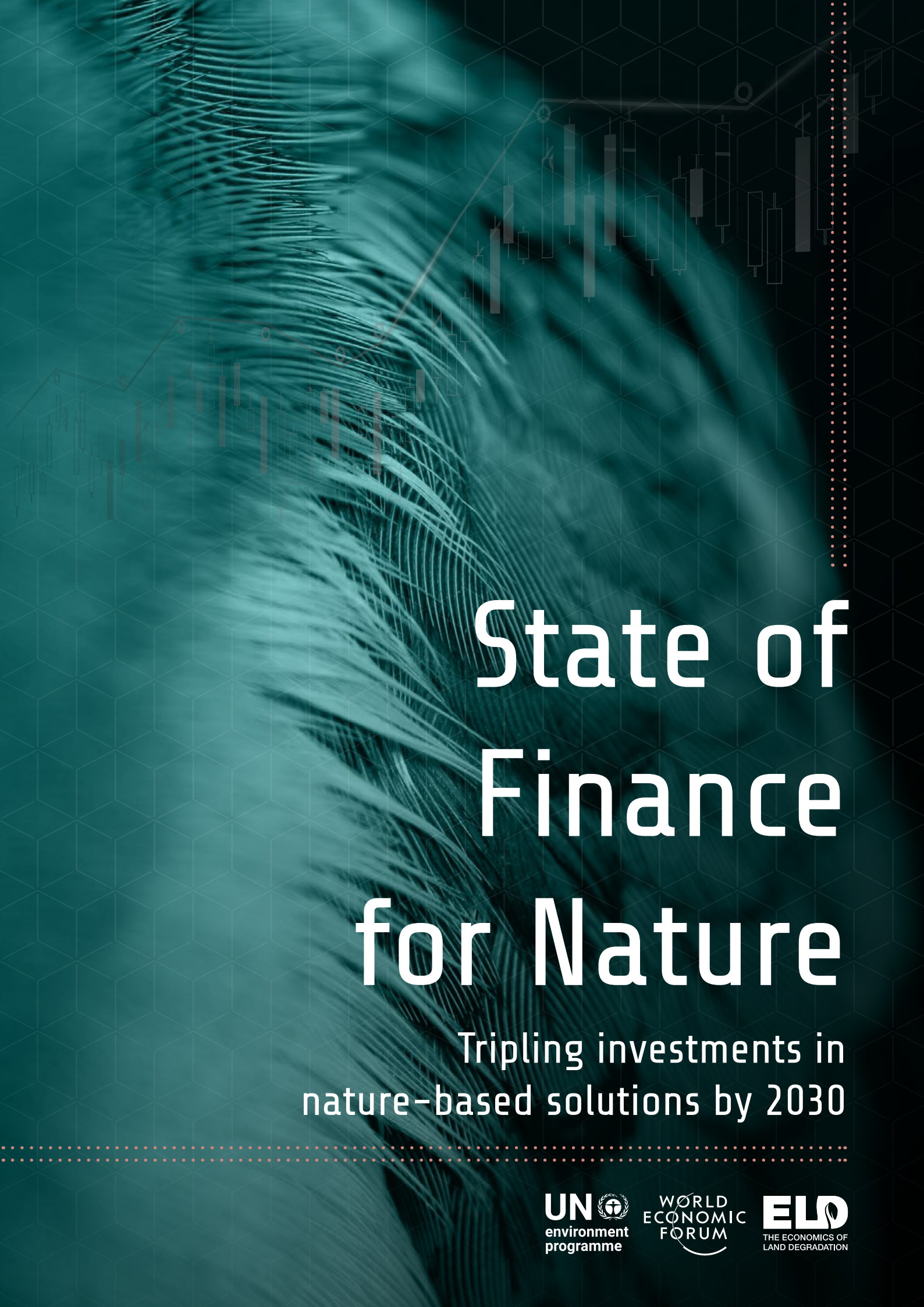

State of Finance for Nature

Tripling investments in nature-based solutions by 2030

UN environment programme
WORLD ECONOMIC FORUM
ELD THE ECONOMICS OF LAND DEGRADATION

ISBN: 978-92-807-3865-0

Job number: DEP/2363/NA

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Suggested citation
United Nations Environment Programme (2021). State of Finance for Nature 2021. Nairobi.

UN environment programme

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The authors would like to thank the Technical Expert Group members and reviewers for their valuable contributions. The content and positions expressed are, however, those of the authors and do not necessarily reflect the perspectives of those who provided input, nor the organisations to which they are affiliated.

In Support of:

UNITED NATIONS DECADE ON ECOSYSTEM RESTORATION 2021-2030

Co-funded by:

Federal Ministry for Economic Cooperation and Development

THE GOVERNMENT OF THE GRAND DUCHY OF LUXEMBOURG
Ministry of the Environment, Climate and Sustainable Development

Foreword

Inger Andersen, Executive Director, UN Environment Programme
Klaus Schwab, Founder and Executive Chairman, World Economic Forum

No one can be in any doubt that we are in a planetary emergency. The interrelated crises of biodiversity loss, land degradation and climate change — driven by unsustainable production and consumption — require urgent and immediate global action.

The new "State of Finance for Nature" report assesses how much public and private investment is being directed towards nature-based solutions and provides insights into the extent to which governments, businesses and financiers are "walking-the-talk". By comparing existing capital flows to recognized investment needs, the report quantifies how serious governments, businesses and financiers really are about tackling the biodiversity, land degradation and climate crises. The findings are clear: we are not investing nearly enough in nature. Indeed, investments in nature-based solutions will have to triple by 2030 and increase four-fold by 2050 if we are to have a shot at solving the planetary emergency.

First, we call upon governments to seize the opportunity presented by the COVID-19 pandemic to 'build back better' and avoid the trap of 'building back-as-usual'. A recent joint study by UNEP and the University of Oxford "Are we building back better?" revealed that out of USD 14.6 trillion the world's 50 largest economies announced in fiscal spending in the wake of COVID-19, just USD 368 billion (2.5 per cent) were directed towards green initiatives. The lessons are not being learned. As governments plan their COVID recovery policies stimulus plans, we urge world leaders to ensure that public funding helps meet objectives under the Paris Climate Agreement and serves to halt and reverse the loss of biodiversity.

Second, now is the time to galvanize political and business momentum to restore our Earth. The upcoming summits on climate, biodiversity, land degradation and food systems provide an opportunity for governments to enhance climate targets through Nationally Determined Contributions, but also commit to an ambitious and transformational post-2020 global biodiversity framework. The latter will be discussed at the 15th Conference of the Parties of the United Nations Convention on Biological Diversity in Kunming, China. The United Nations Decade on Ecosystem Restoration, that runs from 2021 to 2030, is bringing additional impetus and attention to the need to repair the more than 2 billion hectares of degraded land around the world.

Third, this report shows that private finance directed to nature-based solutions must be scaled up significantly. Governments must create the enabling environment that allows this to happen, for example by revisiting agricultural policies, trade tariffs and developing taxonomies to determine what is sustainable and what is not. But companies and financial institutions must also be part of the solution, by sharing the risk and committing to increase finance and investment in nature-based solutions in an ambitious way, with clear time-bound targets.

We have entered a critical decade in which it is still possible to avoid runaway climate change and ecological breakdown, but only if commitments are met with action. This inaugural "State of Finance for Nature" report is the start of an annual process of tracking trends in public and private investment in nature-based solutions. As such, it provides a measure of how commitments are being translated into action and an accounting for those who fall short.

Executive Summary

Nature loss is at the heart of many societal challenges, while nature-based solutions hold the potential to address interlinked crises: The pace of species extinction, global warming, the growing number of extreme weather events and zoonotic diseases like Covid-19, have further reinforced the need to invest in sustainable action that enhances the resilience of ecosystems and addresses societal challenges, such as food security, climate change, water security, human health and enhanced resilience to disaster risk.

Our livelihoods depend on nature. Our collective failure to date to understand that nature underpins our global economic system, will increasingly lead to financial losses. More than half of the world's total GDP is moderately or highly dependent on nature. Agriculture, food and beverages and construction are the largest sectors that are dependent on nature and these generate USD 8 trillion in gross value added.

The integrity of the Earth's ecosystems has been significantly compromised as a result of human activity and the paradigm that has prioritised short-term economic growth. In order to ensure that humanity does not breach the safety limits of the planetary boundaries, we need a fundamental shift in mindset, transforming our relationship with nature. Currently, the majority of the essential benefits of nature have no financial market value, despite underpinning our current and future prosperity. From government policies related to procurement, taxation, trade and regulation, to the way businesses and financial institutions make decisions on investment, risk and disclosure, it is vital that we hardwire into our economic system the value of nature in a profound way.

Knowledge on capital expended and needed for NbS remains limited. Despite the growing interest from governments, businesses and financial institutions, there is typically poor knowledge and understanding as to how much capital is already directed to assets and activities that can be considered nature-based solutions (NbS), how much capital ought to be directed to NbS and what are the clear investment opportunities. This report aims to address these critical knowledge gaps. It analyses current global investment in NbS and estimates future investment needs to meet biodiversity, climate change and land restoration ambitions, as set out in the three Rio Conventions.

The report offers recommendations and lays out opportunities to increase investment in nature-based solutions.

The report finds that approximately USD 133 billion/year currently flows into NbS (using 2020 as base year), with public funds making up 86 per cent and private finance 14 per cent. Of the public funds, which total USD 115 billion/year, over a third is invested by national governments into protection of biodiversity and landscapes. Nearly two-thirds is spent on forest restoration, peatland restoration, regenerative agriculture, water conservation and natural pollution control systems. Private sector finance of NbS amounts to USD 18 billion/year. This spans biodiversity offsets, sustainable supply chains, private equity impact investment and smaller amounts from philanthropic and private foundations. The total volume of finance flowing into nature is considerably smaller than the flow of climate finance.

Looking to the future, investment in NbS ought to at least triple in real terms by 2030 and increase four-fold by 2050 if the world is to meet its climate change, biodiversity and land degradation targets. This acceleration would equate to cumulative total investment of up to USD 8.1 trillion, and a future annual investment rate of USD 536 billion. Forest-based solutions alone would amount to USD 203 billion/year, followed by silvopasture with USD 193 billion/year, peatland restoration USD 7 billion/year, and mangrove restoration USD 0.5 billion/year. This report does not cover all types of NbS, notably those in the marine environment were excluded. These will be included in future editions.

The compilation of data on capital investment in nature across all sectors and for all major economies has proven challenging and the estimates are highly uncertain. This report calls for agreement on a system for labelling, tracking, reporting and verifying the state of finance for NbS. This would improve data comparability and quality, as an input to future decision-making.

The public sector plays a fundamental role in creating opportunities and demand for investment in NbS. First, the public sector brings forward policies and regulations that create a strong and stable revenue stream for NbS activities and assets. Governments and public international organisations can also contribute an enabling environment for project development and for scaling up. The opportunity for NbS to become a formal cross-cutting modality of investment is clear, benefiting from a formalized strategic plan and associated resource allocation.

NbS poses an opportunity for private sector investment in pursuit of sources of revenue, to reap the benefits of increased resilience, to reduce costs and to enhance reputation and purpose. As businesses become more sophisticated in their understanding of NbS opportunities, there will be a role for financial de-risking products such as guarantees and insurance, to create attractive risk-return profiles for large, mainstream investors.

The case studies presented in the report illustrate the business case and the potential for tackling climate change and environmental degradation though NbS. Examples range from the Scottish Government's commitment to spend £250 million on peatland restoration over the next ten years, to the Green Climate Fund in Laos, which supported the implementing agency in the restoration of an urban wetland that was fundamental for ecosystem service provision, such as water flow regulation and flood risk reduction.

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1 Why This Report?

1.1 Background

Three-quarters of the land and two-thirds of the marine environment have been significantly altered by human actions. Since the beginning of civilisation, the world has lost half of its forests,[1] half of coral reefs,[2] 70 per cent of wetlands[3] and dammed two-thirds of the world's main rivers.[4] Wildlife populations have, on average, declined by 60 per cent since 1970 and there is the potential for our actions to cause the loss of 1 million species according to the most recent findings of the Intergovernmental Panel on Biodiversity and Ecosystem Services.[5]

12 million ha of land is becoming degraded due to its unsustainable use every year, in addition to the two billion ha of already degraded land.[6] Much of this land contains irrecoverable carbon, such as that found in peatlands, mangroves and old growth forest ecosystems.[7] Furthermore, approximately 1.3 billion people are trapped on degrading agricultural land. Farmers on marginal land, especially in the drylands, have limited options for alternative livelihoods, and are often excluded from wider infrastructure and economic development.

The ongoing loss of nature has become a systemic risk for the global economy; the New Nature Economy report found over half the world's GDP depends on nature. Yet, investing in nature offers the opportunity to generate United States Dollar (USD) 10 trillion in business value and create 395 million jobs. The Dutch Central Bank recently released a report "Indebted by nature",[8] quantifying the financial system's dependence on nature. The report found that out of Euro (EUR) 1,400 billion analysed, EUR 510 billion were lent to or invested in sectors with high dependency on ecosystems, 36 per cent of the total assets of Dutch financial institutions. It concluded that financial institutions are exposed to reputational and transition risks when financing companies that have major negative impacts on biodiversity.

***Nature-based Solutions* (NbS) support a transformational shift of the economy, by relying on nature to address societal challenges.** These societal challenges range from disaster risk reduction, climate change and biodiversity loss, to food and water security as well as human health. NbS can be cheaper solutions than standard (non-natural) solutions over the longer term, owing to the potential for responding to damages and the ensuing avoided costs.[9]

Among the structural barriers and systemic rigidities that hamper this transition, finance is fundamental.[10] Mainstream financial products and underlying assets accelerate natural resource depletion and magnify environmental degradation.[11]

NbS can provide up to 37 per cent of global cost-effective solutions[12] to reduce the emission gap of 32 Gigatons[13] to meet the targets under the Paris Climate Agreement. NbS also have a vital role to play in helping countries adapt to climatic change, being "cheaper, longer lasting and yielding more co-benefits than technology-based solutions".[14] In addition to the Paris Agreement, investment in nature can help meet the future targets in the post 2020 biodiversity framework of the Convention on Biological Diversity (CBD) and the UN Convention to Combat Desertification (UNCCD) Land Degradation Neutrality Targets as well as the Bonn Challenge of restoring 150 million ha of degraded and deforested landscapes by 2020 and 350 million ha by 2030 (Bonn Challenge).

[1] Crowther et al., 2015
[2] Bloomberg, 2019
[3] IUCN, 2019
[4] Grill et al., 2019
[5] IPBES, 2019
[6] WRI, 2017 and Delgado et al., 2015
[7] Goldstein et al., 2020
[8] DNB, 2020
[9] De Mel and Weerathunge 2011
[10] Ghisetti et al. 2015, Quatrini 2020
[11] Clarke and Boersma 2016
[12] Griscom et al., 2017
[13] UNEP, 2019
[14] Global Commission on Adaptation, 2019

There is growing momentum among governments, civil society and businesses. 66 per cent of governments have committed to restoring or protecting ecosystems in their climate targets, known as Nationally Determined Contributions (NDCs). One hundred and four governments included natural ecosystems in their adaptation plans and 27 governments described NbS in their mitigation targets.[15]

However, there are data gaps to determining the flow of public and private capital to productive and non-productive activities that constitute NbS. Existing estimates are either broad, using terms such as "sustainable finance" and "green finance",[16] or only capture a small slice of the overall NbS finance market such as "conservation finance", "biodiversity finance", and "forest finance".[17]

When tracking investments into NbS, it is critical to recognize gender dimensions, including women's contribution to the preservation and growth of natural capital and the economic opportunities available to them in this area. To enhance these linkages, national statistics should be moving towards gender-disaggregated data at sector level, such as forestry and agriculture. Future reports will seek to utilise a gender lens and the promotion of accessibility to gender-responsive sustainable digital finance.

