develop best practices for renewable energy projects. Together, the organisations created a biodiversity risk framework, sectoral guidelines for the creation of a mitigation hierarchy, and regulatory and safeguard recommendations (IUCN 2019a). Capital Dynamics' investment in the California Flats Solar Project adequately implemented the mitigation hierarchy framework by ensuring that onsite vegetation and land was maintained using sheep to graze the land instead of using landscaping machinery. As a result, a 73,000 acre ranch was able to remain open and in addition 6,200 acres of mitigation land was preserved, protecting local endangered species. Capital Dynamics avoided the potential negative biodiversity impact of transforming and developing the land just for renewable energy commercial use (Infrastructure Investor 2019).

Learn more

ESG and biodiversity conservation in France

In 2015, France revolutionised ESG investment reporting through Article 173 of the French Energy Transition for Green Growth Act, which requires French institutional investors and insurance companies to report on (a) their general ESG policy, (b) the resources they dedicated to their ESG monitoring and evaluation, and (c) the results of a climate risk analysis on their investment risk profile (WWF France and AXA 2019). The French government has opted for a 'comply or explain' approach where investors either agree to these requirements or submit an explanation of why they did not follow Article 173.

So far, the new requirements have produced remarkable results. Many French financial institutions now agree that Article 173 was needed for French investors to consider environmental risks associated with their investments. The law encouraged the creation of the Natural Capital and Biodiversity Asset Class in 2018 to foster synergies between French investors on biodiversity issues (Finance for Tomorrow 2018). In 2019, the French government supplemented Article 173 by requiring that investor reports take into account "the preservation of the biodiversity of the ecosystems and the natural resources, in particular the participation in the objective of zero net artificialisation and the use of renewable energy" (French Energy Code 2019).

Critical to the success of these regulations is also the leadership of large French asset managers in addressing the biodiversity challenge. AXA Investment Managers, BNP Paribas Asset Management, Sycomore Asset Management, and Mirova have jointly pledged to support the development of a global tool for quantifying the biodiversity impacts in investor portfolios, and have partnered with I Care & Consult and Iceberg Data Lab to create this tool (Mirova 2020; Milburn 2020). This tool is being built to encompass a firm's product life cycle, analysing steps from raw materials sourcing to product end-of-life, and to be applicable within a variety of asset classes and companies listed on major market indices (Mirova 2020b). These reporting requirements were bolstered further in 2016 with the Sapin II law, which required large financial institutions (including the French Development Agency) to implement mechanisms for preventing corruption and illegal capital flows (OECD 2018b), including a whistleblowing hotline and a roster of disciplinary rules and sanctions. The law further established a new anti-corruption agency, which can impose sanctions of up to EUR 1 million on non-compliant companies who fail to meet anti-corruption requirements. When including the government's commitment to tripling ODA on biodiversity projects, Sapin II is a top-down approach crucial to improving delivery of biodiversity financing.

Current scale of finance

The current scale of subsidies that are potentially harmful to biodiversity is estimated to be in the range of USD 670 billion to 1.02 trillion per year, with the majority originating from the fossil fuels industry (USD 396–478 billion annually) followed by agriculture (USD 230–451 billion annually). Despite these large financial amounts, these estimates do not even account for the additional social costs of pollution, global warming, and the like, which could potentially drive these estimates much higher (OECD 2019a). These subsidies are distributed in a number of forms, including direct transfers, incentives to increase consumption, price supports, risk removal and tax breaks. Estimated numbers for each category of harmful subsidies can be found in Table 9 below.

Table 9. Annual amounts of harmful subsidies, 2019

Type of subsidy	Subsidies most harmful to biodiversity (USD bn/yr)	Subsidies potentially harmful to biodiversity (USD bn/yr)
Support to fossil fuels production	395.9	478.0
Support to agricultural production	230.0	451.0
Support to fisheries production	15.9	36.1
Support to forestry production	28.0	55.0
Total:	**669.8**	**1020.1**

Concerning the financial scale of supply chain actions harmful to biodiversity, the global trade of products was estimated to be USD 9.67 trillion in 2019 (WTO 2019) and the impact of supply chains on biodiversity has been historically negative. Fortunately, more businesses are subscribing to the idea of sustainable supply chains for their products. It is estimated that at least 1% of the sustainable agriculture, sustainable fisheries, sustainable seafood and sustainable palm oil annual market revenue, or about USD 5.5–8.2 billion, are reinvested in biodiversity conservation initiatives (Deutz et al. 2020).

Future scale of finance

Even when factoring in the maximum estimate of increased financial flows towards biodiversity conservation of USD 449–640 billion per year, the 2030 global biodiversity financing gap will not be closed unless there are significant efforts to scale up the reform of subsidies harmful to biodiversity and improve investment risk management practices by the financial sector. Under a 2030 scenario in which subsidies harmful to biodiversity have not been reformed and funding realigned, the remaining 2030 global biodiversity financing gap would be USD 273–327 billion per year. This gap could be closed by targeting the reform and realignment of the USD 274–670 billion in most harmful agricultural, fisheries and forestry subsidies, in addition with the reform of USD 396–478 billion potentially harmful fossil fuels subsidies. Table 10 below describes in what amounts and to which sectors harmful subsidies are expected to flow towards, assuming reform of only the most harmful subsidies.

Table 10. Annual amounts of harmful subsidies in 2030, assuming reform of the most harmful

Type of subsidy	Subsidies most harmful to biodiversity (USD bn/yr)	Subsidies potentially harmful to biodiversity (USD bn/yr)	Target annual reduction 2019–2030
Support to fossil fuels production	0	82.1	**14.8%**
Support to agricultural production	0	221.0	**6.3%**
Support to fisheries production	0	20.2	**5.1%**
Support to forestry production	0	26.9	**6.3%**
Total:	**0**	**350.2**	

Source: Deutz et al. 2020.

Sustainable supply chains also have potential for dominating a larger segment of global trade by 2030. Estimates for 2030 predict USD 12.4–18 billion worth of certified sustainable agriculture, forestry, seafood and palm oil products (Deutz et al. 2020).

Conclusion

The mechanisms proposed for realigning expenditures will have varying effectiveness from country to country, depending on regulatory frameworks and political economy priorities of both national governments and businesses. To close the global biodiversity financing gap, both the public and private sectors will need to critically assess their expenditures that are harmful to biodiversity and adopt reform alternatives that are politically and economically feasible. Even though realigning existing negative expenditures towards positive biodiversity conservation outcomes has the highest potential for closing the global financing gap compared with other financial solutions described in this book, efforts in this area have experienced the least progress over the past 10 years.

Realigning expenditures will require coordination across borders to identify, mitigate and redirect expenditures that damage ecosystems and wildlife. Rarely are the drivers of harmful biodiversity practices isolated within a single nation, but rather the result of international trade, demand and market competition. The public sector can serve a crucial role in realigning expenditures by setting national frameworks that explicitly commit to phasing out subsidies harmful to biodiversity and require businesses to report on their total impact on biodiversity. The private sector can complement these efforts by realising the material value of biodiversity conservation within businesses and thus incorporating biodiversity criteria within risk management and supply chain management decisions. This crucially requires all sectors to internalise their dependencies on biodiversity, recognise the value of genetic resources, and scale up monitoring and evaluation. It will be difficult to identify and realign all areas of harmful biodiversity spending, but it is necessary to significantly raise the commitment to improving biodiversity realignment mechanisms in order to fully close the global biodiversity financing gap. Even focusing on only realigning the most harmful expenditures by 2030 could yield substantial progress towards a world in which biodiversity is sustainably managed for the long term.

Avoid

7

The notion of avoiding future expenditures generally applies to situations in which a particular intervention or investment in the short or medium term may result in large future savings or prevent a significant loss of future revenue. Measures include investments in preventive actions such as green infrastructure, invasive species mitigation, and eliminating or amending existing counterproductive taxes.

The state of play

Upfront investments in ecosystem health can help to reduce the annual USD 4.3–20.2 trillion estimated value of global ecosystem services lost between 1997 and 2011 (Costanza et al. 2014). Land-use change, land degradation and other activities harmful to biodiversity have direct and indirect effects on human systems, such as global supply chains, food systems and public health (WEF 2020c). Preventing future pandemics and ecosystem collapse necessitates that public and private actors take steps to avoid future expenditures related to biodiversity loss (IPBES 2019). As such, calls for mainstreaming climate change and biodiversity loss into conventional financial analysis have increased. Over the last twenty years, the number of climate-related case filings, including actions to compel disclosure on climate risks in investor materials, has increased from low single digits to over 150 a year (Burgess 2020).

Governments can avoid future expenditures by introducing tax revenue generation tools to mitigate biodiversity loss, such as taxes for harmful production practices that depend on natural resources and taxes for consuming products harmful to biodiversity. Estimates based on the OECD PINE database suggest that 59 countries implement biodiversity-relevant taxes, which generate USD 7.7 billion per year (OECD 2020b). Other policy measures that governments employ to realise future cost savings through targeted interventions in the present day include border controls to stop invasive species introductions and related fees and charges imposed on shipping vessels, which seek to prevent the much larger costs of managing invasive species once they have become established.

Other options for public and private investors in conservation include upfront investments in policy, insurance, and infrastructure targeted towards preserving ecosystem service benefits and natural habitats. Within this group of tools, governments can introduce biodiversity-relevant subsidies in natural-resource sectors such as forestry and agriculture. The OECD PINE database estimates that 25 countries so far have implemented 176 environmentally relevant subsidies (OECD, 2020). The private sector is beginning to invest in protecting environmental assets to avoid future costs that could impact returns to shareholders. Natural disasters are often caused or exacerbated by ecosystem degradation from human activity, such as desertification. Other innovative mechanisms, such as investments in green infrastructure through environmental impact bonds, also represent ways in which national and subnational governments, and associated private and civil society sector partners, can avoid future costs related to biodiversity impacts.

While several governments and private institutions have taken preventive measures to reduce future biodiversity loss, these efforts must be scaled up and adapted to a wider variety of situations. As these measures are operationalised, governments should proactively involve local communities in their conservation strategies to ensure activities mitigate risks related to a lack of community commitment. Indigenous groups and local property owners alike are important sources of knowledge on their surroundings. Community-based conservation can increase the impact and longevity of conservation activities while preventing future costs associated with the loss of cultural identities for groups in biodiverse areas. Indeed, involving community participation as a part of sustainable economic transitions for post-economic slowdown recovery plans, which might be needed following the COVID-19 pandemic, could generate an estimated 395 million new jobs related to sustainable economic transitions (WEF 2020d).

A brief history

Biodiversity-relevant taxes levied to increase the cost of using natural resources or penalise harmful emissions are applied in 56 countries across the world, with the bulk of the instruments in the United States and Europe (OECD 2020b). Fees and charges for natural area use, such as national park entry fees and hunting licenses, are widespread, with the number of countries using them growing from 11 to 48 in the last 40 years (OECD 2020b). These are some of the most widespread measures used by governments to reduce the future costs of dealing with environmental degradation.

Specific examples have occurred in each category on both the national and international stage, and support for taxes on natural resource use has grown steadily. In 2016, the International Monetary Fund called for a carbon tax on shipping and air travel (Guardian Environment Network 2016). Taxes on fertiliser and pesticides have existed in Denmark since the 1990s, and taxes on timber and water are currently and have been historically used to control unsustainable resource consumption (UNDP 2020a; UNDP 2020b). Environmental impact bonds, which focus on private sector financing of measures to avoid future costs, were first used in the United States in 2016 and have since been used for stormwater and forestry projects.