[15] NDC Partnership, 2020
[16] Global Sustainable Investment Alliance, 2019
[17] Credit Suisse, WWF and McKinsey, 2014; NatureVest, 2014; Ecosystem Marketplace, 2016

1.2 Definition of NBS

This report uses the global standard developed by the International Union for the Conservation of Nature (IUCN) for nature-based solutions. NbS[18] are defined as "Actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits". The goal of nature-based solutions is "to support the achievement of society's development goals and safeguard human well-being in ways that reflect cultural and societal values and enhance the resilience of ecosystems, their capacity for renewal and the provision of services; nature-based solutions are designed to address major societal challenges, such as food security, climate change, water security, human health, disaster risk, social and economic development".

The following preliminary principles are to be considered with the NbS definition:

i. NbS embrace nature conservation norms (and principles);

ii. NbS can be implemented alone or in an integrated manner with other solutions to societal challenges (such as technological and engineering solutions);

iii. NbS are determined by site-specific natural and cultural contexts that include traditional, local and scientific knowledge;

iv. NbS produce societal benefits in a fair and equitable way in a manner that promotes transparency and broad participation;

v. NbS maintain biological and cultural diversity and the ability of ecosystems to evolve over time;

vi. NbS are applied at a landscape scale;

vii. NbS recognize and address the trade-offs between the production of a few immediate economic benefits for development and future options for the production of the full range of ecosystem services; and

viii. NbS are an integral part of the overall design of policies, and measures or actions, to address a specific challenge.

NbS emphasize solutions. Such solutions address the multifaceted environmental crises and broader societal challenges affecting humanity today, including climate change, biodiversity loss, land degradation, human health, migration, natural hazards and human-induced disaster, food and water security and biochemical imbalances.

[18] IUCN Global Standard for NbS: https://www.iucn.org/sites/dev/files/content/documents/wcc_2016_res_069_en.pdf.

Box 1. Societal challenges and solutions offered by NbS

According to the definition of NbS by IUCN, societal challenges could include:

- Environmental issues (e.g. climate change, biodiversity loss, desertification, disasters);
- Ecosystem functionality issues (e.g. ecosystem dynamics, non-linear effects, tipping points);
- Socio-economic issues (e.g. population increase, resource limitations, distribution);
- Financial issues (e.g. cost-effectiveness/efficiency, risk management, financial returns);
- Developmental issues (e.g. access to resources/technology, food/water security, poverty);
- Sustainability issues (e.g. resilience, adaptation, long-term resistance, impact); and
- Health issues (e.g. access to health care, pandemics).

(A subset of these challenges was addressed or modelled in this report.)

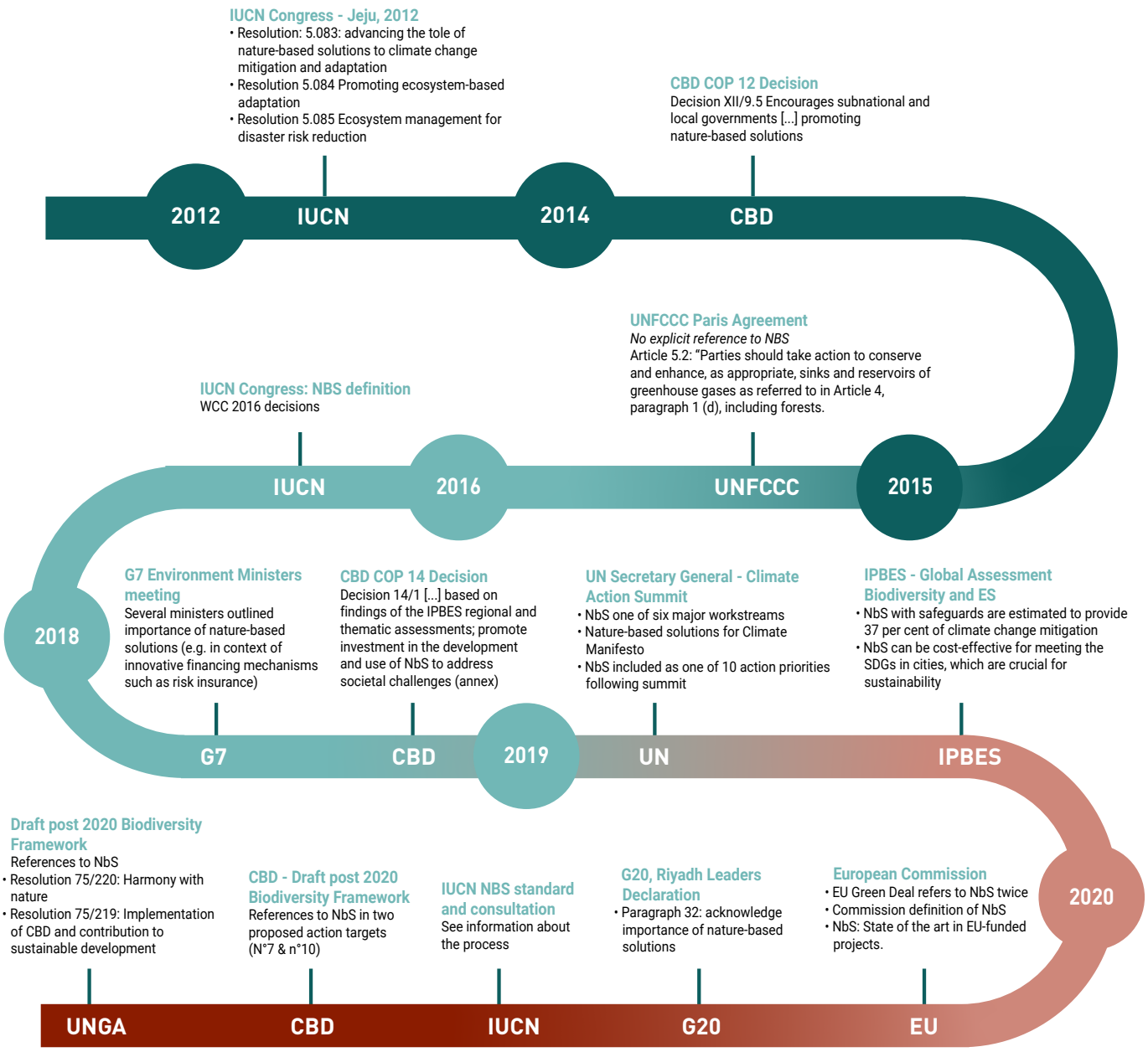
Although not legally binding, the Agenda 2030 adopted by the UN General Assembly (UN, 2015) provides an international reference framework for sustainable development that covers many societal challenges. The adopted definition of NbS is well in line with the holistic character of the Agenda 2030. Therefore, NbS provide great potential for intersectoral and interinstitutional cooperation to achieve multiple Sustainable Development Goals.

Source: Report authors.

1.3 How the term NBS has developed

The NbS concept reflects work undertaken by many international organisations, governments and others. It has been adopted in several resolutions by IUCN Congresses, referenced in international commitments such as the Convention on Biological Diversity and by the G7, the G20, the United Nations (UN) General Assembly, and in international dialogues. Box 2 sets out its adoption by international bodies over time.

Box 2. NbS adoption by international bodies over time



Source: Report authors.

1.4 NbS from an investment perspective

In this report, NbS investment is defined as a financial flow that contributes positively to financing nature-related activities or assets. While a financial flow can be broadly defined as a transfer of capital from any provider to any recipient (e.g. Combes et al. 2019), for the purpose of this report, relevant financial flows are those that contribute capital to nature-related activities that address, directly or indirectly, one or more societal challenges as defined in Section 1.2. A clearer nomenclature in this area could help in the creation of financial asset classes. Over the past decade, renewable energy assets have become understood by mainstream investors, and have become an established asset class. This is not the case for natural assets.

1.4.1 Classification of public and private capital

This report gathers data on public and private financial flows and defines *public* financial services providers as the following entities (Climate Focus, 2015; USAID, 2015; CPI, 2019):

- **Governments**, with examples including domestic financing through public expenditure using the Classification of the Functions of Government (COFOG), international development aid financing (e.g. official development assistance - ODA) and official sector transactions that do not meet ODA criteria (e.g. other official flows - OOF).
- **Development finance institutions (DFIs)**, subdivided into:
  - National DFIs: a single country owns the institution and finance is directed domestically;
  - Bilateral DFIs: a single country owns the institution, and it directs finance flows internationally;
  - Multilateral DFIs: the institution has multiple shareholder countries and directs finance flows internationally.
- **Environmental/climate funds,** which can be further categorized into:
  - National environmental/climate funds;
  - Bilateral/multilateral environmental/climate funds.

In the scope of this report, *private* financial services providers include:

- **Commercial financial institutions**: providers of private debt capital and insurance, including commercial and investment banks;
- **Investors**: including insurance companies, asset management firms, pension funds active in capital markets, venture capital and infrastructure funds;
- **Corporations**: for-profit legal entities;
- **Philanthropies**: including foundations and endowments.

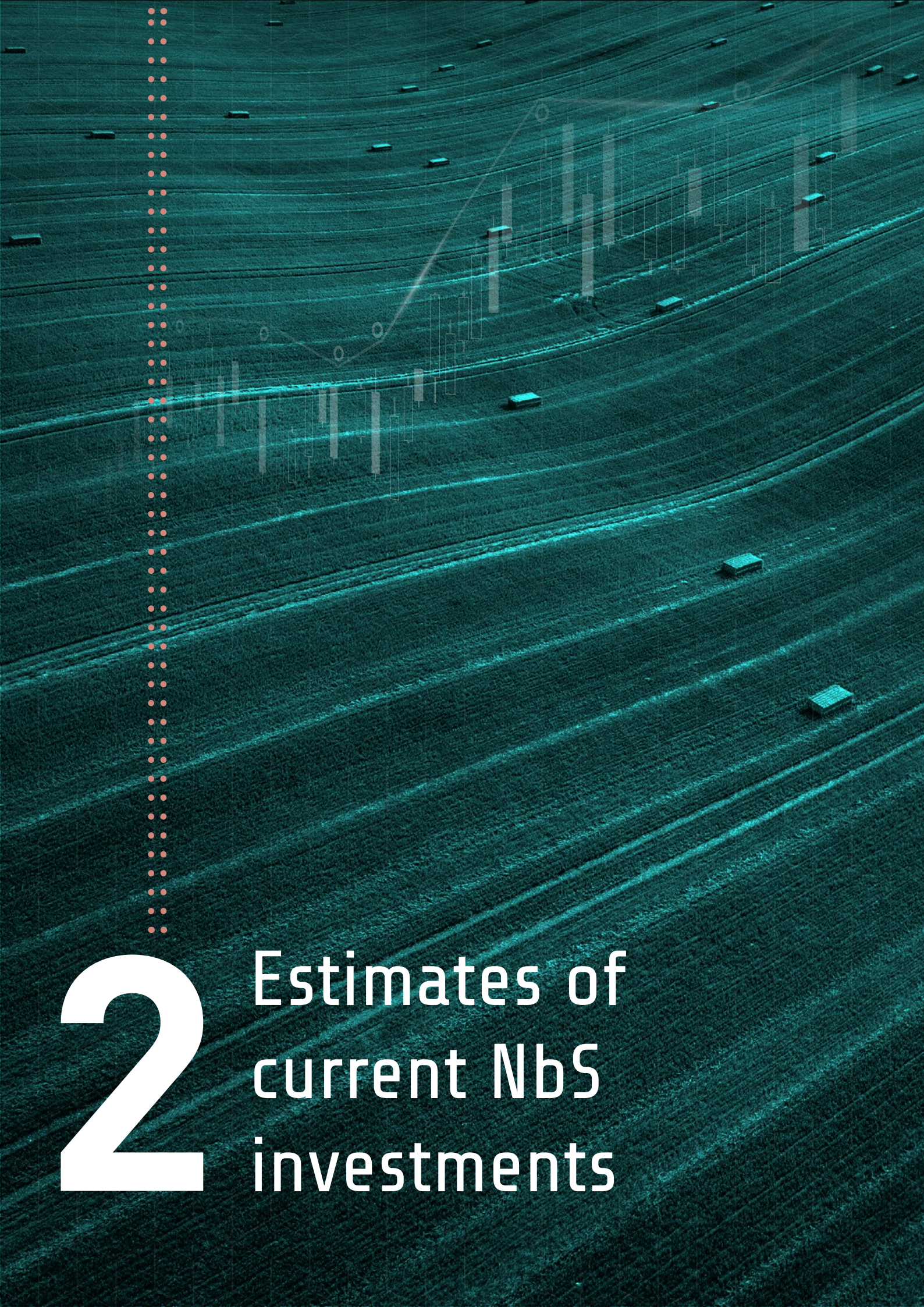
A wide range of financial instruments can be used by public and private financial services organizations to channel capital to activities, actions or assets. This includes capital supply instruments (equity, loans, bonds and grants); risk mitigation instruments that transfer risk (insurance, guarantees and off-take agreements); and fiscal, revenue instruments (subsidies).

1.5 This Report

The main purpose of the report is to provide up-to-date information about public and private sector finance that is channelled to activities and assets that can be considered NbS and to present estimates of the future needs. This Report complements the vast array of existing literature and processes that monitor specific flows of environment or development finance, such as those established under the three Rio Conventions (CBD, UNCCD, UNFCCC), under the Organization for Economic Co-operation and Development (OECD), as well as other multi-partner platforms (e.g. Climate Policy Initiative, Aid Data, IATI) or private sector initiatives (e.g. Bloomberg, Thomson Reuters).

This report estimates existing public and private investment directed to NbS and estimates the size of the gap relative to the investment rate needed in coming decades. Section 2 estimates current NbS investment. Section 3 estimates future investment needs to meet societal objectives and shows the gap. Section 4 lays out evidence and hypotheses that explain current levels of underinvestment and identifies opportunities to scale up NbS. Section 5 concludes, sets out recommendations and proposes a way forward. Throughout the report, there are a number of case studies that have been collected from the literature and through a call for projects that the project team put out. Case studies showcase opportunities for both the public and private sectors.

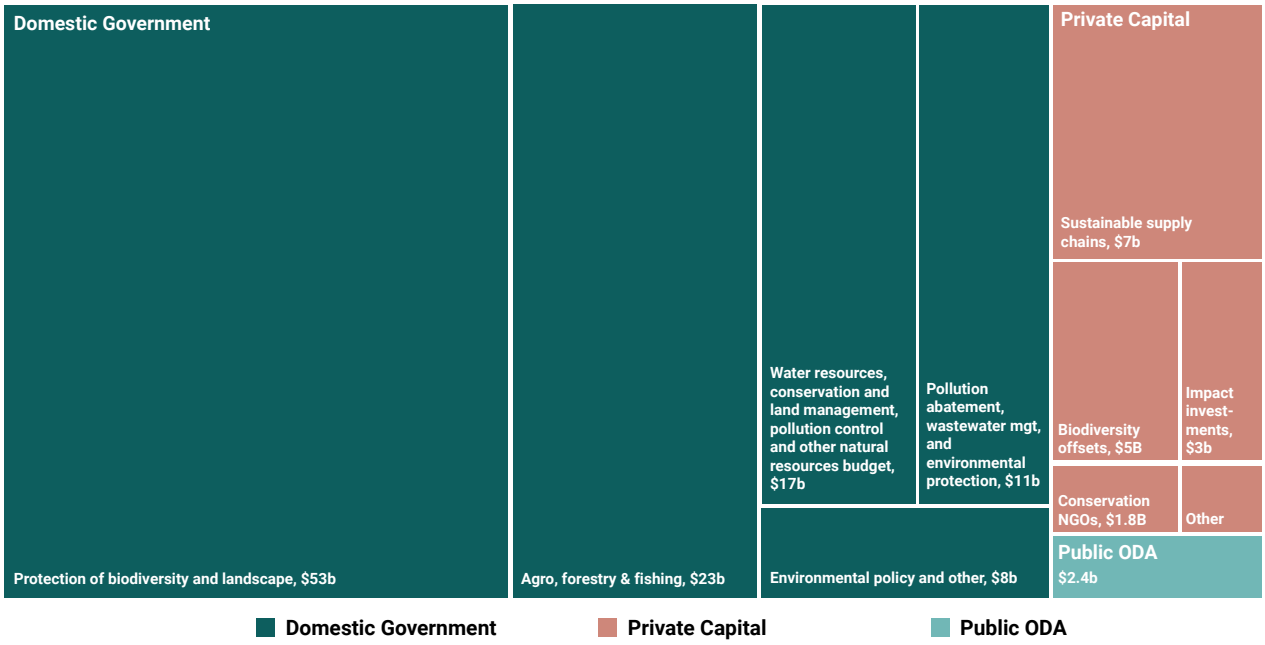
The participating organizations foresee this report becoming an annual publication. Producing the report annually will show trends in public and private investment related to NbS and it will help decision-makers assess how on track the world is to meet international commitments related to biodiversity, climate change and land degradation.



2 Estimates of current NbS investments

The world is currently investing around USD 133 billion annually in NbS (see Figure 1). The largest proportion of NbS investment, USD 113 billion, is carried out by domestic government bodies to protect biodiversity and landscapes, mixed with activities such as sustainable forestry. The private sector contributes around an additional USD 18 billion per year, mostly through investments in sustainable supply chains and environmental offsets. Public Overseas Development Assistance (ODA) and other types of investment amount to approximately USD 2 billion annually, a large proportion of which is climate finance. These estimates fall within the USD 124 - 143 billion range estimated by recent literature for similar concepts such as biodiversity spending and investment in nature.[19]

Figure 1. Classification of NbS finance



Note: These figures are the midpoint between the lower and upper bounds of annual investment.
Source: Vivid Economics, adapted from OECD, IMF and other public data sources listed in the Annex.

The estimates are uncertain because capital flows into NbS are not tracked or reported consistently. The methodology, described in the Annex, employs data sets on public and private expenditure relevant to NbS. However, none of the existing data sets[20] label NbS transactions explicitly. Moreover, only a small subset covers the universe of relevant transactions that are internationally comparable. Hence, the methodology relies upon assumptions to separate out the NbS component of capital expenditure. The quality of the data varies widely across sectors and geographies, so the uncertainty of estimates varies to reflect this.

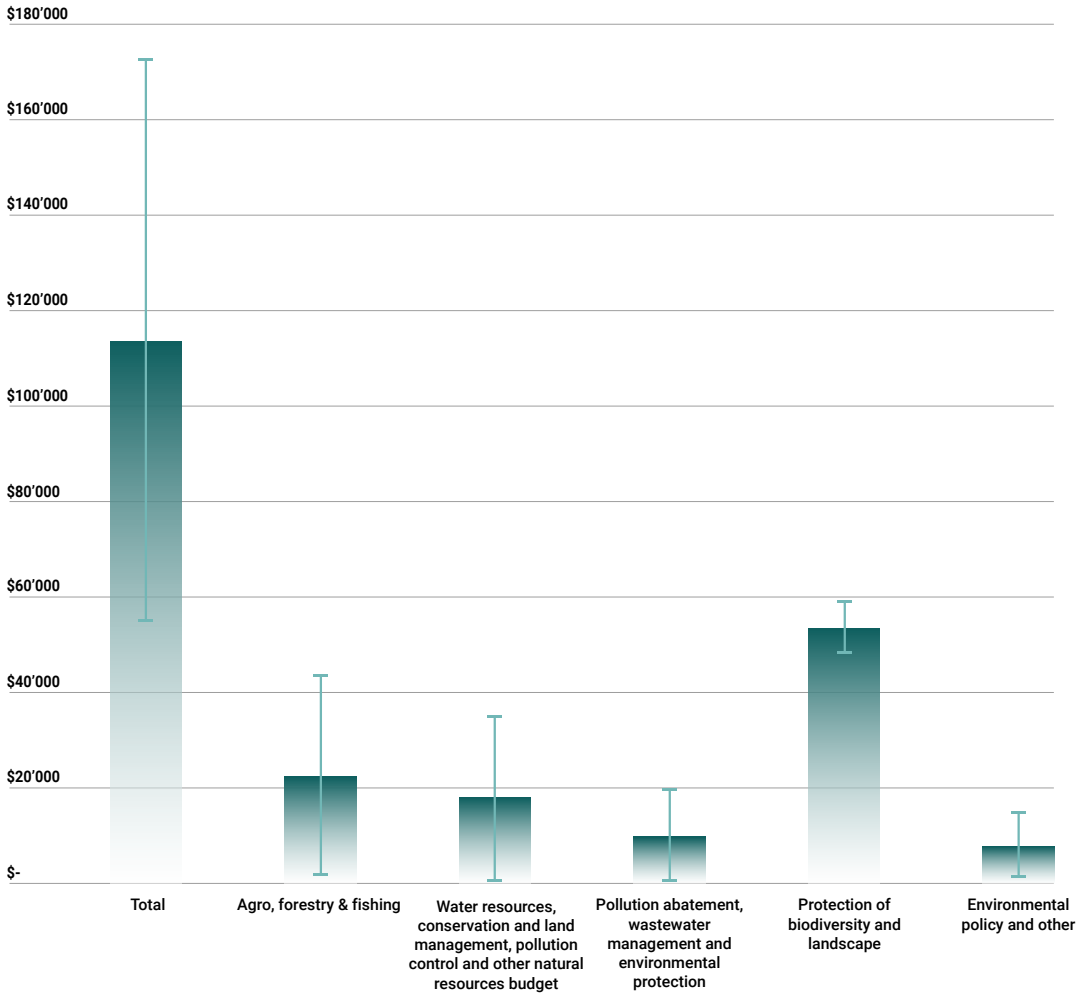
[19] Paulson Institute, TNC, Cornell, McKinsey, OECD and others.

[20] Public sectors: COFOG and CRS from the OECD and IMF. Private sector: voluntary carbon markets1 and REDD+; sustainable supply chains; sonservation NGOs; philanthropy; private equity investments; PES and water trading services; private finance mobilized by GEF, GCF, OECD DAC.

2.1 Public investment: domestic and international

Public-sector financing accounts for 86 per cent of the approximately USD 133 billion invested annually in NbS. Figure 2 shows how public-sector investment is allocated across activities, with most being devoted to biodiversity and landscape protection.

Figure 2. Public-sector finance of NbS in 2019, by category, with upper and lower bounds

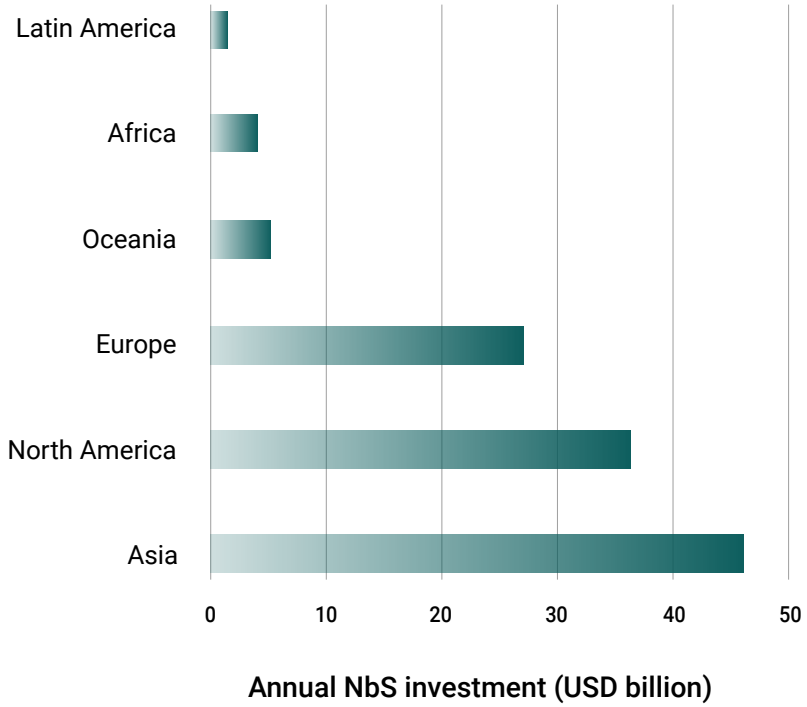


Note: The dark blue bars indicate the midpoint estimate and the light blue vertical lines the uncertainty range.
Source: Vivid Economics.

The main findings are:

- USD 53 million invested in biodiversity and landscape protection, rehabilitation and restoration (including biosphere protection, forest landscape restoration, habitat restoration and green corridors). The uncertainty around this estimate is low because most activities in the sector are closely related to NbS.
- USD 23 billion invested in agriculture (such as regenerative and shade agriculture, and sustainable agriculture supply chains), forestry (including forest conservation, natural carbon storage) and fishing (sustainable fisheries and aquaculture).[21,22] The uncertainty around this estimate is high because most of the NbS-related investments are a small subset of the sector's total investment.
- USD 17 billion for NbS-relevant activities within subsectors that include water and water resources, conservation and land management, pollution control and other activities in natural resources budgets.
- USD 11 billion for pollution abatement (such as natural carbon sinks for air quality), wastewater management (for example, integrated water resources management and algal technologies), and improved enforcement.
- USD 8 billion allocated for activities in support of environmental policies.
- A smaller amount of NbS finance included in the dataset comes from public-sector ODA, totalling USD 2.4 billion.

Figure 3. Regional breakdown of investment needs



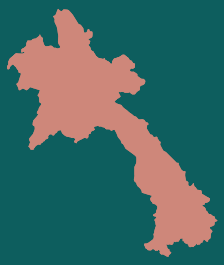
Note: Data coverage and quality is uneven, so international comparisons are likely biased.
Source: Vivid Economics.

[21] This figure corresponds to 2019 data for the most part, with 2018 data in some categories.
[22] FAO (2021), Nature-based Solutions in Agriculture.

The United States and China dominate public sector spending, followed by Japan, Germany and Australia. The United States tops the list with approximately USD 36 billion per year in NbS spending, and is closely followed by China with USD 31 billion (see Figure 3). Further behind are Japan with USD 9 billion, while Germany and Australia spend approximately USD 5 billion. Countries like Brazil, India and Saudi Arabia are likely spending large sums but do not report internationally comparable data.

Case 1. Example of public NbS investments

Building resilience of urban populations with ecosystem-based solutions in Lao PDR



The project, co-funded by the Green Climate Fund, is deploying NbS in four cities in Laos in order to build resilience against flooding caused by climate change. Over five years, it will help restore urban wetland and stream ecosystems to regulate water flow and reduce flood risk. The investments will shift the focus of urban flood management from hard infrastructure towards the integration of NbS and is expected to benefit 10 per cent of the country's population.

The project recognizes that NbS offer cost-effective ways of managing flood risk, as stated by Sara Sekkenes, the UN Resident Coordinator for Lao PDR. "The project works to help strengthen the evidence base around these solutions, so that successful solutions may be promoted and adopted more widely." Damages from floods in 2018 were equivalent to 10 per cent of Laos' entire budget for the year. The project's NbS focus can help avoid those economic damages by controlling water flow and preventing floods and landslides in a cost-effective manner, with various co-benefits for the city's residents, including green spaces, decreased temperatures and tourism opportunities.

The case of Scotland's peatlands

In 2021, the Scottish government announced a package of funding to accelerate Scotland's transition to a net-zero economy. The basket of funds is part of the Scottish Government's commitment to NbS to the climate crisis and includes £1.8 billion of investment in low-carbon infrastructure in which it provides £20 million for peatland restoration and a commitment to invest £250 million over the next 10 years. This commitment has been described as "an absolute game changer for CO_2 emissions reductions, biodiversity and the rural economy" by Roseanna Cunningham, Cabinet Secretary for Environment, Climate Change and Land Reform. Considering up to 25 per cent of the land cover in Scotland is peatlands, this announcement and the restoration action to come will likely place Scotland in a position as a "peatlands restoration champion".

Source: GCF and Scotland's Nature Agency.

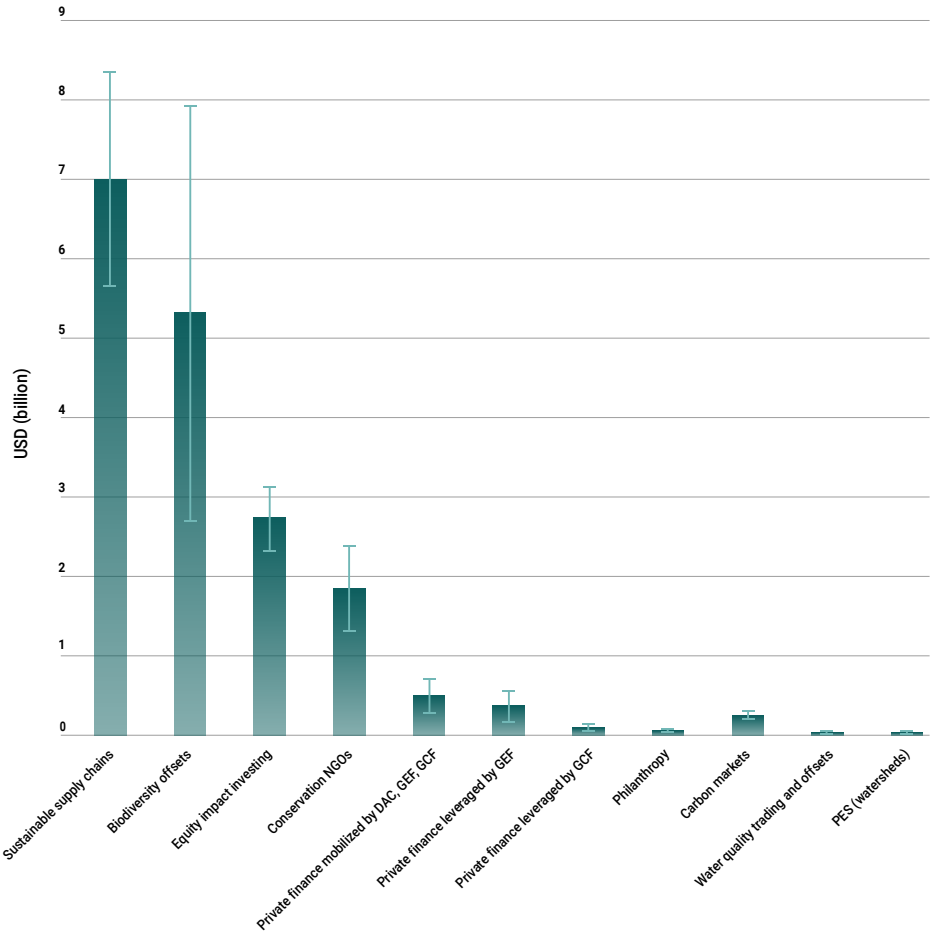
2.2 Private investment: domestic and international

Private-sector finance of NbS represents 14 per cent of total NbS financing, equal to USD 18 billion annually.