Criteria

The table below presents a framework that can be used to analyse the different mechanisms for avoiding future biodiversity expenditures. The framework uses four criteria as follows:

1. **Level:** At what level will biodiversity expenditures be avoided?
2. **Direct or mainstreaming biodiversity:** How will costs be avoided?
3. **Potential:** How much expenditure on biodiversity could be avoided?
4. **Performance-based:** Are payments made before or after avoided costs are realised?

The following pages provide an explanation of these criteria and how they can be used to understand mechanisms for avoiding future biodiversity expenditures.

Table 11. Avoid future expenditures – principles and criteria

Principle	Effective / Efficient	Target	Appropriate
Criterion	**Level** At what level (private, national public, international public, or multi-sector collaboration) will biodiversity expenditures be avoided?	**Avoid potential** What is the scale of expenditures that can be avoided?	**Performance-based** Are payments made before or after avoided costs are realised?
		Direct / Mainstreaming Will expenditures be directly avoided by biodiversity conservation activities? Or mainstreamed through other sectors?	

1. Level

The level criterion describes whether expenditures will be avoided by a mechanism that is implemented by the private sector, the public sector (either nationally or internationally), or both.

Options:

Private | **National Public** | **International Public** | **Multi-sector collaboration**

Private sector avoidance involves the reduction of future spending through mechanisms principally implemented by private actors, while public sector avoidance is implemented by public entities. International avoidance mechanisms are those implemented by bilateral or multilateral ODA providers. Finally, multi sector collaboration involves solutions implemented through collaboration across all sectors. Avoidance mechanisms are typically implemented under the authority of private and/or public sector agencies.

2. Direct or mainstreaming biodiversity

Mechanisms to avoid future expenditures often come in the form of direct investment in creating positive biodiversity outcomes. Other avoidance mechanisms indirectly mainstream biodiversity conservation through investing in environmentally friendly policies or activities that realise biodiversity co-benefits.

Options:

Direct biodiversity investment | **Biodiversity mainstreaming investment**

Direct biodiversity investments avoid future expenditures by channelling funding to conservation activities targeted to directly yield positive biodiversity outcomes. For example, invasive species fees and charges often fund programmes that combat the spread or introduction of those species.

Biodiversity mainstreaming measures may reduce the need for future biodiversity conservation expenditures through sustainable investments or policies that have non-biodiversity primary purposes. For example, green infrastructure assets in urban areas may not ostensibly seem like conservation investments, but in fact, certain types of green infrastructure assets can create mini-habitats for urban pollinators or can better regulate hydrological flows.

3. Avoiding potential expenditure

The avoiding potential future biodiversity expenditure criterion describes the degree to which a mechanism may help reduce the need for future investments in biodiversity conservation.

Options:

Low **Medium** **High**

Avoidance mechanisms with low avoid potential only result in a small reduction in necessary expenditures on biodiversity but may indirectly benefit biodiversity in other ways. Examples of this include tax policies implemented for goods with inelastic demand, meaning that the governments' attempt to minimise future impacts from harmful activities will yield small returns. Those with a medium degree potential, such as environmental impact bonds, have the ability to avoid a moderate amount of future costs.

Mechanisms that have a high avoid potential, such as environmental insurance or invasive species fees and charges, can avoid large amounts of future spending on biodiversity conservation.

4. Performance-based

This criterion answers the question of whether the provision of funding is based on performance related to biodiversity conservation and ecosystem service provision.

Options:

Non-performance-based **Performance-based**

To a certain degree, all delivery mechanisms are related to performance in the sense that there is an expected outcome from funding (for example, grants given in support of capacity-building activities are based on the expected result that capacity will be built). Performance-based delivery as discussed here, however, means that delivery of finance is conditional upon the already executed or expected delivery of outcomes related to levels of provided ecosystem services or impacts on biodiversity conservation.

A guide to avoiding future expenditures

Taxes for avoiding future biodiversity expenditures

To curb overproduction or overconsumption of economic activity harmful to biodiversity, governments can introduce taxation systems that raise the cost of engaging in these activities. Biodiversity-relevant taxes have a 'double-dividend', in that, in addition to being a source of revenue for future conservation activities, they can also regulate the amount of environmentally harmful production and consumption (UNDP 2018). This is because taxes for biodiversity conservation also allow governments to address the costs of negative externalities through generating revenue from the creators of externalities. Taxes for conservation-friendly outcomes can either be implemented on ecosystem extraction or reduce non-extraction-related human impacts on ecosystems.

Taxes on forestry and water provide examples of directly taxing natural resources. The introduction of a forestry tax in Cameroon paved the way for the government to introduce stricter timber production zoning in the country's forests, which in turn enabled them to better manage their previously ailing forestry sector (World Bank 2009). In effect, increasing the cost of production limited timber activity allowed the government to appropriately capture funds, which were then allocated to sustainable forestry management. Forest tax programmes can either require firms to pay pre-harvest or post-harvest taxes or offer tax breaks to incentivise sustainable production practices (UNDP 2018). Stumpage fees, concession fees or area taxes, and royalty payments all involve firms paying governments pre-harvest for the use of public land, either by 'stump' (Lange 2004), by contract (FAO and ITTO 2011), or through payments for the right to use land (Mbugua 2003). Export levies, or other types of fees applied on processed goods, are post-harvest taxes on the forestry industry and allow governments with high cases of illegal forestry an opportunity to capture otherwise obscured forestry revenue (UNDP 2018).

For water conservation, governments can implement taxes based on household or industrial water consumption to fund sustainable watershed management. In countries where water utilities are publicly owned, water fees can be seen as taxes where a portion of them is earmarked for payments for ecosystem services programmes, such as in the case of Mexico's hydrological environmental services programme (UNDP 2020a).

Taxes on pesticides and fertilisers work to limit production or consumption practices that are not connected to resource extraction but still conserve biodiversity. While pesticides and chemicals play a vital role in agriculture, their toxic ingredients have harmful effects on nearby water sources and animal species and can enable the spread of disease (UNDP 2018). The EU's Common Agricultural Policy has introduced both taxes and supporting policies to help farmers minimise the use of pesticides, in order to promote sustainable farming.

In the tourism sector, taxes can catalyse investments in more sustainable forms of tourism, in addition to raising funds for nature-friendly tourism infrastructure. New Zealand's eco-tax splits proceeds from an international traveller tax between sustainable tourism infrastructure and natural area protection (OECD 2018c), and Ecuador and Costa Rica's airline and ship entry fees fund their respective national conservation projects.

When creating tax structures, governments must be careful to avoid unintended adverse outcomes. Although governments should and can use a combination of tax policies, they should ensure that they do not overcomplicate their tax structures so as to lead to limited compliance and effectiveness. This problem is prevalent in developing countries, where the complexity of the tax system has limited governments' ability to extract revenue from their core economic activities (UNDP 2020).

Case study

Costa Rica's 3.5% tax on carbon emissions

Deforestation is the largest source of carbon emissions in most tropical countries. In Costa Rica, forest cover was reduced from 86% to 21% of Costa Rica's territory from 1940 to 1987 (Dwyer 2019). Costa Rica's 3.5% tax law on all hydrocarbons partially funds the country's payments for ecosystem services programme, which works towards reforestation efforts. It is a central policy for the nation's goal of reaching carbon neutrality by 2021 (Irfan 2018).

The structure of the tax provides additional benefits beyond reaching the stated goal. First, the reduction of fossil fuel use means fewer carbon emissions in general, which creates massive benefits for Costa Rica's local environment. Second, the taxes have raised USD 26.5 million annually, 11% of all government revenue in 2018 (FONAFIFO 2019; Dwyer 2019). Third, all proceeds from the tax finance Costa Rica's National Forest Fund (FONAFIFO), which provides reforestation incentives and deforestation disincentives to individuals and businesses. From 1997 to 2018, FONAFIFO paid out USD 500 million to landowners covering nearly a quarter of the country and 1 million hectares of mature tropical forest in payments for ecosystem services. The payments support a range of activities, paying landowners for agroforestry, conservation of existing forests, and reforestation of degraded lands. By 2013, the carbon tax, along with other policies, helped recover Costa Rica's forests to 53% of total land area (Barbier et al. 2020).

Costa Rica isn't the only Latin American country to implement a carbon tax. In 2016, Colombia put in place a tax of USD 5 per tonne of emitted carbon, which created USD 148 million in revenue in 2017 (Barbier et al. 2020). Colombia reinvests a quarter of this revenue in direct conservation and climate change mitigation efforts, and another 5% in its protected areas (Barbier et al. 2020).

Learn more

Alignment of pesticide and fertiliser policies to environmental goals in the European Union, India, Sri Lanka and Seychelles

Overusing fertilisers leads to several negative environmental impacts, the most common of which are soil quality degradation and water pollution. To reduce these damages, multiple countries are introducing policies to ensure that fertiliser usage is either less or not harmful to surrounding environments. The EU's Common Agricultural Policy (CAP) has three of its nine objectives focused on the environment, namely climate mitigation and adaptation, natural resource management, and biodiversity protection. It successfully decreased fertiliser usage between 1990 and 2014, which has led to improved local water quality. Recent legislation has expanded upon fertiliser use restrictions (European Commission 2019a). In the most recent revision to the CAP, farmers will have access to a Farm Sustainability Tool for Nutrients, which will give recommendations and alerts on nutrient use for avoiding greenhouse gas emissions and nutrient leakage. Regulation (EC) No. 2016/0084 will apply stringent standards to all possible nutrient inputs, including both chemical fertilisers and biostimulants (European Commission 2019b). The EU also plans to halve pesticide use and reduce fertiliser use by 20% by 2030, according to working draft plans on pesticide use for biodiversity-positive goals (The Western Producer 2020).

While the EU's policies directly address climate change or biodiversity goals, other countries' policies target pesticide use through food security objectives. Seychelles, for example, imported over 70% of its food, most of which was processed and nutrient-deficient, contributing to the country's high obesity rate (FAO 2015). Ensuing agriculture policies encouraged production to reduce reliance on imports, and thus incentivised overuse of pesticides in Seychellois agriculture. As a result, nitrogen, potassium and phosphate use skyrocketed from 8.5 kg/hectare in 2006 to 79 kg/hectare in 2015 (FAO 2020). To respond to these pollution levels, Seychelles proceeded to enact the Seychelles National Agricultural Investment Plan to focus on six investment areas, including "increased and sustainable use of agricultural land" and "more appropriate use of fertilizers and chemicals".

India and Sri Lanka's fertiliser subsidies were also based on food security goals, with both countries subsidising the cost of imported fertilisers. Sri Lanka's policies lowered urea or nitrogen costs, causing nutrient imbalance and soil productivity decline due to urea overuse. To promote efficient fertiliser use, Sri Lanka's Ministry of Agriculture passed a policy to promote the Integrated Plant Nutrient System and encouraged production of local phosphate fertilisers to balance out nitrogen overuse (Wijewardena 2006). India acknowledged in a 2016 report to the Ministry of Agriculture that fertiliser overuse leads to water pollution, increased greenhouse gas emissions, animal health disorders and decreases in crop productivity (India Ministry of Agriculture 2016). The report recommended to revise fertiliser subsidies to encourage sustainable use, incentivise biofertilisers and promote integrated nutrient management.