Although the literature often focuses on voluntary carbon markets and sustainable supply chains, private-sector finance for NbS includes a wide range of investment categories:

- *Sustainable supply chain* (USD 7 billion/yr), which includes sustainable forest products,[23] sustainable agricultural products,[24] sustainable fisheries and seafood products[25] and sustainable palm oil.[26]
- *Biodiversity offsets*[27] (up to USD 5 billion/yr), are conservation measures to achieve no net loss or a net gain in biodiversity at the project level, such as in construction or in urban development.[28] The data set here covers biodiversity offset programmes in 33 countries.
- *Private equity impact investments* (USD 3 billion/yr), include both private investments in conservation[29] and private equity targeting sustainability.[30] These investments cover investments in conservation and biodiversity through a variety of thematic private equity funds, incubators, venture capital firms and exchange-traded funds (ETFs). It reflects growing interest from private investors.
- *Conservation NGOs* (USD 2 billion/yr),[31] actively engaged in activities related to NbS.
- *Philanthropy*[32] (up to USD 308 million/yr),[33] includes family foundations and corporate foundations. Investment figures include 14 out of 26 philanthropic foundations that reported to the OECD, which were tagged as relevant to biodiversity. Activities reported by the other foundations did not include a biodiversity component and were therefore not included. Furthermore, there may be omitted contributions from high-net worth individuals and private sector co-financing from farmers, service users or co-developers in a given transaction.[34]
- *Voluntary carbon markets*[35] and REDD+ (USD 221 million/yr).[36] These support decarbonization through natural carbon solutions, contributing to climate mitigation.[37]
- *Private finance* channelled through multilateral development banks and bilateral cooperation (up to USD 542 million/yr), reported as private finance mobilized by Development Assistance Committee (DAC) countries' development finance institutions, development banks and other development agencies, and climate funds such as the Global Environment Facility and the Green Climate Fund.[38]
- *Payment for ecosystem services* (PES) *and water trading services*[39] (up to USD 51 million). Market-based solutions to manage natural resources. Land managers and owners receive payments to protect watersheds, conserve biodiversity or to preserve or restore natural carbon through replanting trees, maintaining forest cover or practicing sustainable agricultural techniques. The water trading services category covers mechanisms by which water utilities can purchase services which enhance either water quality or availability.

Figure 4. Private-sector financing for NbS 2019 by category (with upper and lower bounds)



Note: The dark blue bars indicate the midpoint estimate and the light blue vertical lines indicate the range (minimum and maximum estimates).
Source: Vivid Economics.

[23] Breukink et al. (2015), Profitability and Sustainability in Responsible Forestry; Economic Impacts of FSC Certification on Forest Operators.

[24] UNDP-BIOFIN, Moving Mountains: Unlocking Private Capital for Biodiversity and Ecosystems.

[25] FAO 2018 Report; Behan de Jong, 2019.

[26] Market Study Report on Global Sustainability (2019); Breukink, et al., 2015; Profitability and Sustainability in Responsible Forestry; Economic impacts of FSC Certification on Forest Operators in the Palm Oil Market.

[27] Bennett, Gallant and Ten Kate (2017).

[28] https://www.iucn.org/resources/issues-briefs/biodiversity-offsets

[29] Data from State of Private Investment in Conservation (SOPIC), in Paulson Report (2020)

[30] GIIN Impact Investing 2020; Impact Assets portal focusing on natural resources and conservation; Paulson report (2020).

[31] From selected literature from the five largest nature conservation NGOs: Conservation International; Royal Society for the Protection of Birds; Nature Conservancy; Wildlife Conservation Society; WWF (2017 figures), in Paulson Report (2020). Note that revenues from the public sector and philanthropic foundations were subtracted from the lower limit estimate to avoid double counting.

[32] OECD Creditor Reporting System CRS data.

[33] CRS and COFOG OECD databases.

[34] Data from individuals are inconsistently reported and not included in this line total.

[35] With the lower limit (Hamrick and Gallant, 2017); upper limit (Donofrio et al., 2019; Forest Trends Market Report, 2020).

[36] Paulson Report, 2020.

[37] Assumption made that 100 per cent of voluntary carbon markets are private sector investments, whereas the assumption for REDD+ projects is 20 per cent private and 80 per cent public finance.

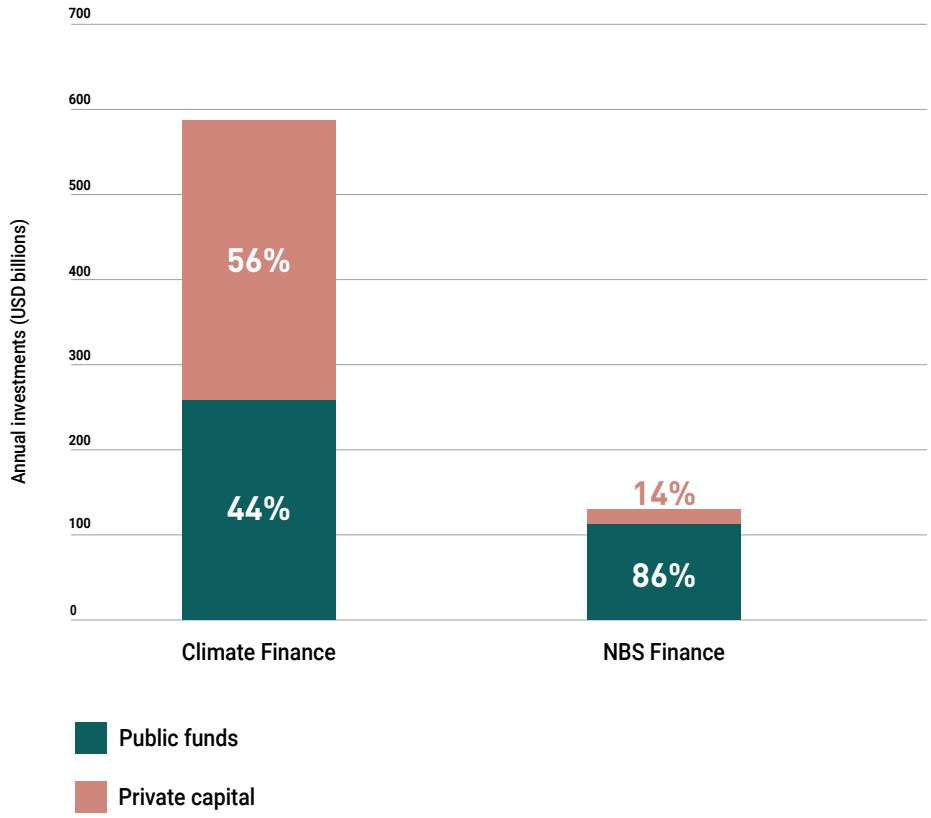
[38] Data from CRS, COFOG as well as through dedicated portfolio analysis by Vivid Economics.

[39] Bennett, Gallant and Ten Kate (2017).

The absence of a universally applied definition of NbS conceals some activities. These may instead be recorded as Environmental, Social and Governance (ESG) activities or through other voluntary standards to track conservation, biodiversity and other sustainability impacts. Some activities, such as carbon offsets, lend themselves more naturally to private-sector investments, tending to be measurable, verifiable, linked to certified climate projects and observed in financial transactions.

NbS finance is much smaller scale than climate finance and relies more heavily on public finance. NbS finance is substantially more dependent on public finance than climate finance in general. In climate finance, private sector investment accounts for most capital flows. A 2019 report by the Climate Policy Initiative (CPI)[40] stated that 56 per cent of the USD 579 billion invested annually (average over the two-year period of 2017-2018) in climate finance originated from the private sector. In comparison, private investment accounts for only 14 per cent of total NbS finance. The scaling up of private finance for NbS is one of the central challenges of the next few years.

Figure 5. Climate finance relative to finance for NbS



Source: Vivid Economics.

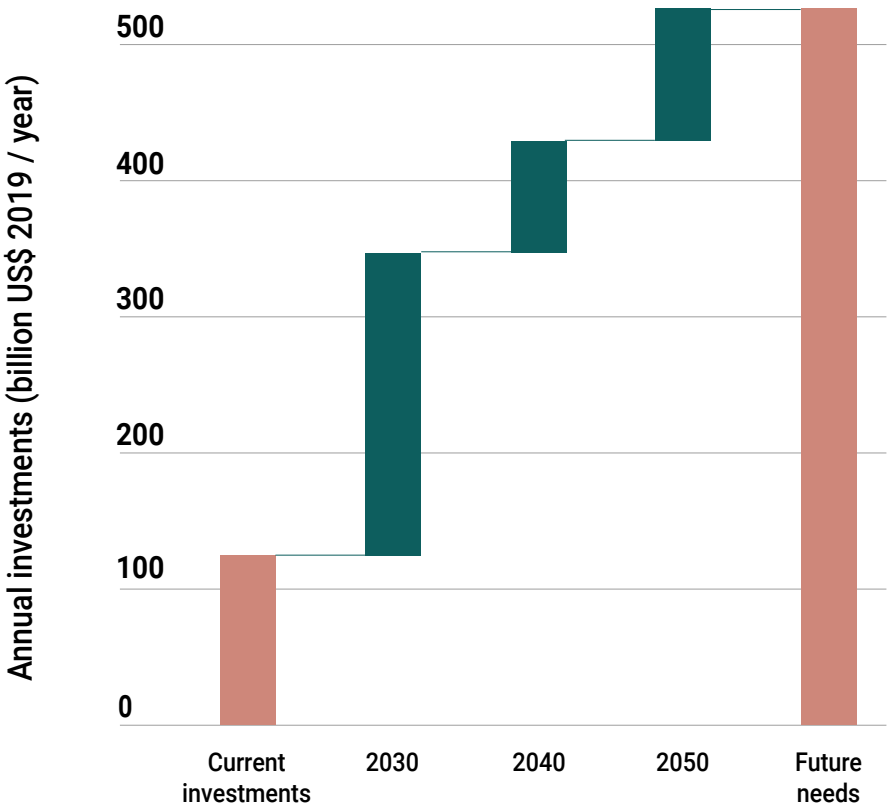
The granularity and quality of the data do not allow for a proper regional or country breakdown. This is a priority in future iterations of this work.

[40] Buchner et al., Climate Policy Initiative (2019). Global Landscape of Climate Finance 2019. https://www.climatepolicyinitiative.org/wp-content/uploads/2019/11/2019-Global-Landscape-of-Climate-Finance.pdf.

3 How much capital is needed to meet international commitments?

In order to meet future climate, biodiversity and land degradation targets, public and private actors will need to scale up their annual investments by at least four times over the next three decades (Figure 6). By 2050, total investment needs will amount to USD 8.4 trillion cumulatively, reaching over USD 536 billion per year, four times the amount invested today. These estimates are based on an immediate action scenario,[41] in which the global community is assumed to act now to halt climate change at 2 degrees; reverse loss and stabilize biodiversity intactness by 2050 at today's levels; and stop land degradation. Decisive action begins in 2020 in this scenario.

Figure 6. Future investment needs charting an accelerating rate over time



Note: These figures are taken from the Model of Agricultural Production and its Impacts on the Environment (MAgPIE v4.1), which was used to estimate investment need for forest-based NbS (which includes reforestation and afforestation cost estimates), and taken from separately estimated figures for silvopasture (planting trees on agricultural land), mangrove restoration and peatland conservation and restoration.
Source: Vivid Economics.

[41] Immediate Action Scenario: Developed by Vivid Economics for the United Kingdom(UK)'s Treasury Under the Dasgupta Review. It depicts a future in which the world acts immadiately to combat climate change and halt biodiversity depletion. See Annex for a full description of the assumptions.

Economic modelling was used to estimate the costs of switching from a business-as-usual trajectory to a trajectory that is aligned with climate change, biodiversity and land degradation targets. The methodology (see Annex for more detail) estimates the future NbS investment under climate and biodiversity targets (land degradation is considered implicitly), for four asset types: forests, mangroves, peatland and silvopasture. These four were chosen because they are expected to make the largest contribution to these objectives in the future.[42]

Table 1. Summary of future investment needs

Type of NbS	Total cumulative investment (2021-2050) USD billion	Additional annual investment in 2050 USD billion per year
Re/afforestation	4,684	203
Mangrove restoration	15	0.5
Peatland restoration	301	7
Silvopasture	3,130	193
Total investment needs	**8,130**	**403**

Note: The additional annual investment does not take into account the USD 130 billion per year that is currently being spent.
Source: Vivid Economics based on MAgPIE and other off model sources (detailed list of sources in Annex).

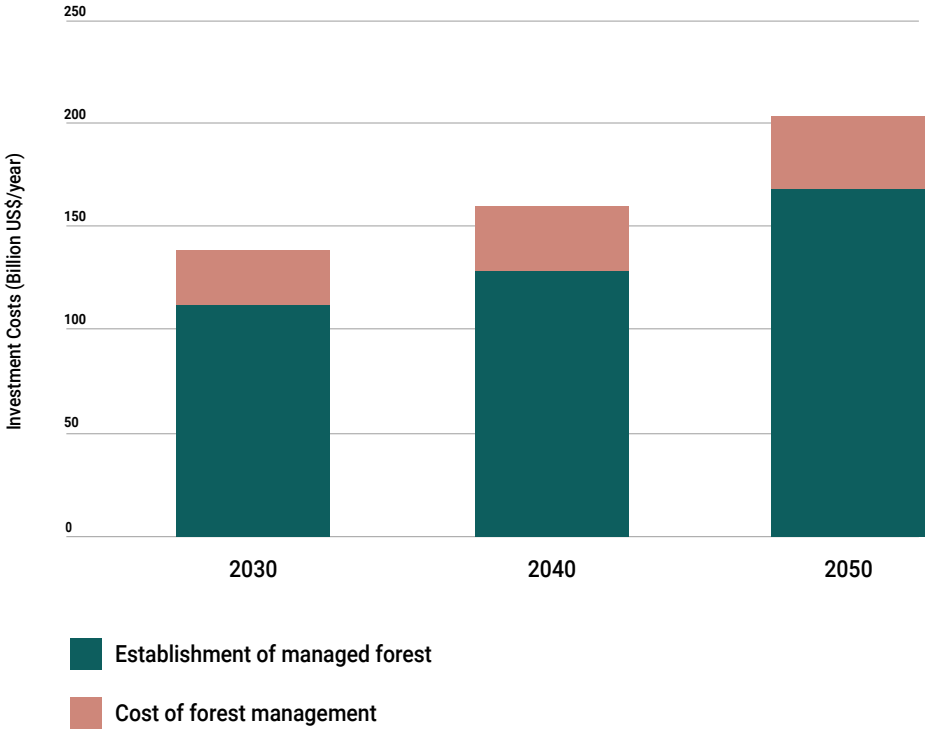
Half of the estimated financing needs are for the management, preservation and restoration of forest assets. As illustrated in Table 1, more than half the total investment need relates to forested lands. This does not mean that reforestation and afforestation are more effective mitigation actions, it just means that the land extensions where these activities could potentially take place is much larger compared to peatland and mangrove restoration. Peatlands, for example, hold more than 30 Gt of carbon globally, more than twice the amount of all of the world's forests combined (Crump, 2017). This carbon storage is often ancient, stored over millennia, and is considered irrecoverable carbon (Goldstein et al., 2020). Current estimates suggest that peatlands cover at least 3 per cent of the world's land surface and that 15 per cent of these peatlands have been drained (0.4 per cent of the global land area) (Joosten, 2015). Although more accurate emissions estimates are contingent on the findings of the upcoming Global Peatlands Assessment, this conversion of peatlands to other land uses contributes as much as 5-6 per cent of global anthropogenic Greenhouse Gas (GHG) emissions annually (IPCC, 2019) and this can rise to 10 per cent when they are on fire. Therefore, NbS activities need to be appropriate for its location/ecosystem to ensure long-term sustainability and impact.