LEVEL

DIRECT OR MAINSTREAMING BIODIVERSITY

POTENTIAL

Invasive species policies, fees and charges

Invasive species are alien organisms that outcompete native species for resources in new habitats (CBD 2020b). Their ability to consume more resources, and reproduce rapidly as a result, makes them a significant driver of biodiversity loss (IPBES 2018). They can produce extensive environmental damage including, but not limited to, negative impacts on ecosystem services, nutrient cycling and pre-existing plant-animal relationships. Invasive species are estimated to cause billions of dollars in damage every year (USDA 2020). In the United States alone, USD 40 billion is lost annually in crop production and forestry damage by invasive species, and much more is estimated to be derived from damage to infrastructure and loss of ecosystem services (Paini et al. 2016). Even in protected areas, invasive species pose an increasing threat to biodiversity. Fewer than 10% of the existing protected areas are currently home to alien species, but more than 80% of protected areas are vulnerable to at least one invasive population already established within 10 km of their boundaries (Liu et al. 2020). Moreover, evidence shows that the rate of invasive species spread has continued to rise rapidly in recent decades, driven mainly by increases in global trade (Seebens et al. 2018). Immediate investments in preventing or eradicating invasive species can lead to future cost savings for food, water, health and ecological systems (US Department of the Interior 2019).

In the United States, several states have programmes to combat invasive species at their point of entry. In California, invasive zebra and quagga mussels attach themselves to the bottoms of ships, enabling their populations to grow in public water systems. In response, a California law charges a USD 1000 fee on all ships arriving at Californian ports from places outside Californian waters. The revenue flows to programmes that implement safety and control measures that prevent ships bringing in mussels and other invasive species (CDTFA 2020). Programmes like these help jurisdictions lock down and prevent invasive species from spreading before they become a problem, thereby preventing the need for extensive tracking and removal initiatives in the future. Efforts focused on limiting the entry of invasive species by trade or travel are well supported by international initiatives. The International Convention for the Control and Management of Ships' Ballast Water and Sediments was implemented in 2017 with the help of the International Maritime Organization. Elements of both CBD guidance and International Plant Protection Convention standards are prime examples of institutions supporting and suggesting invasive species policy (CBD 2020b). Other programmes emphasise restoration projects where invasive species have taken over.

Learn more

Wildlife illegal trade and COVID-19

COVID-19 had its first recorded case in Wuhan, China in November 2019, and went on to infect many millions of people all over the world, with extraordinary rates of spread and relatively high virulence (Davidson 2020). Zoonotic diseases such as COVID-19 are exceedingly common, making up 60% of emerging infectious diseases and 70% of new human pathogens detected in the last three decades (Fine and Kang 2020; IPBES 2020). Land-use change, primarily driven by agricultural expansion and urbanisation, has caused the emergence of more than 30% of all new diseases reported since 1960 (IPBES 2020). Larger-scale environmental degradation, such as deforestation in the Amazon, has also been linked to the spread of infectious diseases such as malaria (MacDonald and Mordecai 2019). Ecologists found that when biodiversity decreases and species become extinct, those that tend to survive are more likely to spread pathogens to humans. Species such as rodents, bats and primates are all known to increase as biodiversity decreases in a landscape (Tollefson 2020).

Many of the initial cases of COVID-19 were clustered around a wet market in Wuhan and brought international attention to the trade of pangolins, which, since the collapse of the elephant ivory market in China, have become the most trafficked animal in the world. Over one million pangolins have been poached over the last decade (Nuwer 2020). Furthermore, 2019 was a landmark year for both the number of illegal pangolin scale seizures and the size of those seizures, breaking records in both regards (Bale 2020). Pangolins are suspected as the initial touchpoint for COVID-19 as some were found to harbour a similar strain (Anderson et al. 2020).

The economic costs of COVID-19 have been extensive and are not yet fully realised, resulting in the shutdowns of national economies, high levels of unemployment, the loss of many businesses, and human suffering. The IPBES estimated that the cost of zoonotic disease emergence is likely to exceed USD 1 trillion annually. The risk of future pandemics could be significantly lowered through global strategies focused on biodiversity conservation (IPBES 2020). The necessary biodiversity conservation and public health surveillance response to protect against similar future outbreaks are estimated to cost USD 22– 31 billion annually, over the next 10 years (Dobson et al. 2020; IPBES 2020). This however is only a fraction of the estimated economic costs of over USD 8–16 trillion incurred in 2020 from the COVID-19 pandemic (Dobson et al. 2020).

The illegal wildlife trade market trades over 35,000 species that are protected under the Convention on International Trade in Endangered Species of Wild Flora and Fauna rules (UNODC 2020). Wildlife crime also extends to the illegal harvesting and trading of non-protected species, as well as the domestic poaching and sale of protected species. The Financial Action Task Force estimates the annual value of the illegal wildlife trade to be at least USD 7–23 billion, around a quarter of the size of the legal wildlife trade (FATF 2020).

Combating the illegal wildlife trade market is also a governance issue that requires high-level political commitment both nationally and internationally since much of the trade crosses multiple political boundaries (World Bank 2019b; FATF 2020). The illegal wildlife trade is but one of the ways in which human impacts on biodiversity are accelerating the spread of diseases. Others include development of previously untouched land, which has impacted exotic animals' habitat size.

LEVEL

DIRECT OR MAINSTREAMING BIODIVERSITY

POTENTIAL

Green insurance

In recent years, the private insurance industry has started to play a larger role in protecting biodiversity, benefitting from a better understanding of the relationship between habitat degradation and disaster risk. From an operational perspective, insurance companies are starting to consider biodiversity both in how they calculate premiums and in the types of products that they offer. As awareness of ecosystem services loss and climate change have increased, so has the realisation that these issues have measurable impacts that ought to be reflected in the calculation of insurance premiums and the creation of new insurance products. Insurers are expected to accurately price risk and advise customers upon risk and are thus pivotal in preventing risks from being realised by advocating for better biodiversity conservation.

Insurers in general provide insurance coverage in the event that an asset is damaged or destroyed, and from that point of view insuring an environmental asset (for example, a coral reef) is no different from insuring a house or an automobile. However, insurers may also invest directly in biodiversity conservation when such investments are likely to lower their expected future insurance pay-outs resulting from damage to that asset. The Nature Conservancy, AXA XL, and the University of California at Santa Cruz recently assessed the protection provided by mangrove forests. They found that introducing insurance products to pay for restoration could avoid the costs related to mangrove loss in natural disasters (TNC 2020). Pay-outs for their restoration could be delivered to policyholders' bank accounts within a 10-day period following a storm.

Insurance provides protection against the down-side risks associated with particular events, and in doing so requires consumers of insurance products to take precautionary measures to limit disaster risk by engaging or investing in conservation activity in the present.

Case study

Mesoamerican Reef insurance

Coral reefs are important natural barriers to hurricanes as they reduce the energy of waves impacting the coastline by up to 97%. The Mesoamerican Reef in Mexico is the second largest barrier reef in the world and protects Mexico's Caribbean coastline, which supports a USD 10 billion tourism sector, from environmental risks such as hurricanes. However, pollution, bleaching, and other types of environmental degradation, as well as the extreme storms that the reef protects against, put the reef at risk. This has led the Mexican government, TNC, and others to establish the Coastal Zone Management Trust, which, in addition to its already established activities focusing on ongoing maintenance of the reefs and beaches, will now make payments to beneficiaries in the event that a storm hits to repair the coastline and reef damages. The solution is also cost-effective, with estimates from TNC stating that while repairing the reef could cost anywhere from USD 50,000–150,000, an artificial measure like a seawall could easily cost USD 1 million per half mile of protection (Smith, 2018).

Funding for the Coastal Zone Management Trust comes from an existing fee on beachfront property owners with contributions from both local government taxes and from the local tourism industry in Cancún and Puerto Morelos. Part of this will cover the cost of insurance premiums, paid to the Mexican-based insurer Afirme Seguros. The parametric insurance product states that in the case that a storm with wind speeds in excess of certain benchmarks, starting with 100 knots, hits predefined areas covered by the insurance, a payout would immediately be made to the trust, up to a maximum of USD 3.8 million. For example, if wind speeds reach 110 knots, then 40% of the maximum payout would be delivered, while if they reach 130 knots and 160 knots then 80% and 100% of the maximum payout would be delivered, respectively (Gonzalez, 2019).

Funds from the insurance payout are to be managed by the Coastal Zone Management Trust, and expenditures will be distributed across a range of projects. The terms state that 50% of the payout funds must be used for preliminary rehabilitation and restoration of beaches and 50% must be used for similar activities for the reef. Priority will first be given to assessing damage, followed by removing debris, nurturing broken corals, and replanting the corals.

The insurance product was a combined effort on the part of several Mexican universities, stakeholders from the tourist businesses, TNC, Swiss Re, and others. The administration of the payouts and delivery of the funding is managed by the trust, while overall support is provided by the Mesoamerican Reef Fund, an international group of conservation agencies that works together to raise and allocate funds for protection of the Mesoamerican Reef ecoregion.

This type of insurance product could mark the beginning of a series of similar steps towards climate resilience, if it is able to successfully bring together public and private actors (and their funds) to preserve natural assets that benefit human infrastructure and associated economic activity.

LEVEL

DIRECT OR MAINSTREAMING BIODIVERSITY

POTENTIAL

Biodiversity-relevant positive subsidies

Biodiversity-relevant positive subsidies can incentivize economic activity that leads to positive biodiversity outcomes. Such activity can include forest management and reforestation, organic or environmentally-friendly agriculture, pesticide free cultivation, and land cultivation (OECD, 2020). These activities might use economic support from subsidies to channel funding to activities via Payment for Ecosystem Services (PES) programs, where funds, from beneficiaries or users of ecosystem services, are delivered to those who conserve these services (OECD, 2020c). Fundamentally, successful subsidy policies tare able to link payments or support to compliance with environmental standards (IEEP, 2009).

According to the OECD's PINE database, biodiversity-relevant positive subsidies contribute USD 0.89 billion per year to total biodiversity financing (OECD, 2019a). A subset of these subsidies represents government support for beneficial agricultural practices (OECD, 2019c) Biodiversity-relevant subsidies make up a significant portion of biodiversity-relevant public funding attributed to sustainable land management and containment, as well as noise and water pollution (OECD, 2020c). Of course, the volume and size of positive subsidies is still insignificant when compared to the size of subsidies awarded to production practices that are harmful to biodiversity.

Even if a subsidy has biodiversity-positive intentions, recent examples have shown that the outcomes do not necessarily correlate with the objective. In the case of Chile's tree-planting subsidy, while forest area more than doubled between 1986 and 2011, carbon sequestration increased only by 1.98% and native forests decreased in size by 13% (Lombrana, 2020). Although reforestation can offer some ecosystem benefits, it in itself will not be beneficial if forests are monoculture plantations as opposed to native, biodiverse forests.

Learn more

Green infrastructure

Given the accelerating pace of global urbanisation, more efficient land and resource management through green infrastructure will be key to avoiding future costs related to severe climate change effects in addition to resource constraints. Prominent examples of green infrastructure include bioswales (natural channels for stormwater run-off), green and blue spaces, and urban wetlands. Green infrastructure investments can provide a variety of ecosystem services. These services range from stormwater protection, protection of pollinators, and natural coastal barriers, all of which can help cities avoid costs related to future climate events or overdevelopment. To avoid expenditures related to unsustainable growth, local governments and developers should consider ways to preserve and/or replicate ecosystem services such that urbanised land does not lose biodiversity or the services that natural habitats deliver.

For example, assets such as green roofs, increased tree plantings, unmanicured green areas, rain gardens and permeable pavements can be critical components of cities' climate adaptation plans (NRDC 2013). Some cities have promoted green infrastructure investments to commercial property owners, arguing that more sustainable development can lead to higher rental rates, retail sales and property values, in addition to lower utility implementation and development lifecycle costs (NRDC 2013). With regards to promoting biodiversity, such development can create mini habitats or corridors for pollinators or species passing through urban areas.

Municipalities can incentivise private construction of green infrastructure through offering tax credits, rebates and development incentives (NRDC 2013). New York City offers a Green Roof Tax Abatement equal to USD 4.50 per square foot of green roof space, which is capped at USD 100,000 (NYC Department of Finance 2020). Such infrastructure absorbs stormwater, combats the urban heat island effect and provides insulation for homes (NYC Department of Finance 2020). The stormwater absorption ecosystem service is believed to lead to avoided costs, since the roofs prevent rainwater from overflowing impervious street and sidewalk surfaces.

To scale current green infrastructure efforts, policymakers and private development firms should communicate their investment potential by monitoring the effectiveness of current green infrastructure assets in producing ecosystem services and positive biodiversity. Local governments must ensure the equitable distribution of green infrastructure and aim for all neighbourhoods within their jurisdictions to have access to ecosystem service benefits (Shi 2020). Local governments and engineers should also be educated on the benefits of green infrastructure assets so they can identify ways in which nearby communities can benefit from them as well as plant and animal species.

LEVEL

DIRECT OR MAINSTREAMING BIODIVERSITY

POTENTIAL

PERFORMANCE BASED

Environmental impact bonds

Environmental impact bonds (EIBs) are a way to raise financing from public and private capital in domestic markets for environmental projects that enable both private and public stakeholders to avoid future costs, be it through forest restoration projects that mitigate wildfires, or urban green infrastructure solutions that lead to better storm water management. Like a conventional bond, the principal raised through an EIB is required to be repaid, with interest added, over a set period. EIBs differ from regular bonds in that bond issuance proceeds are used for 'green' projects that generate environmental and financial returns, and are only paid in the event that avoided costs can be realised (Gonnella 2017). EIBs are often a source of risk capital for investments, providing governments or other investors with a way to access additional capital for projects that will reduce future costs associated with resource management (Herrera 2017). These cost savings ultimately benefit public institutions, as well as investors who can receive a portion of realised savings.

The repayment of EIBs depends on pay-for-success (PFS) contracts that link the payment for delivering a service to the achievement of measurable outcomes. In a PFS contract, upfront investors, who provide capital through the purchase of a bond, are paid back at pre-agreed varying rates by public entities depending on the project's success (Gonnella 2017). Connecting payments to project outcomes incentivises investors to ensure that projects have positive environmental impacts (CPIC 2019). In some projects, investors may be repaid at a premium for extremely successful projects or receive less money back for partial success. In others, investors face the risk of not receiving any repayments if certain benchmarks are not met. Preliminary examples of EIBs are largely funded by philanthropic institutions or philanthropic wings of commercial institutions who are willing to take on the risk in the pursuit of environmental or social benefit (Quantified Ventures 2018). Often, these projects work with governments who stand to benefit from savings derived from the project. However, EIBs also offer ample growth potential for commercial ventures in the future.

EIBs are generally used for projects that can avoid future expenditures while generating shorter-term returns. Although the application of EIBs to biodiversity conservation has yet to be scaled, the structure of the instrument is well suited to a range of biodiversity projects since they encourage projects with cost savings from which both governments and investors can benefit. Indeed, many of the existing EIBs have some indirect or direct positive impacts on biodiversity.

Case study

The forest resilience bond for wildfire management

Forest restoration often involves replanting native tree species and increasing plant biomass and forest cover. However, in certain forests, including many in the western United States, forest restoration concerns removing excess vegetation to return forests to a more natural state. In these forests, the combination of arid weather conditions and the natural fire cycle results in forests that are naturally sparse, where dead and decomposing plant matter have limited opportunity to build up before being consumed by fire. Removing dead plant matter can simultaneously improve landscape resilience to fire and make it easier to manage fire when necessary to protect people and property (Mandle et al. 2019). Other benefits include improved water quantity and quality, avoided carbon emissions, protected habitat and species, and community resilience. The Forest Resilience Bond (FRB), an initiative of Blue Forest Conservation in collaboration with Encourage Capital and the World Resources Institute, is a public-private partnership that enables private capital to finance forest restoration in the United States and is especially targeted at wildfire prevention. The FRB connects private capital from land managers and other beneficiaries with certified implementation partners to increase the pace and scale of restoration beyond what government funding alone can achieve. Overall, the FRB leverages investor capital to reduce the impacts of uncontrolled fires while bringing together a variety of beneficiaries, including the United States Forest Service (USFS), electric utilities and water companies, to share the costs of forest restoration. The FRB allows stakeholders to choose from a variety of ecosystem services and valuation benchmarks to calculate pay-outs, including increased water quantity, reduced sedimentation, reduced damages from flooding, added hydropower, improved wildlife habitat and others (Blue Forest Conservation 2017).

On the ground, the FRB is built so that the USFS, utilities and states reimburse a predetermined percentage of restoration costs once restoration work is completed, and utilities make additional pay for success payments based on achieved outcomes, such as measurable increases in water volumes. In November 2018, the first pilot FRB was executed, which was a USD 4 million five-year financing paying a 4% interest rate (Mandle et al. 2019). This FRB targeted restoration activities on Tahoe National Forest land in the North Yuba watershed in California. The issuance of the first FRB required the participation of multiple stakeholders representing a variety of disparate interests, including CSAA Insurance, Calvert Impact Capital, The Rockefeller Foundation and the Gordon and Betty Moore Foundation. Beneficiaries from the forest restoration measures who agreed to repay investors included US government agencies such as the USFS, non-profits such as the National Forest Foundation, and local water and energy utility companies. Finally, the development, implementation, and assessment of the project and associated interventions also involved a large number of stakeholders, including state forest agencies, research partners and community groups.

Case study

Storm water management in Atlanta and Washington DC

Storm water management is an especially challenging issue for cities that consistently receive heavy rainfall but lack the sewage infrastructure to handle large volumes of water. System overflows can generate a variety of negative impacts on cities and riparian systems, ranging from urban floods to environmental degradation. In areas where sewage flows into nearby bodies of water, poor storm water management can severely pollute watersheds and disrupt ecosystem health (Quantified Ventures n.d.)

Green infrastructure offers a way to manage storm water while providing ancillary benefits not provided by traditional ('grey') infrastructure. Some of these solutions include rain gardens, green roofs, and permeable pavement, among others, providing green spaces to communities that both sequester carbon and absorb storm water that would otherwise overwhelm their sewage systems. In order to finance these green infrastructure solutions, the District of Columbia Water and Sewer Authority (DC Water) and the Atlanta Department and Watershed Management (DWM) issued EIBs in which payment was tied to the infrastructure's performance in mitigating storm water run-off. Issued in 2016, DC Water's USD 25 million, 30-year privately placed EIB financed the construction of green infrastructure for storm water management in the Washington, DC area. Nominally, the bond paid a 3.43% coupon to investors, a rate equivalent to the market rate of municipal bond issues by the authority.

However, actual pay-outs to investors are subject to either a multiplier or a discount factor, which is a function of the volume of storm water flowing through the sewage system during peak storms. Under this three-tier performance payment structure, if storm water flow was found to be above a certain threshold (that is, the green infrastructure performed below expectation), then investors would be required to transfer an additional USD 3.3 million to DC Water, reducing the effective return of the bonds to investors and reducing the cost to DC Water. Conversely, if the green infrastructure performed above expectations in reducing water flows, DC Water would make an additional USD 3.3 million payment to the investors, resulting in an above-market rate of return (Quantified Ventures 2018).

The Atlanta DWM issued a USD 14 million EIB in 2019 using a similar structure to finance six green infrastructure projects. Repayment was based on a two-tiered performance payment system consisting of a base case and a high-performance scenario, which were both defined in terms of volume of storm water captured. If the base case scenario unfolded, Atlanta DWM would pay investors a below-market return, while a high-performance outcome would trigger an additional USD 1 million payment. In this case, investors receive an above-market return only in the event that Atlanta DWM realises greater economic value from the infrastructure investments than expected, as measured by the amount of excess storm water captured (Quantified Ventures 2019.

Environmental impact assessments

Environmental Impact Assessments (EIAs) are regulatory tools that require developers to assess the potential anthropogenic impact a project could have on the nearby environment, or impacts that would not have occurred if the project never took place (Komnikova 2016). The typical steps within an EIA are for the developer to describe the project and all possible impacts (negative or positive), classify the severity of these impacts, identify alternative construction procedures that produce the best possible outcome for environmental and social good, and establish some type of ranking system to sort all possible alternatives. EIAs are critical within the beginning stages of a project to prevent any development activities that yield irreversible consequences. EIAs highlight the potential harmful impacts of projects, and in doing so allow developers and public institutions to take preventive measures such that they can avoid future costs.

EIAs employ a range of different methodologies, given that projects can span a range of industries and involve a multitude of different ecosystems. Standardising EIAs is therefore difficult to do at a national or international scale, and each EIA methodology and team is tailored to each specific case. Some legislative bodies, such as the Environmental Protection Agency (EPA) in the US, can uphold some base requirements and procedures, but the success of an EIA ultimately relies on the quality of data gathered by the project developer, transparency of methodologies used, the accuracy of a developer's assumptions and predictions, and the qualifications of personnel. EIAs must also consider a project's tenor when assessing impact, whether it be over 10 years or 50 years, and what ways impacts can accumulate (Singh et al. 2020). Ultimately, an EIA's usefulness comes down to whether it affects a developer's decision. It is up to the executive or governing authorities of the project to decide to restructure or scrap a project if it proves to be deleterious to nature. For EIAs to affect development processes, governments must implement regulations that enforce compliance with environmental standards.

To provide some security that EIAs are adhered to during a project, some institutions use EIA bonds as a surety (BIOFIN n.d.). EIA bonds are bonds provided by the project developer that assure monetary compensation will be provided if a project developer does not meet an agreed set of EIA provisions. In the case where EIA provisions are not met, the bond can be used to pay for environmental impacts, even in the case of bankruptcy (BIOFIN, n.d.).

LEVEL

DIRECT OR MAINSTREAMING BIODIVERSITY

POTENTIAL

PERFORMANCE BASED

LEVEL

DIRECT OR MAINSTREAMING BIODIVERSITY

POTENTIAL

Community-based conservation

It has been estimated that involving local communities and property owners in conservation activity can contribute to the 30% increase in global protected area coverage needed to prevent ecosystem collapse (Waldron et al. 2020). These efforts can be funded by ecotourism fees, payments for ecosystem services, philanthropy, national budgets, or crowdfunding through the communities themselves (WWF 2017). Recent spatial analysis work shows that indigenous people currently make up less than 5% of human population but contribute to the protection of 80% of global biodiversity due to their management of sparsely populated lands (IUCN 2019b). Community involvement can enable governments and society to avoid non-market and market costs, related either to the erosion of community knowledge and culture, especially in the case of indigenous groups, or weakened long-term commitments from nearby communities for environmental protection (Waldron et al. 2020; WWF 2017).