The scenario used in this study shows that NbS assets could increase by approximately 300 Mha by 2050, relative to 2020, in order to reach the targets. Under the Immediate Action Scenario, annual investment needs increase substantially in the coming decades, see Figure 7. By 2050, NbS would require annual additional expenditure of USD 403 billion globally. This would lead to the following outcomes:

- A future that is compatible with the Representative Concentration Pathway 2.6 (RCP2.6) which is representative of the literature on mitigation scenarios aiming to limit the increase of global mean temperature to 2°C. In this scenario, carbon emissions from land use change fall and become net negative by 2035, falling further to minus 1.1 $GtCO_2$ per year by 2050.
- A future where biodiversity stabilizes at current levels by 2050, using the Biodiversity Intactness Index, though species extinctions continue at well above the background rate. It is important to highlight that if action is delayed, it becomes infeasible to stabilise biodiversity intactness globally even at today's depleted level.

[42] Griscom (2017), Natural Climate Solutions.

Figure 7. Investment in forest-based NbS under the immediate action scenario



Note: The scenario portrayed is the immediate action scenario.
Source: Vivid Economics.

The estimate of the future required investment is in line with the ranges proposed by recent literature: USD 500-970 billion per year. There are a number of reports that estimate future investment needs of biodiversity finance, investments in nature and other estimates that are comparable with NbS investment needs. Estimates range from USD 500 billion per year in the case of McKinsey,[43] based on estimates of NCS (excluding biodiversity) financial flow potential into forest countries, to USD 970 billion in the case of the Paulson Institute, Cornell University and The Nature Conservancy.[44]

[43] McKinsey 1°5C math (McKinsey, 2021).
[44] As cited previously.

4 Opportunities to scale up NbS investments

NbS solutions can address all three Rio Conventions' goals simultaneously, by providing applicable solutions to counter the adverse effects of climate change, environmental and land degradation, and biodiversity depletion. The CBD, UNFCCC and UNCCD have all considered NbS as an approach to meeting the goals of each convention, as outlined in Box 3.

Box 3. NbS in the Rio Conventions

Convention on Biological Diversity (CBD)

The update of the Zero Draft of the Post-2020 Global Biodiversity Framework was published in 2020. The Zero Draft recognizes NbS as a tool through which to increase contributions to climate change mitigation and adaptation and disaster risk reduction (Target 7) and its contribution to regulation of air quality, hazards, extreme events and quality and quantity of water (Target 10). Moreover the draft supports the development of better approaches to valuing nature in the public and private sector and the sustainable management of natural resources.

United Nations Framework Convention on Climate Change (UNFCCC)

The Standing Committee on Finance is focusing on financing for NbS as the theme of its next annual forum, due to take place later in 2021. During the forum, its members will discuss and explore what NbS means for climate change mitigation, adaptation and resilience, how NbS relates to climate finance, the financing gaps that exist and the policy frameworks that will be needed to close these financing gaps. The outcome of the forum will be a report considered by the CoP. The report will include recommendations.

United Nations Convention to Combat Desertification (UNCCD)

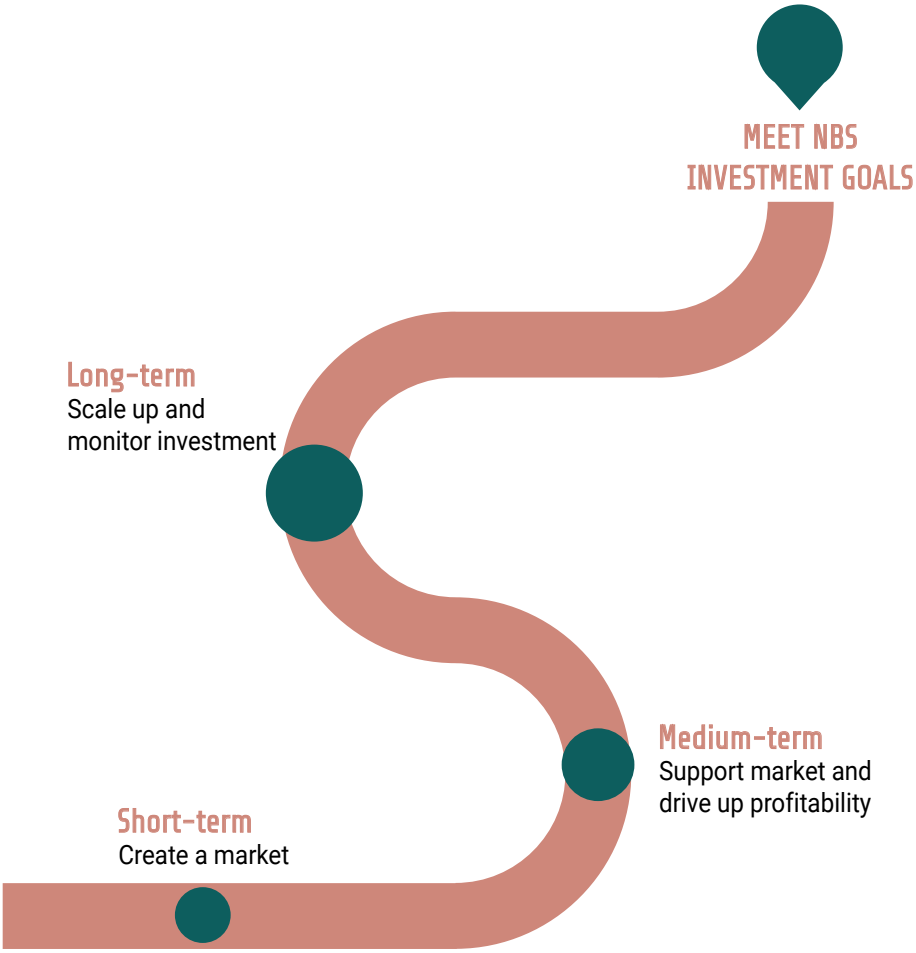
The rehabilitation and restoration of degraded land provides multiple potential benefits such as erosion control, enhancing natural carbon sinks, preserving ecosystems and simultaneously contributing to food security and sustaining dependent livelihoods. In UNCCD, NbS is not explicit but is reflected in Sustainable Development Goal target 15.3 on land degradation neutrality, which commits "by 2030 to combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world".

Source: Vivid Economics based on interviews with convention experts.

Investment in NbS is deterred by market failures. The most important failures are the unrewarded provision of public goods and services (for example, carbon sequestration by forests and carbon storage of peatlands); over-exploitation of common access resources (such as fisheries); regulation of water; and externalities (for example, water pollution) as well as indigenous peoples' rights, and the pure enjoyment of nature. These distortions in economic incentives reduce the private returns to investment in NbS.[45]

Stakeholders can facilitate investment in NbS, along a pathway over time, depicted graphically in Figure 8. First, the public sector creates a market for NbS investment, with support from the private sector. This includes putting in place a policy and regulatory framework that supports revenue streams for assets, and fostering private- and public-sector cooperation in scaling up investment. Actors then work to support the emerging market and to drive up investment returns through appropriate risk allocation and mitigation, and by building scale. Once the market is mature, support can be scaled back. Within this framework, public- and private-sector actors have roles to play at each stage.

Figure 8. Pathway to meeting NbS investment goals



Source: Vivid Economics.

[45] World Bank Group, 2020.

4.1 Public Sector

The public sector plays a key role in creating opportunities for private investment in NbS and increasing investment itself. Currently the key barriers to investment in NbS are the lack of cash flow (revenue) in many of the existing NbS projects, lack of coherent regulation, lack of suitable funding mechanisms (related to lack of revenue) and the often small-scale ticket size. In addition, public finance that supports environmentally harmful practices (e.g. subsidies for certain pesticides and fertilisers) can crowd out investment and create an unequal playing field, to the detriment of NbS investment. These barriers limit private-sector investment. Public sources of capital from governments, donors and multilateral development banks (MDBs) in the forms of grants and various types of concessional finance can contribute to an enabling environment for the implementation and scaling up of NbS, address barriers that inhibit the flow of funds, and fast-track the development of an investment pipeline.

There is an opportunity for the public sector to measure and value NbS in ways that are meaningful for investment decision-making. The current public and private investment processes, including investment and policy appraisal tools, are not tailored for use with NbS. The lack of estimates of value of the economic and financial benefits of NbS investments has contributed to the inability of countries, project developers and investors to compare NbS as an investment and as a policy priority against other options.[47] Governments could work with academics, MDBs, the private sector and NGOs to develop the methodologies, pilot best practices and adopt methodologies.[48,49]

4.1.1. Support of NbS by classification of NbS and value appraisal

The lack of a classification for data on capital expenditure makes it harder to coordinate upstream investment in the supply chain for NbS, including in finance.[46] Clearer definitions of what qualifies as NbS would encourage investment and policymaking. Clear definitions would also support better data collection on investment, impact, costs and need. In turn, this will enable better-evidenced business cases for investors and for governments putting the supporting policy in place. In a similar vein, as renewable energy has now become a "young" asset class, classifying NbS to ensure that loans and investment exhibit similar characteristics is an important element to create an asset class.

[46] Swann et al., 2021.
[47] Swann et al., 2021.
[48] Cooper and Matthews, 2020.
[49] Watkins et al., 2019.

Table 2. Examples of standards, tools, metrics and valuation methodologies

Name	Year	Overview
Taskforce on Nature-related Financial Disclosures (TNFD)	Forth coming: 2023	The overall TNFD goal is to provide a framework for corporates and financial institutions to assess, manage and report on their dependencies and impacts on nature, enabling them to take nature-related risk, dependencies and impacts into account. The taskforce will complement the Task Force on Climate-related Financial Disclosures, whose recommendations have now been made mandatory by the UK government.
Greenhouse Gas Protocol Guidance on Carbon Removals and Land Use	Forth coming: 2021	The Greenhouse Gas Protocol is developing new guidance on how companies and organizations should account for greenhouse gas emissions and carbon removals from land use, land use change, bioenergy and related topics in their greenhouse gas inventories, building on the Corporate Standard and Scope 3 Standard.
Natural Capital Protocol	2021	The Natural Capital Protocol is a decision-making framework that enables organisations to identify, measure and value their direct and indirect impacts and dependencies on natural capital.
Global Canopy Programme: Trase	2021	A data-driven transparency initiative that is revolutionising our understanding of the trade and financing of commodities driving deforestation worldwide. The supply chain mapping approach brings together disparate, publicly available data to connect consumer markets to deforestation and other impacts on the ground related to the production of commodities such as soy, palm oil, timber and beef.
Green Stimulus Index	2021	The Greenness of Stimulus Index (GSI) assesses the effectiveness of the COVID-19 stimulus efforts by G20 countries and ten other nations in ensuring an economic recovery that takes advantage of sustainable growth opportunities, and builds resilience through the protection of the climate and biodiversity.
Global Reporting Initiative: Sustainability Reporting Database	2011-2021	A global repository of sustainability reports by sector, country and year.
Science-based Targets Network	2020	Expert-based initiative to create methods, guidance and tools to set science-based targets for the whole Earth system. First guidance for business to help you get started on your journey to setting nature science-based targets
International Financial Reporting Standards Foundation (IFRS): Consultation on Sustainability Reporting	2020	Consultation with a view to establishment of an international sustainability reporting standards board within the existing governance structure of the IFRS Foundation, as set out in the Trustees' February announcement.
Toward Common Metrics and Consistent Reporting of Sustainable Value Creation	2020	Buliding on existing frameworks, the document presents 21 core and 34 expanded metrics and disclosures. The metrics and disclosures can be used by companies to align their mainstream reporting on performance against environmental, social and governance (ESG) indicators and track their contributions towards the SDGs on a consistent basis.
Business for Nature & MIT: Business Action Database	2019	Database collecting 1240 case studies of businesses acting to reduce negative impacts on nature, invest in protecting and restoring nature, innovate and scale up products and technologies with a lower impact.
ISO 14008:2019 MonetaryValuation of Environmental Impacts and Related Environmental Aspects	2019	International standard specifying a methodological framework for the monetary valuation of environmental impacts and related environmental aspects. Environmental impacts include impacts on human health and on the built and natural environment. Environmental aspects include releases and the use of natural resources.
International Institute for Sustainable Development (IISD), Sustainable Asset Valuation (SAVi) tool: Natural Infrastructure (2019) Together	2019	A methodology to assist policymakers and investors in making informed infrastructure financing decisions. The methodology considers environmental, social, economic and governance factors, including risks and their associated costs and externalities, across the full life cycle of the project. A recently launched review is systematically assessing the economic and financial value of nature-based infrastructure.
Natural Capital Finance Alliance (NCFA), Exploring Natural Capital Opportunities, Risks and Exposure (ENCORE)	2018	A tool that aims to help financial institutions in their understanding, assessment, and integration of natural capital considerations in their decision-making. ENCORE provides information for portfolio screening and the management of natural capital risks and opportunities.
Coalition for Private Investment in Conservation (CPIC), Blueprints (2018)	2018	CPIC is a global group of investors, banks, project developers, non-governmental organizations and research institutions. The group has developed a series of "blueprints" of model financial transaction structures that aim to facilitate the replication and scaling of investments that deliver both economic and conservation returns.
System of Environmental Economic Accounting–Ecosystem Accounting (SEEA EA)	2012	The SEEA Ecosystem Accounting (SEEA EA) constitutes an integrated and comprehensive statistical framework for organizing data about habitats and landscapes, measuring the ecosystem services, tracking changes in ecosystem assets, and linking this information to economic and other human activity.
Wealth Accounting and the Valuation of EcosystemServices (WAVES)	2010	WAVES is a World Bank-led global partnership that aims to promote sustainable development by ensuring that natural resources are mainstreamed in development planning and national economic accounts.

Source: Vivid Economics and World Economic Forum adapted from Swann et al., 2021.

4.1.2. Support of NbS via policy and regulation

NbS is not singled out in international and domestic legislation, policies and strategies.[50] Often, NbS is not reported or in its own category. The reporting of NbS in data on project origination, procurement, finance and standards would help with the coordination of resources into NbS. This includes countries' NDCs, NAPs and similar plans as climate action scales and action is taken to restore degraded land and to halt biodiversity loss.

Some MDBs are working to highlight NbS in their policies and investment. For example, the Asian Development Bank is developing internal guidance as part of a larger, more systematic and operational commitment to scaling up NbS. The internal guidance will introduce NbS options within the disaster risk and climate adaptation investment programmes for water, cities and the transport sector.[51]

COVID recovery plans offer an early opportunity to mainstream NbS. Stimulus plans provide an opportunity to match recovery investment allocation to environmental objectives and to reform business-as-usual policies. It is vital to introduce market incentives to invest in NbS and to reform policies which have a negative impact on nature, the climate and land degradation. Included in these opportunities is the repurposing of agricultural subsidies and land ownership, bringing with it investment in productivity and job creation.[52] However, with the exception of some countries and cities that have included investments in forests and NbS in their recovery packages,[53] governments are so far missing this unique opportunity for green investment. Only 3 per cent of recovery spending to date supports natural capital, and up to 17 per cent may have a significant negative impact on natural capital.[54]

Fiscal instruments can be used to motivate firms to avoid negative impacts on nature. Fiscal instruments, such as taxes and subsidies, can incentivize private-sector institutions to adjust their practices. In particular, it is important to reform and repurpose environmentally harmful subsidies to level the playing field and create fiscal space for NbS investment. These also include subsidies to adopt sustainable practices and taxes to raise the costs of damaging activities. For example, Costa Rica has introduced a 3.5 per cent tax on carbon emissions. The tax has reduced fossil fuel use and raised revenue which is used to support agroforestry, conservation and reforestation. Similarly, in Peru, the Sanitation Sector Law was updated in 2016 and requires utilities to direct 1 per cent of revenues towards improvements in water quality.[55]

4.1.3. Financial instruments to de-risk NbS investment

Governments and DFIs can serve as cornerstone investors and provide catalytic capital to funds and projects. This includes support for result-based financing schemes such as green or conservation bonds, the expansion of the resilience bonds market, credit facilities for habitat restoration and water quality improvement, blended finance mechanisms and credit guarantees. A variety of public-sector institutions including national and international development finance institutions with a mandate to support green investments can supply these instruments.[56]

Table 3 lists types of financial instruments alongside examples.