Land trusts and community conservancies can enable long-term conservation because they tie community interests with ecosystem health. In doing so, they pre-emptively engage all relevant stakeholders in ecosystem protection. For either land trusts or community conservancies to be effective, governments and communities must have a mutual understanding of local property rights as well as long-term financing sources. Land trusts are non-profit organisations that assist in land acquisition or conservation easements. Most of these organisations are community-based, which gives them the local social and environmental context to identify land that has significant conservation value (Finger Lakes Land Trust n.d.). They also benefit from the receipt of private donations of land, funding and voluntary conservation agreements with local property owners.

Community conservancies are less common but are an effective means for governments to involve indigenous groups in national conservation efforts. Conservancies are not national parks but are instead government-administered land protected for certain groups. Namibia's community conservancies, established with the support of WWF, offer the most prominent example of such an arrangement. Here, conservancies have a dual objective of preserving local rights to land and offering communities a way to contribute their environmental knowledge and wildlife monitoring efforts (Potgieter 2019). Communities are given the authority to dictate zoning or the extent to which predetermined hunting quotas are used and work with the Ministry of Environment and Tourism to attract ecotourism revenue. In 2017, the programme contributed USD 54 million to the country's net national income and generated 5000 jobs in remote rural areas (Potgieter 2019). The programme has also had successful wildlife conservation outcomes, with populations of lions, elephants and black rhinos increasing since its inception in 1996 (Potgieter 2019).

Key to successful community-based conservation are clear land rights. For example, the Liberia Land Authority officially certified six communities in northwest Liberia as land-owning communities, thereby implementing the 2018 Land Rights Act recognising local communities as owners of their Customary Land and guaranteeing them full legal protection as private landowners. Facilitated by IDH and funded by the Norwegian government, communities in the region can develop their own land use plans identifying land for agricultural production, setting aside forest for protection and attracting new investments.

Conclusion

In helping to avoid future expenditures related to environmental damage and their associated social impacts, investors in these mechanisms can also bolster future biodiversity budgets by freeing up previously unavailable capital. However, if governments allocate the value of avoided costs to purposes unrelated to or, worse, negative to biodiversity conservation, their actions will contradict the purpose of the avoidance mechanisms described in this chapter.

As with mechanisms related to delivering better and realigning expenditures, it is imperative that mechanisms are regulated to ensure transparency and are monitored to verify that these measures are truly working to avoid future expenditures. If not, they should be modified as is not uncommon for measures that are well-intentioned to have unforeseen consequences both to people and to the environment. While most of the mechanisms within the book are geared towards mitigating the current biodiversity funding gap, the mechanisms for avoiding expenditures work to prevent that gap from increasing. Often it is cheaper and easier to prevent damage to biodiversity hotspots and habitats now than it is to restore and reverse that damage in the future. Incorporating these measures will help prevent biodiversity loss, but more attention is required from governments and businesses to realise these cost savings in a timely manner.

Catalyse

8

This chapter explores existing catalysts and institutional arrangements that facilitate the flows of biodiversity financing and make it possible for them to achieve scale. These catalysts may support biodiversity at the subnational, national, and international levels across both developed and developing countries.

The state of play

The efficacy of different biodiversity financing mechanisms will vary from country to country, depending on domestic priorities and national conditions. So, the governance and coordination of financial flows for biodiversity conservation is of critical importance in optimising the generation, delivery and realignment of funds.

In accordance with Article 21 of the CBD, Parties are required to review the effectiveness of the mechanisms used for financing biodiversity and to improve these mechanisms by strengthening existing financial resources. Parties should continually aim to enhance international, domestic public, and domestic private financial flows for biological diversity, and appropriate catalysts can expedite progress. Countries are also required, in accordance with Article 6 of the CBD, to develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity, and to integrate them into relevant sectoral or cross-sectoral plans, programmes and policies. These strategies act as key catalysts for the support of biodiversity conservation.

A guide to key catalysts

While the work of individual stakeholder groups is important, it is most impactful when it leverages others – a combination of their efforts will be needed to close the global biodiversity financing gap. The catalysts described in this chapter require a consensus among stakeholders on best practices and on the long-term benefits of investing in conservation. Catalysts will be more or less effective in different jurisdictions, depending on their biodiversity needs and their capacity to implement biodiversity finance solutions. Key catalysts listed below are grouped according to their structure and purpose.

Mainstreaming biodiversity conservation in the public sector

National Biodiversity Strategies and Action Plans (NBSAPs) are the main public policy instrument for governments to plan and implement the goals of the CBD. NBSAPs are a critical signal to citizens, business and subnational governments of the priority of biodiversity to the issuing nations. To date, 191 countries, or 97% of Parties to the CBD, have developed at least one NBSAP, but few countries have backed their plans with the necessary financing, and effective implementation and alignment with other national priorities has lagged. Indeed, for many countries NBSAPs are aspirational documents that address priorities to mobilise finance towards biodiversity (UNDP 2018). In order to act as effective catalysts for biodiversity conservation and funding, through their NBSAPs, governments should address the following:

- National Biodiversity Finance Plans (NBFPs) should be included within all governments' NBSAPs. NBFPs can enable countries to identify relevant financial mechanisms and formulate realistic budget targets that will help achieve their conservation goals. These plans are critical to mainstreaming biodiversity conservation across sectors and geographical areas and avoiding project clustering around niche ecosystems or species. NBSAPs and NBFPs should also prioritise collaboration with the private sector and civil society stakeholders. In doing so, they need to outline ways in which governments can enable scaled investments in conservation. For example, governments can lower the risk of investing in conservation by developing appropriate tax incentives and/or guarantees.
- Governments should also prioritise reforming economic policies that have adverse effects on biodiversity. Catalysing investments in biodiversity requires that governments transition to economic growth models that have minimal or net-zero impacts on biodiversity. Understanding the all-in costs associated with biodiversity loss is crucial to enabling these reforms, particularly in agriculture, forestry, fisheries and other sectors that rely on healthy ecosystems. Governments must consider, where appropriate, the reform of subsidies that are potentially harmful to biodiversity. While significantly reforming these harmful subsidies may be untenable for some countries in the immediate future, the act of identifying and assessing them is critical to begin the global process of redesigning, greening, reducing or redirecting more than USD 670–1,020 billion in annual subsidy flows that are potentially harmful to biodiversity, of which approximately USD 274–542 billion is estimated to flow to the agriculture, forestry and fisheries sectors each year (Deutz et al. 2020).

- Governments should also strengthen their regulatory frameworks to enforce environmental standards to ensure that terrestrial, freshwater and marine key biodiversity areas achieve better protection by protected areas and/or other effective area-based conservation measures, contributing significantly to the conservation of global biodiversity (UNEP-WCMC, IUCN and NGS 2020).
- Governments should enforce policies that require public and private compliance with environmental standards. As pointed out by the World Economic Forum, two categories of regulations are needed: first, regulations that prevent resource mismanagement in commodities and raw materials and, second, regulations that require the incorporation of biodiversity risk in financial decision-making (WEF and AlphaBeta 2020). Through setting compliance standards based on either specific habitats or ecosystems, governments can encourage environmental markets that drive industries that have significant negative impacts on their surrounding environments. In practice, this might include governments strengthening the design and enforcement of carbon markets and nature-based climate solutions, natural infrastructure, biodiversity offsets and mitigation hierarchy policies that channel funding from high-environmental impact sectors such as infrastructure or energy to conservation.
- As governments develop new policies and programmes to support the delivery of their post-2020 national climate goals in their nationally determined contributions, they should evaluate opportunities to align these with their NBSAPs, by increasing their climate ambitions using natural climate solutions and nature-based solutions (UNDP 2019; Seddon et al. 2019; Beasley et al. 2019). Government job programmes and development projects can also be an important part of economic recovery plans. The use of nature-based solutions in these cases can both support the economy and help normalise these alternative solutions (Lieuw-Kie-Song and Pérez-Cicera 2020). For example, recent estimates suggest that nature-based solutions focusing on reforestation and afforestation could generate USD 800 billion in annual revenues by 2050 (Vivid Economics 2020).
- Where possible, governments should also default to natural infrastructure solutions in infrastructure procurement and development projects and, in any case, require the evaluation of natural infrastructure alternatives to conventional infrastructure solutions, when considering investments in infrastructure.
- Governments, financial institutions and developers should strengthen the enforcement and transparency of their no net loss policies, to mandate that biodiversity offsets are the last option used in all development projects. That is, economic compensation for unavoidable damage to biodiversity should only be an option after a development project has rigorously implemented the mitigation hierarchy (avoid, minimise, restore and offset), and with significant technical evidence to prove that the cause of biodiversity damage is extremely difficult or impossible to eliminate.

Mainstreaming biodiversity conservation through policy planning can be achieved not only at the national level using NBSAPs, but also at the supra- and sub-national levels. For example, the EU Biodiversity Strategy for 2030 proposes setting aside at least 30% of EU land and sea as protected areas, restoring 30% of degraded ecosystems, and investing 10% of the EU's long-term budget in biodiversity. At the sub-national level, Governor Gavin Newsom of California has joined the call for protecting '30 by 30' for his state (CA Office of the Governor 2020).

Catalytic international organisations

Much of the technical assistance and knowledge exchange on biodiversity finance and biodiversity conservation strategies, is carried out by international agencies such as UNDP, IUCN, and the OECD. For example, the OECD national-level 'Guidance to identify and assess subsidies harmful to biodiversity' and the UNDP BIOFIN Biodiversity Finance Policy and Institutional Reviews (PIR) help countries undertake national-level assessments to identify and evaluate subsidies harmful to biodiversity. Over the past decade, IUCN and UNDP have provided critical technical assistance to over 36 countries for improving the development, assessment and monitoring of their NBSAPs. In addition, organisations such as UNDP BIOFIN and IUCN, and bilateral and multilateral financial aid, can help cover the capacity gaps that present obstacles to the development, monitoring and implementation of NBSAPs and NBFPs, especially in developing countries.