NbS projects have high transaction costs where they are small scale. Public capital can be used to aggregate NbS projects. This allows private investors to participate at scale, improving viability and reducing the cost of finance. Examples include aggregating outcomes at the project level (also known as stacking), and aggregating NbS projects at a sectoral, catchment or regional level to achieve the scale necessary to attract private investment.[57,58]

[50] Cooper and Matthews, 2020; World Bank Group, 2020.

[51] Cooper and Matthews, 2020.

[52] World Bank Group, 2020.

[53] UNEP News Story, Amid COVID-19, These 10 Countries Are Aiming to Kickstart Their Economies by Repairing Nature, 7 October 2020, https://www.unep.org/news-and-stories/story/amid-covid-19-these-10-countries-are-aiming-kickstart-their-economi.

[54] UNEP, 2021, Are We Building Back Better?.

[55] Cooper and Matthews, 2020.

[56] Cooper and Matthews, 2020; Watkins et al., 2019.

[57] Young et al., 2020.

[58] Young et al., 2020.

Table 3. Overview of financial instruments of NbS finance

Instrument	Category	Sources	Examples of investments
National budget allocations	Revenue tools	Public	National Forestry Financing Fund (FONAFIFO) in Costa Rica
	Spending tools	Public	WISE-UP (Water Infrastructure Solutions from Ecosystem Services) nature infrastructure project in the Tana basin (95,000 km^2), Kenya
Grants	Subsidies	Public	Including fiscal and trade incentives
	Grants	Public and private	DfID and the UK Department for Business, Energy and Industrial Strategy (BEIS) invested more than 100 million British Pounds (GBP) in Partnerships for Forests (P4F)
	Payment for results	Public and private	Norway's REDD+ programme, (critical transition #3 on protecting and restoring nature) has disbursed $2.3 billion
	Technical assistance	Public and private	AgDevCo invests, develops and provides training for sustainable smallholders
Equity	Concessional equity	Public and private	Dutch Government contributed USD 40 million to the junior share of the Agri3 Fund
	Non-concessional equity	Public and private	Packard Foundation invested USD 1 million to EcoTrust Forests Fund I
Debt	Concessional loan	Public and private	OeEB invested in Eco.business Fund with USD 25 million in subordinated notes. Includes microfinance.
	Non-concessional loan	Public and private	The International Finance Corporation (IFC) invested in Green Resources AS with $10 million in senior loans
	Credit line	Public and private	The French Development Agency (AFD) developed a 50 million EUR green credit line (long-term loan) for Agrobanco
	Securitization	Public and private	Agricultural financing securitized through notes traded on the Colombian National Agricultural and Livestock Exchange
	Debt-nature swaps	Public and private	The US among other funders have forgiven debt obligations in favour of environmental conservation funding
Risk Mitigation	Bonds	Public and private	Examples include the USD 95 million sustainable "landscape" bond issued by the Tropical Landscape Finance Facility (TLFF) 1 Pty to finance a sustainable natural rubber plantation in Indonesia. Other examples are related to resilience and catastrophe bonds, as well as reef or mangrove insurance.
	Insurance	Public and private	OPIC provided a financing commitment of up to $106.5 million to the insuree, Silverlands Fund I
	Guarantee	Public	USAID Development Credit Authority (DCA) guaranteed USD 134 million of commercial loans that Althelia Climate Fund can issue. Bonds for resilience and disaster-related.
	Off-take agreement	Public and private	Michelin created a long-term offtake agreement with Royal Lestari Utama (RLU) in the context of the TLFF 1 landscape bond, by agreeing to buy natural, sustainably-produced rubber at a given price for a given period

Source: Report authors.

4.2 Private Sector

NbS can be attractive to the private sector where it accesses new sources of revenue, increases resilience of commercial activities, reduces costs or contributes to reputation and/or purpose.
The private sector can play roles as investors, developers, market infrastructure makers, customers and beneficiaries. A number of private-sector led initiatives have emerged in recent years. Two examples are shown in Box 4.

Box 4. Notable private-sector initiatives

1) A 2030 Investment Vision for Natural Climate Solutions (NCS) is an investor-led initiative that explores opportunities to scale up investment into specific action to reduce emissions and address resilience to climate change. Specifically, NCS are needed to address the scale of climate action, in order to raise hundreds of billions of dollars that need to flow into NCS over the next decade. Investors have the opportunity to align their portfolios with NCS by undertaking the following actions:

Engaging, including (1) engaging companies to implement deforestation-free supply chains and to commit to net-zero emissions trajectories; and (2) advocating for ambitious climate change mitigation policies that incorporate NCS as part of sector-based decarbonization strategies.

Investing in sustainable and regenerative production including sustainable forestry and agriculture, not only through direct investment in underlying real assets but also public and private investment in related and growing sectors that will reduce pressure on natural ecosystems, such as sustainable food innovation and the circular bioeconomy.

Innovating by pursuing new investment products and market exposures that will scale and transform investment opportunities in NCS, such as carbon finance to protect and restore ecosystems, blended finance structures to enhance impactful investment in tropical forest regions, and green infrastructure that supports ecosystem protection and restoration.

2) The Green Gigaton Challenge (GGC) is a public-private initiative that aims to catalyse funds from private companies and international donors to send a strong demand signal for high-integrity emissions reductions from REDD+ and thus contribute to reducing tropical deforestation. The global initiative aspires to securing commitments for transacting a cumulative gigaton of emission reductions by 2025 at attractive prices for forest countries (an initial floor price of USD 10 per ton is envisioned).

The GGC will address key challenges for forest countries implementing REDD+: specifically, the combined effect of unpredictability of external financing and the current low prices for forest carbon (averaging USD 5 per tCO_2e for results-based payments and USD 4.3 per tCO_2e in voluntary carbon markets) limit the ability of governments to implement the required policy changes to address forest loss.

The GGC aims to facilitate a substantial increase in both international public and private results-based funding commitments which are essential to protect tropical rainforests.

Note: NbS are related to climate as well as biodiversity and land degradation targets, while natural climate solutions are only related to climate.
Source: New forests et al. (2021)., A 2030 Investment Vision for Natural Climate Solutions and the Green Gigaton Challenge.

4.2.1. Risk mitigation services provided by NbS

The private sector is increasingly recognizing the risks posed by the loss of natural biodiversity and ecosystem services to its own assets and activities.[59] Private-sector institutions can update their processes to reflect these risks, to align with updated regulations and to incorporate explicit standards addressing risk mitigation and management for biodiversity and ecosystem services. This includes scaling up commitments to become carbon neutral or to reduce the net impact of activities, including by making supply chains more sustainable. These activities are also spurring additional investments in nature-based offsets.

Financial institutions can develop and adopt tools to measure and manage nature-based risk exposure. Current risk assessment techniques are largely backward looking and can be replaced by forward-looking, scenario-based analyses to better capture the risks associated with climate and biodiversity and ecosystem service losses.[60] In addition, the private sector can work with public-sector actors to develop methods to value the benefits resulting from investments in NbS. The ability to accurately appraise risks and benefits supports high-quality investment decisions. An example is the Biodiversity Footprint for Financial Institutions (BFFI) methodology developed by ASN Bank. This approach maps impacts of investment portfolios to sectors and geographies. ASN is currently expanding and automating the use of BFFI.

Case 2. The case of Kenya - Livelihoods Mount Elgon

The region of Mount Elgon faces both environmental and socio-economic challenges. Issues such as deforestation and unsustainable agricultural practices threaten not only the region's biodiversity, but also its watersheds, which connect to Lake Victoria. Moreover, the lack of access to water and nutrient-rich feed has negatively impacted farmers' livelihoods. The Livelihoods Fund is an investment fund, developed in 2016, with the ambition of combatting the problems that Mount Elgon is facing, while boosting the local economy. It focuses specifically on agricultural productivity, dairy value chain development, and environmental conservation, which is done by training 30,000 farmers on 35,000 ha of land with sustainable land management practices, as well as by supporting 15 cooperatives with various tasks on the ground. The overarching goal of the initiative is to create a sustainable supply chain that will be linked to East Africa's primary dairy company, Brookside Dairy.

4.2.2. New financial products

Financial institutions can offer consumers nature-positive investment products. They can develop funds that include NbS not only to compensate for the damaging effects of other activities but also to offer customers a choice of net or positive impact from their investments. A number of larger European ethical banks, such as Triodos and GLS-Bank, have introduced products such as sustainability funds, socially and environmentally targeted crowdfunding investment funds, and climate bonds. In 2020, Triodos raised resources, alongside the UK government, trusts and private foundations, to finance the restoration of the Caen wetlands in Devon, for improvements in the natural flood management system in the Wyre catchment in Lancashire, and the restoration and conservation of peatlands in the Pennines.

Some business models related to NbS are in a strong position to scale up with the help of institutional investors. Forestry assets are especially ready for at-scale investment. There, investment produces environmental benefits (under certain conditions) as well as strong and stable cash flows, which are fundamental to attract finance at scale. Institutional investors, in particular, need these types of mature investment opportunities to fulfil their fiduciary duty.

[59] World Bank Group, 2020.
[60] World Bank Group, 2020.

Case 3. The case of the Café Selva Norte project in Peru

The Café Selva Norte project, financed by the Land Degradation Neutrality (LDN) Fund, aims at reversing land degradation by implementing sustainable coffee plantations on degraded areas in Peru. It creates a scalable model for sustainable agroforestry that could be replicated at a landscape level in other areas of Peru and South America. This USD 12 million investment aims to transform 9000 hectares of degraded land into productive agroforestry areas, avoid or sequester 1.3 million tonnes of CO_2 emissions per year, and improve the livelihoods of 2400 producers.

New business models can be developed to fund NbS.[61] An example is private payments for ecosystem services, such as payments for wildlife services in Zimbabwe, where farmers derive income from conserving wildlife through ecotourism and safari hunting. Here users contribute financially to compensate for the maintenance of the ecosystem.

Case 4. The case of Indonesia Credit Union's innovative financing schemes to support integrated landscape initiatives

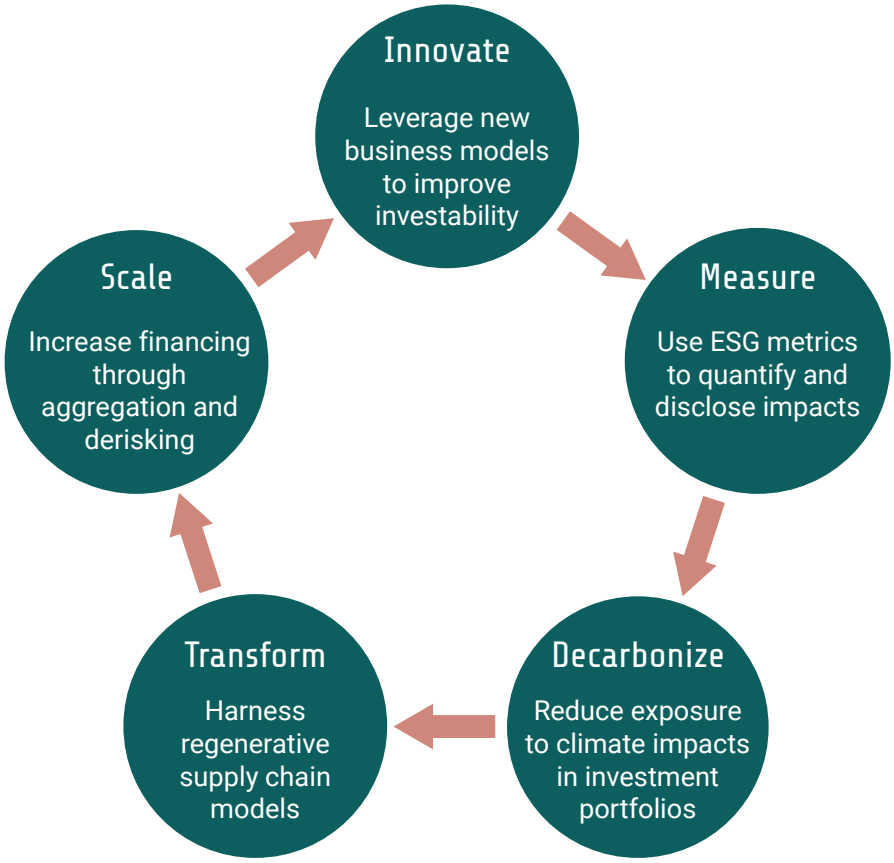
The Indonesian Credit Union Semandang Jaya provides small-scale farmers with alternative financing solutions that support them not only in continuing their farming business but also in improving their industry knowledge. It established Social Performance Management (SPM), which provides sustainable agribusinesses across various sectors such as agriculture, livestock, plantations, fisheries and eco-tourism with alternative savings and loans. In addition, the Credit Union, in cooperation with other stakeholders, offers mandatory technical assistance in the form of training and capacity building for loan beneficiaries. Based on the ongoing research "Finance for Integrated Landscape Management" by Tropenbos Indonesia, the loan provided by SPM is estimated to have positive impacts in terms of increasing revenue and food security, creating new employment opportunities, building social solidarity and providing equal access to financial services, along with positively impacting climate change mitigation, protecting biodiversity, reducing forest fires and illegal logging, preventing illegal mining and promoting crop diversification.

[61] Watkins et al., 2019.

Private sector actors could identify opportunities to aggregate projects to access larger scale sources of capital. Most investments in NbS are relatively small and have a high level of risk. However, once properly aggregated, diversified and packaged, they may have a risk return profile well suited to mainstream investors. The private sector can play a role in aggregating and packaging projects and structuring finance. An example is Ecosystems Investment Partners, an investment group specialising in mitigation banking and biodiversity offsets. The company buys, restores, and conserves priority properties (such as wetlands, streams, and habitat mitigation and restoration projects), and sells the credits generated.[62] The Emergent Forest Finance Accelerator provides a price floor for suppliers and aggregates fragmented supply to meet demand for larger tickets.

Figure 9 provides a summary view of private sector actions to accelerate the valuation of natural capital and investments into nature-based solutions.

Figure 9. Private sector actions to accelerate finance for NbS



Source: Report Authors.

[62] World Bank Group, 2020 (B).

5 Conclusions, recommendations and the way forward

Despite surging interest in the topic of NbS, there is relatively little comparable and detailed data on public and especially private investment directed to activities and assets that protect, conserve or restore nature. This report was put together with the purpose of giving insight into the capital flowing into NbS-relevant sectors, of setting these flows in the context of the investment rate consistent with meeting the objectives of international agreements, and of highlighting the opportunity that NbS offer – both to investors and to society – to address a wide variety of societal challenges related to health, the climate crisis, disaster risk reduction and food security. In this way, it is hoped that the report will encourage governments, businesses and financiers to redouble their efforts to address the investment gap, putting the topic higher on the political agenda and systematically addressing it in corporate boardrooms and financial markets. This task is made even more pressing by the need to "build back better" after the COVID-19 health pandemic, using public stimulus to redirect economic growth and job creation in ways that tackle the nature and climate crisis.

5.1 Conclusions

- **Both the volume of capital directed to NbS-relevant assets and activities, and the share of private finance, are insufficient at present.** The majority of the USD 133 billion tracked by this report – using 2020 as base year – comes from public sources (86 per cent) in the form of domestic government expenditures and international public aid. Private finance only accounts for 14 per cent, including capital mobilized through sustainable agricultural and forestry supply chains, private equity investments, biodiversity offsets financed by private sectors, philanthropic capital, private finance leveraged by multilateral organizations and forest and other land use-related carbon markets.