UNDP Biodiversity Finance Initiative

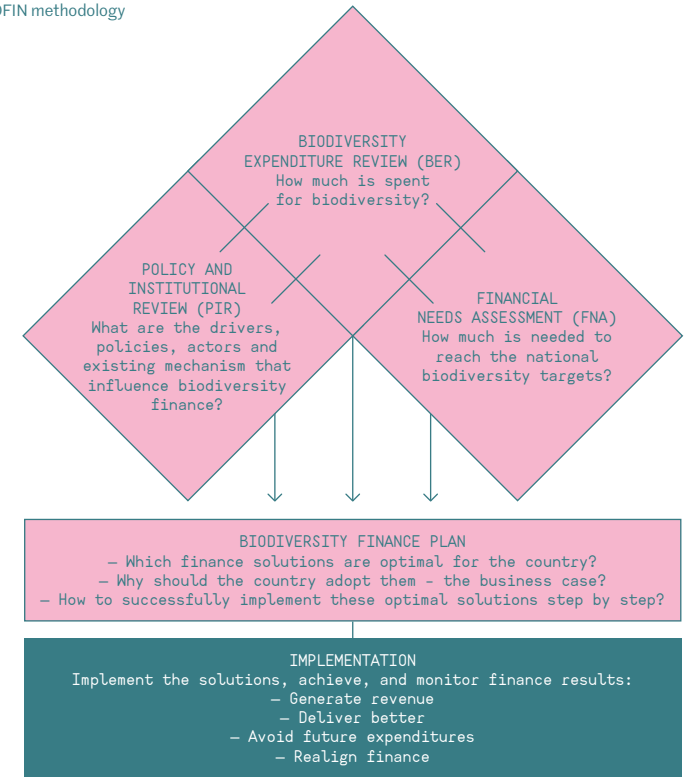
The Biodiversity Finance Initiative (BIOFIN) was created by UNDP to direct countries on how they could finance their biodiversity goals using evidence-based frameworks. The BIOFIN methodology is implemented in over 35 countries and tailored to each unique country context. During implementation of the BIOFIN methodology, countries work with their respective ministries of finance through a bottom-up five-step approach:

1. Create a database of existing financing policies and mechanisms
2. Measure current expenditure levels for biodiversity from the public and private sector
3. Estimate future financial needs to achieve national biodiversity goals
4. Design strategic plans to prioritise and deploy the right mix of finance solutions based on each country's financing potential, biodiversity impact and feasibility
5. Implement solutions using a variety of financing mechanisms

This book discusses the last step, financing mechanisms, according to the four approaches identified by BIOFIN. BIOFIN provides a catalogue of finance solutions detailing mechanisms and approaches that countries can develop, according to their national fiscal needs and priorities. BIOFIN has had positive results in a number of countries, including:

- In **Cuba**, as a result of the Biodiversity Expenditure Review process, the government approved for the first time a **Specific Environmental Accounting Standard** (NEC No.11) issued by the Ministry of Finance and Prices.
- The Central Bank of **Sri Lanka** developed the **Sustainable Finance Roadmap** with the technical assistance of the International Finance Corporation and BIOFIN. Both provided the foundation for soft credit facilities for biodiversity-friendly development projects and encouraged development initiatives sensitive to biodiversity. Four commercial banks have already initiated sustainable finance schemes under this roadmap.
- In the **Philippines**, BIOFIN helped fill a gap in protected area legislation in 2018 to formally include a further 94 protected areas into law, bringing the total to 107. They consequently supported the development of underlying regulations and the formulation of a USD 40 million 2020 budget proposal for protected areas.
- Through results-based budgeting processes, five coastal municipalities in **Guatemala** increased funds available for coastal and marine biodiversity conservation and management by over 50% from 2018 to 2019.
- The Environment Ministry in **Georgia** saw a budget increase for biodiversity conservation from USD 30,000 to USD 270,000.
- **Mexico** successfully redesigned two major environmental funds, a national climate fund that has since seen a turnover exceeding USD 3 million, with USD 2 million directed to nature-based solutions for ecosystem resilience, and a green fund of Mexico City, resulting in a saving of USD 3 million per year and a better articulated focus on biodiversity.
- **Seychelles** – where the parliament formally adopted all of the finance solutions of the finance plan – launched the first ever Biodiversity Finance Unit in 2019 to lead the country's Biodiversity Finance Plan.
- **Indonesia** capitalised on existing Islamic finance modalities – green bonds or *sukuk* and alms-giving or *zakat* – and expanded their use to address biodiversity financing issues, resulting in an investment exceeding USD 2 million for biodiversity starting in 2021.

Figure 9. The BIOFIN methodology



Source: UNDP 2018

Mainstreaming biodiversity conservation in the private sector

Despite making substantial progress in recent years, firms in the financial sector and in the real economy are still in the process of assessing the biodiversity risks associated with their practices and evaluating the opportunities inherent to more sustainable economic models. This growing understanding, combined with more sophisticated government regulation, will likely lead to more thoughtful valuation of biodiversity loss to businesses and more thorough disclosure of environmental impacts. In order to achieve this, the Task Force on Nature-related Financial Disclosures (TNFD) is in the process of developing guidelines and standardising methodologies for identifying biodiversity-related risks, which enable users to better understand their firms' exposure to transition, physical, legal and systemic risks related to biodiversity loss.

Non-financial and financial companies should accompany these disclosures with increased investments in sustainable supply chains and better financial risk management processes. These efforts should be guided by corporate climate and nature science-based targets (SBTs), adopted by companies to reduce global greenhouse gas emissions and biodiversity loss, that are aligned with current scientific evidence necessary to meet the goals of the UNFCCC and the CBD. Over 1000 companies have pledged to develop climate SBTs. Several companies, including Kering and GlaxoSmithKline, have started to design and align their biodiversity investment strategies, policies and programmes to the SBT framework (Science Based Targets Initiative 2020; Kering 2020; Segal 2020). Companies should not only invest in transitioning their supply chains to be more sustainable, but should also, in partnership with governments and civil society organisations, educate consumers on the benefits of more sustainable supply chains.

Governments can greatly support the mainstreaming process by putting in place regulatory frameworks that facilitate the development of funds and other financial products and services focused on such areas as sustainable forestry and agriculture. This can be accomplished through tax incentives, de-risking tools, reducing subsidies harmful to biodiversity or monetising biodiversity benefits (Deutz et al. 2020). Governments may also contribute to the growth of investment activity that supports biodiversity by passing legislation that provides a safe haven for asset managers who, afraid of running afoul of their fiduciary duties, avoid any investments that may be perceived as sacrificing financial returns in exchange for broader societal benefits.

Learn more

The potential role of development agencies and banks

The landmark 2019 IPBES Global Assessment warns that biodiversity conservation requires "transformative changes across economic, social, political and technological factors" (IPBES 2019). This paradigm of mainstreaming opens a vast area of opportunity for the finance sector to integrate socio-economic and biodiversity co-benefits in all economic sectors. The role of over 539 development finance institutions (DFIs), including development agencies, MDBs and development banks will be crucial in this task considering that the amount of finance needed for such transformative changes is in the range of their financing capacities.

At least 28% of the USD 11.2 trillion DFI investments in 2019 are highly exposed to its financing projects' biodiversity loss and ecosystems degradation risks (Jessop 2020). For example, the International Development Finance Club is the largest provider of public development and climate finance globally, with USD 4 trillion in combined assets and annual commitments above USD 850 billion. Another 200 to 500 development banks could further magnify such financing forces worldwide. Their contributions can be summarised in two complementary approaches. Development banks represent about 10% of total global investment and so are in an influential position to lead biodiversity financing and set targets for biodiversity goals (Mrema and Rodriguez 2020).

The first approach, which has already been used for decades, is adopting measures to avoid negative impacts on key ecosystems or populations. This requires implementing 'exclusion lists' which explicitly protect biodiversity, for example zero deforestation lists in funds exercised in the Amazon (PRI 2020b). Committed agencies would also have to implement biodiversity safeguards and due diligence along with environmental and social safeguards.

The second and more innovative approach is to adopt a selective investment strategy targeting projects that integrate transformative changes in biodiversity mainstreaming and biodiversity co-benefits by design. A selection criteria and screening method through which institutions select these projects is required, for example the nature-based solutions standard by IUCN. This approach also requires improved reporting on these biodiversity investments and establishment of a global common framework for tracking finance. One way to do so is by adopting what are called the 'Rio Markers' by the CBD, which use a simple scoring scale to indicate if an investment can target biodiversity outcomes. MDBs, development agencies and banks could also dedicate some effort to implement ex post biodiversity impact monitoring and evaluation of those projects.

Finally, crucial to development banks mainstreaming biodiversity finance is scaling up demand and support in their clients to adopt their own transformative changes. To this end, development banks could help countries, local authorities or companies build their own mainstreaming frameworks, through proper mapping of vulnerable biodiverse areas.

Case study

Policy-based loans in Mexico

Using policy-based loans (PBLs), the French Development Agency (AFD) is supporting Mexico to improve its climate change mitigation and adaptation policies. PBLs provide borrowing member countries with flexible and liquid funding to support policy reforms and institutional transformations. With PBLs, the development agency facilitates the design and implementation of public policies in the borrowing countries by: (i) increasing the availability of funds, (ii) providing technical assistance and (iii) implementing policy reforms based on key performance indicators (AFD, 2019).

For example, in 2012, Mexico invested in a USD 72 million policy-based loan, to support its national biodiversity conservation policies implemented by the Mexican National Protected Areas Commission (CONANP). As a result, in 2016 CONANP implemented a new local governance mechanism for ecological and landscape management, which was established in partnership with the Mexican federal, state, and local governments.

In 2017, Mexico contracted a new PBL to promote ecological and biodiversity conservation in its rural development policies. The PBL contributed to the strengthening and alignment of the Mexican territorial planning policies with biodiversity conservation policies (e.g. natural protected areas). In addition it contributed to the promotion of sustainable commodity production practices and reform of policy economic instruments (e.g. environmental taxes) aimed to reduce their potential negative impacts on biodiversity conservation.

In the future, new policy-based loans in Mexico have the potential to support biodiversity mainstreaming in sectors such as agroecology and sustainable fisheries (AFD, 2020).

Catalytic funds

Investors looking to lower the risk of biodiversity loss to their investment models can channel funding to biodiversity conservation through leveraging green financial products, or co-investing with governments or multilateral development institutions in blended finance funds (for example, Agri3 Fund and Mirova's Land Degradation Neutrality Fund). Bilateral and multilateral organisations can, in some instances, manage such funds, and can offer technical support in the form of project design, monitoring, data collection and project management capacity building. Organisations such as the GEF or the Green Climate Fund are valuable for scaling investments in biodiversity conservation not only because they provide grant money or concessional loans, but also because they can connect national conservation strategies with relevant technical support. In addition to being co-investors, bilateral and multilateral funds can offer concessional capital and guarantees that can encourage further private sector investment in conservation.

Case study

Land Degradation Neutrality Fund

Land degradation neutrality (LDN) refers to a state where land resources are sufficient in quantity and quality to support an ecosystem's functions and services. However, as a consequence of poor land management for short-term economic gains, 25% of the world's arable land has been lost in the last two decades. Two billion hectares of land are degraded worldwide, and another 12 million hectares of productive land are lost every year. The United Nations Convention to Combat Desertification has initiated the Land Degradation Neutrality Fund, and selected Mirova to structure and manage it. The two sponsors of the fund are European Investment Bank and Agence française de développement. The goal of this investment fund is to restore productivity to degraded land to mitigate climate change and improve livelihoods. Initially, the fund was established with a 15-year investment time horizon and a target size of USD 300 million. To achieve this, the fund primarily invests in sustainable agriculture and forestry, as well as in other LDN-related sectors on a case by case basis, such as green infrastructure or ecotourism.

The fund's structure is based on a blended finance structure, which leverages public funding to increase private sector investment. This concessionary capital takes a junior investor role, taking a first-loss position in the fund, partially protecting private investors. Concessionary capital is often provided by public organisations such as national development investment agencies, climate funds or private foundations. Private investors are typically institutional investors such as pension funds, insurance companies and development banks. These investors require market financial returns with a low risk profile, which is provided by the layered structure of the LDN Fund.