- **The investment case, that is, the available return to the investor relative to risk, needs to be stronger, judging by the small share of private finance compared to public funding.** In contrast to NbS capital flows, climate financial flows are much larger. Research by CPI (2019)[63] found annual capital flows of USD 579 billion (on average over 2017-2018) into climate investments, with private investment accounting for 56 per cent. The reason for this is that returns to investments in low-carbon transport, renewable energy investment and energy efficiency are attractive and becoming well understood by DFIs, commercial banks, investment banks and institutional investors. NbS investments, on the other hand, often lack sufficient predictable, long-term revenue streams, deterring banks and investors. Other barriers reflect the current immaturity and small scale of the asset class, such as high transaction and structuring costs.

- **In comparing existing capital flows to NbS-relevant sectors to the needs of international targets related to addressing the climate crisis, land degradation and reversing biodiversity loss,[64] it is clear that investment needs will have to almost triple by 2030 and increase to over USD 536 billion/year by 2050, at least four times the amount invested today.** The way to overcome this investment gap is to place nature at the heart of how economic growth is generated in the future. Instead of disinvesting from nature, the focus should be on investing in nature to support sustainable economic growth in the twenty-first century.

[63] Buchner et al. (2019), "Global Landscape of Climate Finance 2019". https://www.climatepolicyinitiative.org/wp-content/uploads/2019/11/2019-Global-Landscape-of-Climate-Finance.pdf.

[64] This future investment needs scenario# for climate targets takes into account countries' Nationally Determined Contributions and includes a Paris-aligned carbon price trajectory. Investment needs for NbS used the "immediate action" scenario, which was developed by Vivid Economics for the UK Treasury in collaboration with the Potsdam Institute (PIK) and the Natural History Museum (NHM). For biodiversity, we assume the global community acts now to reverse loss and stabilize biodiversity intactness by 2050 at today's levels. With regards to tackling land degradation, the model already includes land degradation neutrality by stopping agricultural expansion and enhancing restoration activities

5.2 Recommendations

- **Create economic and regulatory incentives to scale up NbS investments.** Tax breaks, repurposed agricultural policies, and trade-related tariffs are some of the tools governments could use to create economic incentives to invest in NbS. Governments allocate more than USD 700 billion a year to global agricultural subsidies (Food and Land Use Coalition, 2019). In many instances, subsidies and other agricultural support work against building a sustainable, fair and resilient food system.

- **Align the economic recovery post-Covid-19 with the Paris Agreement and the anticipated Kunming Agreement, and thus be consistent with 1.5°C warming above pre-industrial levels as well as halting and reversing the loss of biodiversity.** The case for scaling up investment in nature has been made clear by the United Nations, scientists, civil society, foundations and others on multiple occasions. However, of the USD 14.6 trillion in public stimulus spending across the largest 50 countries, only 2.5 per cent (USD 368 billion) has been directed to so-called green investment (UNEP, 2021). Moreover, the Greenness of Stimulus Index (GSI) found that a substantial part of the total capital will go towards sectors with major negative impacts on the climate and nature. Parties must ensure that public and private investments are in line with objectives and targets in the Paris Climate Agreement as well as a post-2020 biodiversity framework to be agreed upon during CBD Conference of the Parties (COP) 15 in Kunming.

- **Harness the potential of carbon markets, with robust environmental and social standards and fair and equitable sharing of the benefits.** There is growing interest from companies to commit to "net zero" targets and to use a variety of mitigation and offset measures to achieve these targets. Natural climate solutions, and credits derived thereof, serve to decarbonize land use sectors and offer the opportunity to compensate for emissions while in transition or address historic emissions. However, corporate investment in NbS are not a substitute for the need to rapidly phase out fossil fuels. Investments in NbS to tackle the climate crisis should also be designed to positively impact biodiversity and create other co-benefits. There remains much to be done to create demand for NbS, to put in place robust environmental and social safeguards, including consent from indigenous peoples when applicable, and to address legal hurdles (such as how to treat carbon reduction claims). The opportunities will be boosted if and when negotiations related to Article 6 of the Paris Agreement have been completed.

- **Work together to create standard metrics, baselines and common characteristics for NbS to facilitate the creation of a new asset class.** Like other asset classes, it is important to converge on definitions, key performance indicators, quality standards and other characteristics. By comparing transactions along similar criteria, it might be possible to build a track record and move towards the creation of an asset class for nature-based solutions. Both regulatory efforts, such as the European Union (EU) Taxonomy on Sustainable Finance, and industry standards such as those developed by the Climate Bonds Initiative help to set minimum standards for what can be considered sustainable investments. Ongoing efforts by UNEP and others to harmonize indicators for restoration, sustainable agriculture and forestry will also play a role.

- **Increase the number of commercially viable projects and businesses that incorporate NbS into their business model through technical support, economic and regulatory incentives.** It is critical to increase the pipeline of investable projects and businesses that matches the mobilization of capital that is needed and trigger the deployment of finance into NbS. Practical measures to achieve this include: (i) raising awareness of novel land use models, as viable alternatives to business-as-usual; (ii) supporting their successful adoption through the provision of grants for technical assistance; (iii) increase the likelihood of commercial success through skill transfer and capacity building by providing access to an ecosystem of interventions, business incubators and accelerators, that support early-stage business development; and (iv) incentivizing their adoption by aligning fiscal measures with positive environmental outcomes.

- **Scale up availability of concessional finance to accelerate the transition to "net zero, nature positive" sustainable agriculture, forestry and other forms of nature-based solutions.** The risk profile for banks and other finance institutions in adopting sustainable agricultural or forestry practices, is initially significantly higher than the risk of financing business as usual, due to prevailing legislation and Basel 3/Basel 4 regulatory frameworks, the lack of reliable risk data (e.g. to assess credit worthiness of smallholder farmers) and tenors required to finance innovations. This leads to higher cost of capital and increases in interest rates that are unaffordable to borrowers. Scaling up public funding in the form of concessional finance to partly de-risk novel forms of sustainable agricultural production and forestry that lead to net zero, nature-positive impact is needed as an initial 'stepping stone' to build a track record of transactions. Improved availability of risk data and an increase in transactions will improve market transparency and reduce (perceived) risk when information about which business models are commercially viable will become better known, reducing the need for public funding over time.

- **Unlock institutional investor capital** for sustainable agriculture, forestry and other forms of nature-based solutions that have clear and predictable flows of renevues. Many impact funds that invest in nature-based solutions do so for 5-10 years, given the need for patient capital. Such tenors do not match the requirements for liquid assets by asset onwers (e.g. pension funds, private banking clients). Increasing the number of impact funds that are listed and scaling up the availability of guarantees that can provide an exit, can increase the degree of liquidity that enables institutional investors to increase their exposure in this nascent market, initially by developing a primary market, and eventually a secondary market by increasing the number of listings on stock exchanges.

- **Galvanize political and business momentum to protect and restore our earth.** The upcoming summits related to climate, biodiversity, land degradation and food systems as well as the launch of the UN Decade on Ecosystem Restoration provide opportunities to harness political and business momentum by putting NbS as a central pillar across all these key events. Any strategy that aims to repair our relationship with nature and to harness the potential of NbS would need to strongly feature protection and conservation measures for high carbon value ecosystems like peatlands, mangroves and primary forests as a central pillar.

5.3 Building on this report

Annual report on the state of finance for nature: This current report will be the inaugural report in a series to track global trends in public and private investment in NbS, to compare trends, improve data quality and showcase opportunities for governments, businesses and financiers. Four specific areas will be addressed in the next report:

1. **Broaden the scope:** The scope in the next report will cover both the terrestrial and marine environment more comprehensively and it will put forward land degradation targets.
2. **Improve tracking of revenue sources for NbS:** This report has found significant limitations in tracking public and especially private investment in NbS. Setting up a method to track investment will be a key focus for forthcoming reports.
3. **Economic benefits derived from NbS:** This report has focused on existing investment flows and what is needed to meet international commitments related to climate change, biodiversity and land degradation, but did not attempt to estimate the benefits derived from investing in nature, such as potentially a lower prevalence of zoonotic diseases, ecosystem co-benefits related to vulnerable high-carbon ecosystems such as peatlands, etc. The next version of this report will seek to include the economic benefits that can be derived from NbS, thereby strengthening the economic rationale to invest in nature.
4. **Capital flows that negatively affect nature:** This report did not focus on reducing capital flows that negatively affect nature. A comprehensive strategy will have to focus both on reducing capital flows that negatively impact nature, while at the same time enhancing capital flows to NbS-relevant activities and assets. As such, forthcoming reports will attempt to focus on both parts.

Expert and stakeholder engagement: This report benefited from an inclusive process with expert and stakeholder engagement. Experts provided input in a series of two workshops and contributed practical cases of NbS investments that could be replicated or scaled up. The next report will engage experts and stakeholders similarly.

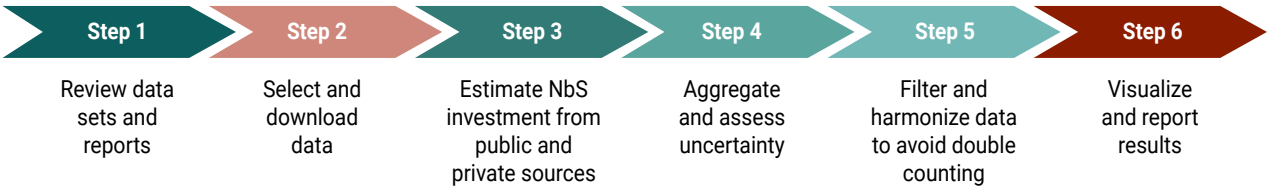
Improving data comparability, quality and availability: Data for this report have been gathered using existing databases, in combination with secondary literature and stakeholder interviews. There are comprehensive and comparable data for example from the Classification of the Functions of Government (COFOG), but there is no “marker” for NbS. In advance of the next report, the team will engage with the database owners to explore whether the labelling of financial flows as NbS could be introduced.

6 Annex: Methodology

6.1 Investment by public and private sector in NbS

The estimation of current investments included the selection of relevant data sources and development of a methodology to extract their NbS component.

Figure A 1. **MAgPIE: structure of the optimization process**



Source: Vivid Economics.

Step 1: Review data sets and reports

The team reviewed secondary sources complemented by stakeholder interviews. The most closely related studies that were found were:

1. **Financing Nature Report (TNC, Cornell and Paulson, 2020)**: Global review of financing in biodiversity conservation. It uses a narrow definition of NbS as climate finance channelled through carbon markets totalling USD 0.8–1.4 billion per year in 2019. Finance into biodiversity protection amounted to USD 124–143 billion in 2019. Does not distinguish between private and public flows.
2. **Global landscape of climate finance (CPI, 2019):** Review of global climate finance, updated in December 2020. No specific NbS definition. Estimates of climate finance flowing into the land use sector in 2019: USD 21 billion, disaster risk management 7 billion and water and waste 13 billion. No figure for private flows into NbS.
3. **Climate finance report (joint MDB publication, 2019):** Review of total MDB financing globally. No explicit NbS definition. Estimate of investment in land use sectors in 2019 were USD $1.7 billion and water and waste water $1.6 billion.
4. **A comprehensive overview of global biodiversity finance (OECD, 2020)**: Global review of financing in biodiversity conservation. No specific NbS definition. Total expenditure in biodiversity conservation USD 78–91 billion per year (2015–2017 average). Private flows: USD 6.6–13.6bn/year.
5. **Nature-based solutions policy brief (Carbon Disclosure Project, 2020)**: Survey-based assessment of corporate investment in NbS. Fifteen per cent of a total of 459 responding companies are investing in NbS. No information on value invested.

Step 2: Select and download the data

For the amount of finance of NbS in the public sector, this study relied on two main data sources: data collected from domestic public expenditures (COFOG)[65] and data collected from the Creditor Reporting System (CRS) of the Aid Activity database[66] from the OECD.[4,5] These data contain expenditure targeted at global environmental objectives for Overseas Development Assistance (ODA).

Public expenditure data were collected by the IMF and OECD for a total of 60 countries, countries which account for more than 70 per cent of global Gross Domestic Product (GDP), including the US and China. The CRS Aid Activity database presents basic data on where aid goes, what purposes it serves and what policies it aims to implement, on a comparable basis. CRS covers 144 countries, with data collected at the recipient level. For both databases, OECD refers to first-level and second-level categories (see Table A 1). In addition to the OECD data set, COFOG figures from a number of non-OECD countries were obtained from the International Monetary Fund (IMF). Additional data sets were consulted for the US[67] and China.[68] The support of the OECD data[69] with sectoral studies allowed the scope of the report to be widened, to more sectors and to a wider range of NbS interventions, as well as geographically.

Specific to the private sector, the team identified sources of NbS finance in the literature and stakeholder interviews and tracked data that covered those sources. The OECD shows figures for philanthropies and foundations. This study extended the data set by including figures from recent studies on biodiversity, conservation, ecosystem-based services, supply chains and voluntary carbon markets.

[65] This part of the data set refers to the COFOG, which provides first- and second-level COFOG on government expenditure data from the System of National Accounts by the purpose for which the funds are used. First-level COFOG splits expenditure data into 10 "functional" groups or sub-sectors of expenditures (such as defence, education and social protection), and second-level COFOG further splits each first-level group into up to nine subgroups. For the purpose of this report, we have extracted the second-level data and triangulated these against both OECD sectoral guidance on inclusions and exclusions within each category and subcategories, and other major reports and studies in each of the sectors that can potentially contribute to NbS, including those on biodiversity, peatland and agriculture. Studies are referenced in the Bibliography section.

[66] CRS data are monitored and analysed by the OECD DAC. Data are collected on individual projects and programmes, with a focus on financial data. Within CRS, this study focuses on selected sectors and references for sectors relevant to NbS financing. A sector in this database refers to the main purpose category (e.g., health, agriculture, forestry, energy) of the intervention. The sectors represent first-level data. The sub-sectors represent second-level data, that (as described above) go into further detail and from which data linked to NbS are extracted. Data are subsequently cross-referenced with key sectoral studies.

[67] http://usaspending.go.

[68] CBD Financial Reporting Framework for China.

[69] As outlined in the methodology section, OECD data have been collected through the domestic public expenditures (COFOG) and the Creditor Reporting System (CRS) of the aid activity.

Table A 1. Data sources on private-sector finance of NbS used in this and previous published work

Category	OECD Report data	Paulson Report data	Data used in this report		
			OECD Report	Paulson Report	Mix / Other
Sustainable supply chains	Data focus on Programme for the Endorsement of Forest Certification (PEFC) and Forest Stewardship Council (FSC) only (forestry and agriculture)	Data taken from four sectors (forestry, agriculture excl. palm oil, palm oil, fisheries)		x	
Biodiversity offsets	Data from Bennett et al (2017). Figure focuses on biodiversity offset programmes in 33 countries.	Figures are higher because report spans public and private finance of biodiversity offsets.	x		
Private equity impact investments	Not present in report	Data taken from the Global Impact Investing Network (GIIN) Impact Investing 2020; Impact Assets portal; State of Private Investment in Conservation (SOPIC).		x	
Conservation NGOs	Data from five largest conservation NGOs	Paulson Report combines these two categories. The OECD and Paulson Report both rely on the same data sources.	x		
Philanthropy	Expenditure from 14 out of 26 philanthropies that reported to OECD.		x		
Private finance leveraged by multilateral orgs.	OECD Report and Paulson Report use data from GEF and OECD DAC. This report includes GCF data.		x	x	x
Forest and land use carbon markets	Combines transactions from both voluntary and compliance markets. Higher risk of double counting with public-sector funding.	Paulson Report does not disaggregate public and private investments into carbon markets. This report uses the Paulson approach for voluntary forest carbon markets and REDD+ only.		x	x
Water quality trading & offsets	Both reports use same data source (Bennett and Ruef, 2016)	Report includes a broad "natural infrastructure" category encompassing watershed and coastal protection. It is unclear to what extent these are private sector investments in NbS.	x		
Payment for ecosystem services	Specifically, private-sector payments for watershed services.		x		

Note: OECD Report (2020). "Comprehensive Overview of Global Biodiversity Finance".
Deutz et al. (2020). "Financing Nature: Closing the global Biodiversity Financing Gap". The Paulson Institute, The Nature Conservancy, Cornell Atkinson Center for Sustainability.
Source: Vivid Economics.