In addition, the fund also incorporates a technical assistance facility managed by IDH Sustainable Trade Initiative, an international NGO specialising in making supply chains more sustainable. The technical assistance facility aims to maximise positive impacts and reduce commercial and ESG risks. It provides grants to support projects seeking investment from the LDN Fund and is funded by donor contributions of a target size of 5% of the fund's size. Current donors include the French Development Agency and the GEF.

Learn more

How technical assistance can accelerate investments in nature

Supporting public and private blended finance with technical assistance facilities can significantly increase the flow of capital in support of inclusive sustainable land use and biodiversity conservation. The number of impact funds dedicated to nature-based solutions and sustainable land management has grown in recent years. But before investment capital can flow, bottlenecks may need to be overcome. First, conservation projects need to meet the financial and impact objectives of the fund(s). Second, project developers who can deliver nature-based solutions with positive biodiversity outcomes also often need to work with a variety of stakeholders, such as local governments and communities. Building stakeholder engagement and partnerships takes time. As such, project developers have specific financial and technical capacity needs that have to be addressed either before or in parallel with a conservation investment.

To close this gap between investors and conservation project developers, a TAF can play a critical role. A TAF is a capacity solution that encompasses the mobilisation of grants, advice, and training for potential investees and key stakeholders. For example, IDH – The Sustainable Trade Initiative manages three TAFs, linked to sustainable land use investment funds which mainly target three outcomes. First, they aim to enable investment readiness for a bigger pool of high-impact projects, often enabling potential investees to strengthen their business models and their operational and financial structures, making it possible for the ESG criteria to be met. Second, they can also work with investees to strengthen projects' positive environmental and social impacts, for example by supporting land rights and governance, strengthening value chains and markets for 'additional' products harvested in agroforestry systems, and working with local governments to develop policies conducive to positive biodiversity outcomes. Here, they can also enable and help implement data-based approaches that build proof of concept and allow for adaptive management to be practiced. Finally, they can be used to facilitate learning and knowledge sharing on how to mobilise finance for nature by analysing replicability of deals and publishing insights gained with investment funds.

Through these actions, targeted technical assistance reduces overall investment risk, while ensuring increased numbers of higher quality projects, and enables larger environmental and social impacts related to the sustainable land use sector asset class, and through it, biodiversity. With a healthy pipeline of larger-scale investment opportunities with transparent features, more investors are also more likely to be willing and able to increase their exposure to natural capital investments.

Case study

The AGRI3 Fund

The AGRI3 Fund was created by UNEP and Rabobank, together with partner IDH and supported by FMO, the Dutch entrepreneurial development bank, to mitigate climate change. It aims to catalyse private financial resources for forest protection and sustainable agriculture, with the aim of unlocking at least USD 1 billion in finance towards deforestation-free, sustainable agriculture and land use. The fund provides de-risking financial instruments and grants for technical assistance for food value chain actors, and, particularly, farmers. The AGRI3 Fund is set up to be a role model for banks and other financial institutions. It was initially funded by a grant from the Dutch government with Mirova Natural Capital, FOUNT and Cardano Development as advisors. IDH manages a linked technical assistance facility (TAF). It began operations in mid-2020.

Eligible projects for aid from the AGRI3 Fund focus on the objectives of forest protection and reforestation or on sustainable agriculture, and also contribute to improved rural livelihoods. The fund targets initiatives and deals that have long term viability and undertakes transactions in a wide range and combination of crops, countries and currencies, maintaining diversity. The fund is a public-private partnership with a related layered financing structure where different instruments (junior, mezzanine and senior) face different roles and levels of risk, and where money is contributed by different types of stakeholders. Donors channel grants towards the TAF, while investors contribute junior capital to the Finance Fund. Commercial and development banks contribute senior debt and mezzanine capital to the Finance Fund. The ultimate beneficiaries receive technical assistance and soft loans, while banks and execution partners receive guarantees and loans of their own. Commercial debt is provided to either execution partners or ultimate beneficiaries.

The fund targets a total capital size of USD 150 million to allow for an exposure of its guarantees up to USD 300 million. This double blending structure subsequently unlocks investments made by commercial banks, initially Rabobank, and aims to increase to up to USD 1 billion in total finance. Key innovative aspects of the fund are its partnership with commercial banks, it being an evergreen fund, its open architecture allowing future partnerships with commercial banks beyond Rabobank, and its ability to blend finance to attract commercial investors to riskier deals. IDH manages the AGRI3 TAF, providing support for projects to enable the transactions, reduce risk and increase development impact. The TAF provides reimbursable grants to projects both at the pre- and post-investment stages to improve technical quality and strengthen environmental and social impacts. The technical assistance will also help implementation of a data-based approach to support impact tracking and adaptive management and facilitate knowledge sharing from the AGRI3 Fund. It is expected that the use of technical assistance for AGRI3 projects ensures reduced risk, increased numbers of and higher quality projects, larger environmental and sustainability impacts, and the growth of a sustainable land use sector as a new asset class.

Case study

Joint SDG Fund

The UN Joint SDG Fund supports countries to accelerate their progress towards the SDGs. It was founded in 2014 and works across the entire UN with 14 separate agencies that implement programmes dedicated to the SDGs. The fund works toward activating SDG policy changes, enhancing ecosystems for SDG financing, and catalysing SDG investments at scale. Thus, the fund closes the financing gap for achieving the SDGs through systemic action in the international community.

The fund operates through open calls for funding. The first call for a total envelope of USD 100 million of SDG financing closed in March 2020. The call resulted in the approval of 62 joint programmes (Component 1 – the enabling environment for SDG investments) for an envelope of USD 80 million. Component 2, catalytic investments, was achieved through awarding of preparatory funding to 28 concept notes. The second component is explicitly focused on investing in initiatives that leverage additional funding for the SDGs from both public and private sources. This increases the efficiency of capital deployment, reducing the total amount of capital needed to address the SDGs (Joint SDG Fund n.d.).

Both components will support the quest of adequately financing biodiversity via SDGs 14 and 15 (Life Below Water and Life on Land). A new generation of financing strategies and enabling frameworks for SDG investment will be crafted – in the form of Integrated National Financing Frameworks. The basic idea is to innovate and adapt financing schemes to the SDGs and replicate and upscale them by blending public and private resources.

The fund's catalytic investments pipeline may subsequently support initiatives that leverage public and private financing for conservation. The 28 shortlisted catalytic investment proposals were grouped in five thematic clusters, two of which are relevant to biodiversity – 'natural ecosystems and climate action' and 'blue economy'. For example, proposals in small island states will aim to set up facilities for project identification, formulation, and financing of businesses and infrastructure to preserve critical coral reefs. Other proposals encourage a new set of financial instruments to upscale the use of *sukuk* and other lending products to fund national park systems. Still others aim to leverage private investment to support small businesses to invest in waste management, and to build facilities for biogas, green fertilisers and compost.

Learn more

Global Environment Facility

Established in 1991, the Global Environment Facility (GEF) is the largest financier of environmental projects for developed and developing countries. As of 2018, it has provided around USD 20.5 billion in grants, mobilised USD 112 billion in co-financing from governments, civil society, and other bilateral or multilateral agencies and supported 4800 projects in 170 countries (GEF 2018a). GEF is the financial mechanism for major international conventions on environmental protection, including the CBD and the UNFCCC (GEF 2018a).

GEF's unique governance structure provides institutional capacity to oversee its operations, channel funding across agencies and provide technical assistance to recipients of funding. GEF's council, its main governing body, evaluates the facility's policies and programmes. The assembly consists of all 183 member countries and meets every three to four years to review general policies, operations and membership (GEF 2018d). GEF's operations are conducted through 18 agencies, which work together with project stakeholders to design and implement GEF-funded projects (GEF 2018d). Its Scientific and Technical Advisory Panel and Independent Evaluation Office provide technical support regarding policies and operations for funding recipients and monitor the impact of GEF grants (GEF 2018d).

During the GEF-7 replenishment meeting, participants also agreed to a new investment strategy, which has focused GEF financing on (a) investments that catalyse change in key systems driving environmental loss, that is, energy, cities and food, (b) prioritising projects that focus on more than one global problem at a time, and (c) strategies that include stronger engagement with stakeholders, including the private sector, indigenous peoples and civil society (GEF 2018c). To execute these initiatives, GEF distributes funds to developing countries, or countries that are transitioning to meet international environmental standards across five main focal areas: biodiversity, climate change, land degradation, international waters, and chemicals and waste (GEF 2018c).

GEF's most recent biodiversity focal area strategy aims to maintain globally significant biodiversity in landscapes and seascapes through mainstreaming biodiversity across sectors, addressing drivers of species loss to protect habitats and species and developing relevant policy and institutional frameworks (GEF 2018b). It plans to achieve these goals through the following key entry points for investment in recipient countries: biodiversity mainstreaming in priority sectors, the global wildlife programme, natural capital assessment and accounting, sustainable use of plant and animal genetic resources, inclusive conservation, food systems, and land use, among others. GEF-7 has also instituted new monitoring guidelines that standardise monitoring of programme results across a series of core and sub indicators. Core indicators seek to gather quantitative and qualitative data regarding the improved marine and terrestrial habitat management outcomes.

Private stakeholder coalitions

Aligning the private sector and government strategy is facilitated by organisations and initiatives that foster dialogue and collaboration between conservation project managers and investors such as the Coalition for Private Investment in Conservation (CPIC). The Nature+ Accelerator, a collaboration between CPIC, IUCN, Mirova and the GEF selects projects to be scaled through rigorous technical assistance (IUCN n.d.). The Nature Conservancy's Natural Capital Accelerator programme is another example of a platform for conservation specialists and investors to engage and develop innovative solutions (Schwelder 2020). Since 2018, the programme has given USD 2.5 million to nature-based climate projects around the United States.

Learn more

Coalition for Private Investment in Conservation (CPIC)

The Coalition for Private Investment in Conservation (CPIC) came together to develop sustainable products with reasonable risk-return profiles. Prior work done on the subject of conservation investing, in particular the 2014 report released by Credit Suisse, WWF and McKinsey & Co., demonstrated that there was an untapped market for investors looking to invest in conservation-oriented financial products that provided significant returns. However, there was no central organisation dedicated to the development and fostering of sustainable financial products focused on conservation. To that end, CPIC was founded in 2016 by Cornell, Credit Suisse, IUCN and The Nature Conservancy. It now has approximately 80 partner organisations, including Mirova, Conservation International and WWF, spanning the conservation space, with partners that are international agencies, NGOs and impact and sustainable investing institutions (CPIC n.d.).

The goal of CPIC is to be both a repository of knowledge and an engagement platform to encourage private investment in conservation by facilitating the development of conservation investment products that investors can purchase or invest in. CPIC works towards this goal in a number of ways. First, CPIC creates blueprints for how to create, deliver and scale investable conservation projects. Second, CPIC brings together the investors, financial structuring experts and conservation experts necessary to create and implement innovative financial products. Finally, CPIC also works to accelerate the shift from concepts to investable products by acting as a network for both amplifying information and creating connections. CPIC investments operate in a series of areas relevant for the conservation and protection of biodiversity, and CPIC has developed blueprints in a number of fields to illustrate how new conservation investments can be created and scaled. One example of this is the Forest Resilience Bond (FRB), the first of which was created by Blue Forest Conservation (CPIC n.d.). CPIC's blueprint describes where and why a FRB would work and how organisations might follow in Blue Forest's footsteps. Other examples of CPIC's blueprints include a description of a public-private partnership for marine protected areas, a description of the restoration and renovation of smallholder cocoa farms, and environmental impact bonds for green infrastructure and watersheds. CPIC has garnered significant support and recognition since its founding, and has received USD 10 million of committed funding from GEF, the Rockefeller Foundation and Cornell to support the development of these products.

9

Where do we go from here?

Where do we go from here?

The twin crises of biodiversity loss and climate change are among the most significant challenges facing our species today. In some ways the biodiversity crisis is the more intractable – in the area of climate change there is, if nothing else, a universal metric (tonnes of CO2 equivalent) that facilitates communication and provides a common language for negotiators. Still, there is tremendous enthusiasm, particularly among the younger generations, for combining economic development with sustainability. The biggest challenge now is simply how to finance it.

Given the growing body of evidence that shows that the long term cost of conserving biodiversity is likely to be much higher than what governments will be able to afford in the coming years, it would be easy to despair. However, the private sector is able to deploy capital into novel solutions in much larger amounts than the public sector is – and, crucially, the amount of new and reinvested capital that moves through investment markets every year is vastly larger than the cost of addressing the biodiversity crisis. This suggests a possible solution to the biodiversity crisis that is funded in large part by private investments that deliver both financial returns and biodiversity co-benefits.

It is not clear whether the COVID-19 pandemic, and the accompanying global economic downturn, will make that vision more difficult to fulfil. Despite more than USD 10 trillion in government policy stimulus and recovery measures announced in 2020, biodiversity conservation has, in most cases, not been central to COVID-19 policy responses (OECD 2020; Finance for Biodiversity 2020). While some governments have slashed funding for protected areas or conservation programmes, a few others have embraced a 'green stimulus recovery', although these are mostly focused on addressing climate change risks. What those economic stimulus plans will look like once they have been developed further in still unclear. But the fact that zoonotic diseases like COVID-19 result at least in part from our mismanagement of biodiversity strongly supports the economic case for conservation—and policymakers need to bear this in mind as they develop their COVID-19 economic recovery plans and implement initiatives to not only strengthen their economies but, also, to prevent the next pandemic.

There is, at the time of writing, a growing call for integrating biodiversity conservation into COVID-19 recovery plans to ensure that economies are more resilient to systemic shocks and to prevent future pandemics (OECD 2020). And there is a growing realisation that nature must be conserved not only for its intrinsic value but also for far more prosaic reasons: every nation is built upon its natural capital and relies on ecosystem services for its food, air, climate, and water quality, among others.

To this extent, conservation can look to integrate financial and non-financial funding opportunities into current plans. The real market benefits from an established ability to regulate and deploy capital, as well as a combination of regulatory, corporate and strategic financial mechanisms that exist to ensure that capital can reach a desired asset. Similar to traditional assets, there are now a range of mechanisms and financial actors that have created ecosystems to fund social innovations, such as solutions to affordable housing, or renewable energy transitions. The goal moving forward is to assess how these systems have been put in place to achieve sustainable funding for these causes, and to apply them to biodiversity.

The tools mentioned in this book should therefore be complemented by financial and regulatory structures that mainstream biodiversity conservation into investment and policymaking processes. In doing so, each sector of society can contribute towards building a financial ecosystem, where each institution and actor understands their distinct roles, and commits to them to ensure consistent funding for nature. As the need for an alternative economic development path that is truly sustainable becomes clearer, so too does the need for collaboration amongst the public, private and civil society sectors. Such collaboration should result in a financial ecosystem that considers impacts on biodiversity alongside metrics of risk and return, and that is populated by a series of institutions for which non-financial returns and long-term impacts of their business activity are defining features.

If the international community is to move towards this sustainable financial ecosystem, in which the whole is greater than the sum of its parts, substantial progress will be needed on the following eight transformations:

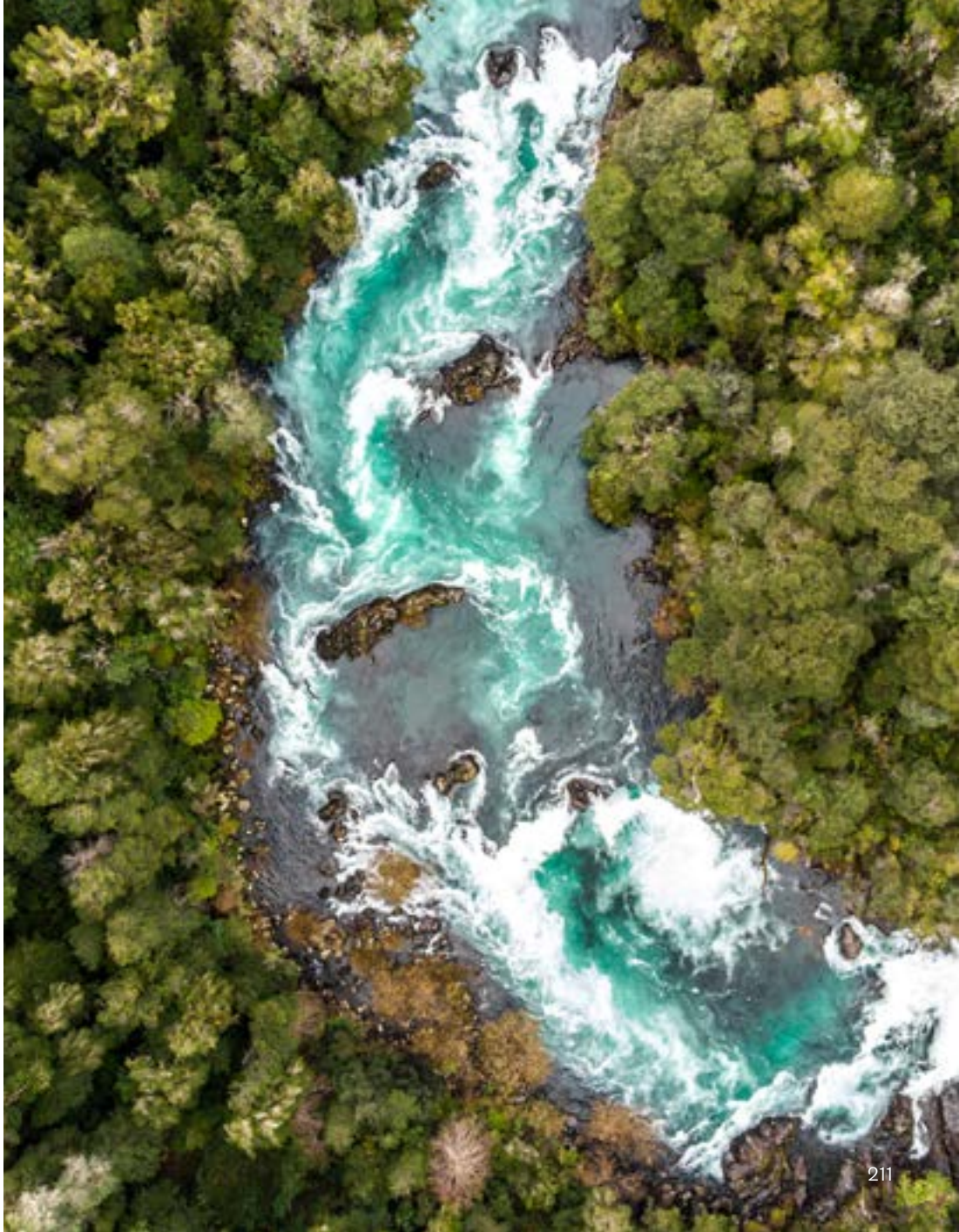
1. **Risk assessments and disclosures:** The public and private sector will understand and quantify their respective exposures to risks associated with biodiversity loss and the negative impacts associated with their activities and operations. This will include improvements in disclosure, tracking, and reporting of biodiversity finance. The Taskforce for Nature-related Financial Disclosures (TNFD) provides a framework that governments and firms can use to produce disclose their nature-related risks.
2. **Metrics of investment impact:** In addition to understanding the financial returns, of a transaction or project, it is crucially important that the area of biodiversity finance development is clear and uses broadly applicable metrics of non-financial impacts, which are associated with particular investments.
3. **Finalisation of NBSAPs and NBFP:** National governments will develop National Biodiversity Strategies and Plans (NBSAPs) and National Biodiversity Finance Plans (NBFPs), in line with funding needs.
4. **Harmful subsidies reform:** Governments will transition existing policies that negatively impact biodiversity by addressing and reforming agricultural, fisheries, forestry and fossil fuel subsidies that are harmful to biodiversity.
5. **Sustainable supply chain transitions and investment risk management:** Private institutions will have policies in place to support sustainable commodity production and reform their supply chains and investment practices in accordance with science-based targets. Investors will understand the impacts of their investments and lending decisions and will incorporate that information into the choices they make.
6. **Capacity building and financial support:** Where needed, international and national organisations will continue to support countries as they transition to more sustainable economies, through offering technical assistance in the drafting of key policies, training for the implementation of, and monitoring and reporting on conservation programmes. Development institutions will partner with governments and the private sector to develop concessional finance or blended finance funds to help increase local capacity.
7. **Reform of laws and regulations discouraging ESG investments:** National and international organisations that regulate investment practices will reassess, and where relevant, reform laws and regulations that discourage investors from making triple-bottom-line investments. This will involve moving towards a broader definition of fiduciary duty that incorporates an understanding of the long-term collateral environmental and social benefits or harm associated with certain investments.
8. **Alignment of investment portfolios with individual and institutional values:** Investment managers will conform portfolios to changing values that reflect clients' demand for preventing the loss of nature. In alignment with reforms of laws and regulations that better enable ESG investments, investors will develop assets that allow clients to realise returns for their portfolios, while minimising harm to biodiversity or generating revenues from conservation. Private lending and equity investments in new technologies for biodiversity conservation project design, monitoring, evaluation, and investment management (for example, satellite imaging, machine learning, and investment assurance for nature-based solutions) will play a catalytic role in delivering better biodiversity finance.

In order to appropriately respond to the risks posed by global biodiversity loss, the public and private sector must first understand the risks to which they are exposed, and the measures that must be taken to minimise or eradicate them. The public sector should take stock of each economic sector's dependency on biodiversity, and potential economic losses that might result from ecosystem degradation. Governments must also identify

barriers to their achievement of biodiversity protection targets and ways in which international and civil society can help overcome these barriers. The private sector will need to assume the responsibility of addressing its existing business operations by transforming supply chains, addressing investment practices that are negative for biodiversity, introducing risk mitigation tools that enable better delivery of funds to biodiversity, and creating new funding structures that realise long-term business opportunities related to biodiversity conservation. These actions should be taken in collaboration with governments.

Growing this financial ecosystem will require simultaneous bottom-up and top-down transformations. While governments and the private sector will need to change their current practices at national and subnational levels, national and international civil society organisations will continue to play a vital role in enabling further investment in conservation. This will include bolstering technical and policy capacity, supporting implementation processes and citizen outreach, and helping local private and public actors to ensure that funds reach their desired destinations.

Achieving national biodiversity goals will not only require transitions for economic gain and environmental health. Governments, the private sector and civil society organisations will also need to consider ways in which mainstreaming biodiversity can address inequities. A sustainable financial system should also improve communities' access to clean air and healthy food, and, in the case of indigenous communities, empower them to manage their land in a manner consistent with biodiversity conservation.



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