For both the private and public sector, data have been collated and checked in interviews and against published reports and academic articles. Cross-referencing and checking between sources has reduced the potential for double counting, but this risk has not been totally eliminated, in particular within the public-sector data from OECD. The OECD recognizes that there may be some double-counting in its data set, for example in the case of biodiversity and forestry-related activities.

Step 3: Estimate NbS investment from public and private sources

For public flows, the team estimated the amount of money flowing into NbS-relevant sectors and extracted the share that is directed towards NbS. As there is no NbS classification, this study employed multipliers (scaling factors) from existing literature, together with sectoral guidance from OECD, to scale down the volume of investment within each sector on the basis of the share of activities within that sector which can more confidently be defined as NbS (see Table A 2). All numbers were peer-reviewed.[70]

Table A 2. Methodological framework used

Sector	Scaling Factors
14010: Water sector policy and administrative management	0.4
14015: Water resources conservation (including data collection)	0.7
14040: River basins development	1
31110: Agricultural policy and administrative management	0.1
31120: Agricultural development	0.1
31130: Agricultural land resources	0.9
31140: Agricultural water resources	0.1
31210: Forestry policy and administrative management	0.9
31220: Forestry development	1
32162: Forest industries	0.6
41010: Environmental policy and administrative management	0.5
41020: Biosphere protection	0.6
41030: Biodiversity	1
41040: Site preservation	0.1
41081: Environmental education/training	0.4
41082: Environmental research	0.4

Source: Vivid Economics based on expert assessments.

Step 4: Aggregate and assess uncertainty

The reliability of NbS estimates depends on the granularity of the data. For example, the CRS dataset indicates, for each activity, whether or not it targets the environment and the Rio Conventions (biodiversity, climate change mitigation, climate change adaptation and desertification),[71] as reported by donors to the OECD. In this case reliability is high. In other sectors, reliability is low, such as for agriculture, where both NbS-specific and non-NbS activities are recorded.

[70] List and resumé of reviewers available upon request.
[71] These are the Rio Markers, a scoring system of three values, in which aid activities are "marked" as targeting environment as the "principal objective" or a "significant objective", or as not targeting the objective.

Table A 3 below lays out the framework used to classify sectors, sub-sectors and activities, their relevance and their level of certainty or uncertainty. Uncertainty remains, as the inclusion of global and cross-sectoral data reduces granularity while providing the benefit of a more comprehensive and comparable data set. In addition, the examination of asset-level data has helped build granularity, but at the expense of comparability. The uncertainty has been represented by ranges of data estimates, with the upper bounds reflecting a more comprehensive list of NbS activities and the lower bounds reflecting a narrower definition of NbS. The final estimates are simply the midpoint between the upper and lower bounds.

Table A 3. Methodological framework used to assess uncertainty

Range	High uncertainty	Low uncertainty		
Relevance	Low	Medium	High	
Estimate of share of NbS	1-33%	34-66%	67-100%	
Source type	Fund/flow level	Expenditure level	Earmarked programme level	Asset level/project level
Example	Agriculture	Agricultural land resources, agricultural water resources	Regenerative agriculture, soil preservation, shade agriculture Water conservation measure and agricultural waste water reuse and repurposing	

Note: The level of the data (first, second or third level) is a statistical classification to characterize the granularity of the data. First level is less granular than second and third level.
Source: Vivid Economics.

Step 5: Filter and harmonize data to avoid double counting

The data are triangulated between sources and the definitions are assessed to exclude repeated transactions. Previous works point to the risk of double counting, which arises when the same transaction is included multiple times. With the emergence of new financial instruments, the boundaries between private- and public-sector flows into NbS are increasingly blurred. The combining of data sets can lead to double counting where categories overlap.

The focus of the analysis is on expenditure figures exclusively, hence it excludes pledged or budgeted figures.

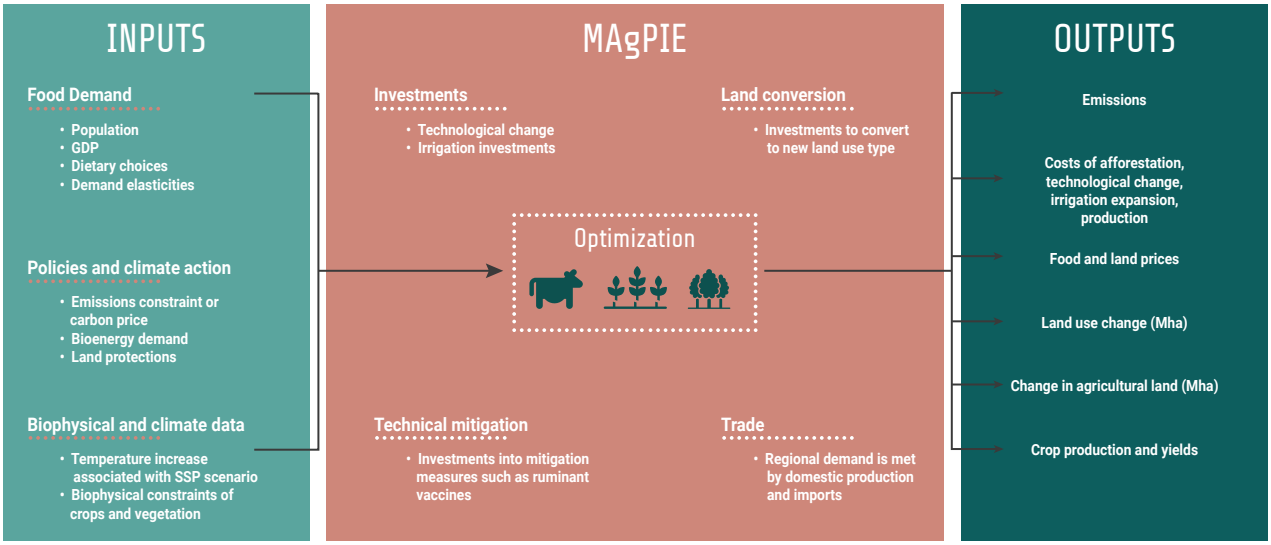
Step 6: Visualize and report results

Results are visualized to convey the level of uncertainty around the estimates.

6.2 Future NbS investment needs

To determine future investment needs, we rely on modelled estimates from MAgPIE[72] (Model of Agricultural Production and its Impact on the Environment), a global land use allocation model designed to explore land competition dynamics in the context of carbon policy. The model takes a set of policy input assumptions and estimates the least-costly way in which the land use sector can meet demand for agricultural products. Key outputs from the model include cost of action and land use change (Figure A 2 describes the basic structure of the model).

Figure A 2. MAgPIE: structure of the optimization process



Source: Vivid Economics.

In this work, we compare two sets of scenarios: the first set focuses on the additional costs needed to achieve international climate targets, while the second one focuses on the additional costs needed to achieve biodiversity targets. Each set includes at least two contrasting scenarios: a baseline and a policy scenario. The difference in costs between each policy scenario and the baseline scenario represents the additional investment needed to achieve respective climate and biodiversity targets, such that for each time period, t:

$$\textbf{Investment Needs}_t = \textbf{Costs}_{t,\ \text{Policy Scenaria}} - \textbf{Costs}_{t,\ \text{Baseline Scenaria}}$$

In the following sections, we lay out the methodology behind our modelling exercise. First, for each set of scenarios, we define model assumptions and provide an overview of the differences across the scenarios. Then, we discuss model interactions and how key assumptions are going to affect results. Finally, we describe how the modelled outputs fit into our analysis of future investment needs.

[72] Vivid Economics is currently using MAgPIE v4.1. The latest version, MAgPIE 4.3, models peatland restoration (see Humpenöder et al., 2020).

Climate targets: assumptions

As mentioned in Section 1.2, our modelling exercise starts with the development of two scenarios, each characterized by a set of assumptions. To study the additional costs needed to achieve climate targets, we compare two scenarios developed by Vivid Economics for UN Principles for Responsible Investment: the inevitable policy response forecast policy scenario and the corresponding baseline scenario. Table A 4 lists selected assumptions, some of which remain unvaried across scenarios:

- **Population and GDP:** growth projections align with SSP2 of the Shared Socioeconomic Pathways (SSP) (O'Neill et al., 2014; Riahi et al., 2017). This assumption implies a moderate increase in GDP, from about USD 130,000 billion in 2020 up to over USD 300,000 billion in 2050. Global population growth is moderate and levels off in the second half of the century, after reaching ~9.2 billion people in 2050.
- **Trade:** trade liberalization will increase across the board, with crop products achieving higher levels of liberalization than livestock products.
- **Cost of investments:** investment in technological change is aligned with historical trends.
- **Protected areas:** Both scenarios include strict nature reserves, wilderness area and natural parks (IUCN I and II categories).

The difference between the forecast policy scenario and the baseline scenario is based on key policy assumptions:

1. NDC commitments on afforestation and regeneration of natural land. The baseline scenario only includes nationally implemented policies, while the forecast policy scenario integrates countries' NDC commitments.[73]
2. 2C-aligned carbon price trajectory. A carbon price is introduced in the agriculture and forestry sectors in the forecast policy scenario, but not in the baseline scenario.[74] The price applied to CO_2 is half of that applied to all other gases to reflect challenges in regulating deforestation and rewarding afforestation.
3. 2C-aligned bioenergy trajectory. In the forecast policy scenario, bioenergy production in the land use system allows the energy sector to reduce its emissions using Bioenergy with Carbon Capture and Storage (BECCS).[75]
4. Ruminant meat fade-out. In the forecast policy scenario gradual, global ruminant meat demand declines by 25 per cent by 2050 relative to the baseline scenario, where it remains constant.

[73] Information on NDC commitments has been extracted from country reports, while information on currently implemented policies refers to policies implemented before year 2015.
[74] These trajectories are available as part of a database of Integrated Assessment Modelling (IAM) exercises run by Potsdam Institute for Climate Impact Research (PIK).
[75] Bioenergy with Carbon Capture and Storage (BECCS).

Table A 4. Key assumptions in the MAgPIE model

Variable	Description	Source	Baseline scenario	Policy scenario
1. GHG price trajectory	Defines global price trajectories for CO_2, N_2O, CH_4.	IIASA* database and PIK	No carbon price	Consistent with a carbon budget of 950 $GtCO_2e$ (<2C), 2030 phase-in
2. Reduction factor for CO_2 price	Lowers economic incentive for CO_2 emissions reduction from avoided deforestation and afforestation compared to carbon price level.	-	Not relevant	50%
3. Bioenergy trajectory	Defines demand for second generation bioenergy crops (only used for fuel production, not for food).	IIASA database and PIK	Consistent with current commitments	Consistent with a carbon budget of 950 $GtCO_2e$ (<2C)
4. Population	Sets trajectories based on SSPs (shared socioeconomic pathways).	SSP database	SSP2 - "middle-of-the-road" consistent pathways	
5. GDP	Sets trajectories based on SSPs.	SSP database	SSP2 - "middle-of-the-road" consistent pathways	
6. Protected areas	Level of area protection is based on IUCN categories. The default (WDPA) includes IUCN WDPA* categories I and II. The WDPA protection covers approximately 400 Mha of the terrestrial land surface. Alternatively, protection can be extended to include other areas, such as biodiversity hotspots.	(Leclère et al., 2018)*	IUCN categories I and II (no change from current levels)	
7. Ruminant meat fadeout	Defines decline in proportion of calories from ruminant meat in total meat demand relative to baseline scenario where it is treated as constant.	(Bodirsky et al., no date)	Share of ruminant meat in diets remains constant.	Gradual global ruminant meat demand declines by 25 per cent by 2050
8. Trade liberalization	Defines change in current trade patterns. Traded goods can be allocated in one of two trade pools: one based on historical trends and another one where goods are traded based on comparative advantage. Trade liberalization implies a higher percentage on goods being traded in the "comparative advantage pool".	(Schmitz et al., 2012)	Historic self-sufficiency ratios maintained, trade with historic partners, limited free trade	
9. Future costs of investment	Selected options for the expected costs of future productivity improvement.	(Dietrich et al., 2014)	Trajectories for future investment costs in line with historical trends	

Notes: *shared socioeconomic pathways
*International Institute for Applied Systems Analysis (IIASA)

Source: Vivid Economics.

Biodiversity targets: assumptions

To study the additional costs needed to achieve biodiversity targets, we compare two scenarios developed by Vivid Economics for the UK's Treasury Under the Dasgupta Review: immediate action scenario and baseline scenario. As with the previous set of scenarios, assumptions on population, GDP, trade and cost of investment remain unchanged across scenarios. Additionally, both scenarios include a diet shift of 25 per cent away from ruminant meat by 2050 (relative to a baseline in which it remains constant).

The immediate action scenario differs from the baseline scenario in terms of policy and biodiversity ambition. As with the Inevitable Policy Response (IPR) scenarios, one (immediate action) is more ambitious and includes NDC commitments on afforestation and regeneration of natural land as well as 2C-aligned carbon prices and biodiversity supply pathways. In addition, protected areas expand under the immediate action scenario to include ~21-24 per cent of global land area to cover all categories of protected areas under the World Database of Protected Areas (WDPA) as well as key biodiversity hotspots.

Table A 5. Immediate and delayed action scenarios differ in assumptions regarding scale of policy action

Variable	Description	Source	Immediate action (includes immediate high ambition)	Baseline scenario
1. GHG price trajectory	Defines global price trajectories for CO_2, N_2O, CH_4.	IIASA database and PIK integrated assessment modelling exercise	SSP2 RCP2.6 consistent trajectory with carbon prices phasing-in globally in 2020 (higher for immediate action)	No carbon price
2. Reduction factor for CO_2 price	Lowers economic incentive for CO_2 emissions reduction from avoided deforestation and afforestation compared to carbon price level.	-	0.5	-
3. Bioenergy trajectory	Defines demand for second generation bioenergy crops (only used for fuel production, not for food).	IIASA database and PIK integrated assessment modelling exercise	SSP2 RCP2.6 consistent trajectory	SSP2 NPi consistent trajectory
4. Population	Sets trajectories based on SSPs.	SSP database	SSP2 – "middle-of-the-road" consistent pathways	
5. GDP	Sets trajectories based on SSPs.	SSP database	SSP2 – "middle-of-the-road" consistent pathways	
6. Protected areas	WDPA categories plus all proposed areas and key biodiversity hotspots.	Leclère et al., 2018*	2708 Mha in 2020	351 Mha (no change from current levels)
7. Ruminant meat fadeout	Defines decline in proportion of calories from ruminant meat in total meat demand relative to baseline scenario where it is treated as constant.	Bodirsky et al., no date	25 per cent reduction in ruminant meat share of diet by 2050	
8. Trade liberalization	Defines change in current trade patterns.	Schmitz et al., 2012	10 per cent trade liberalization for secondary and livestock products in 2030, 2050, 2100 and 20 per cent for crops	
9. Future costs of investment	Selected options for the expected costs of future productivity improvement.	Dietrich et al., 2014	Trajectories for future investment costs in line with historical trends	

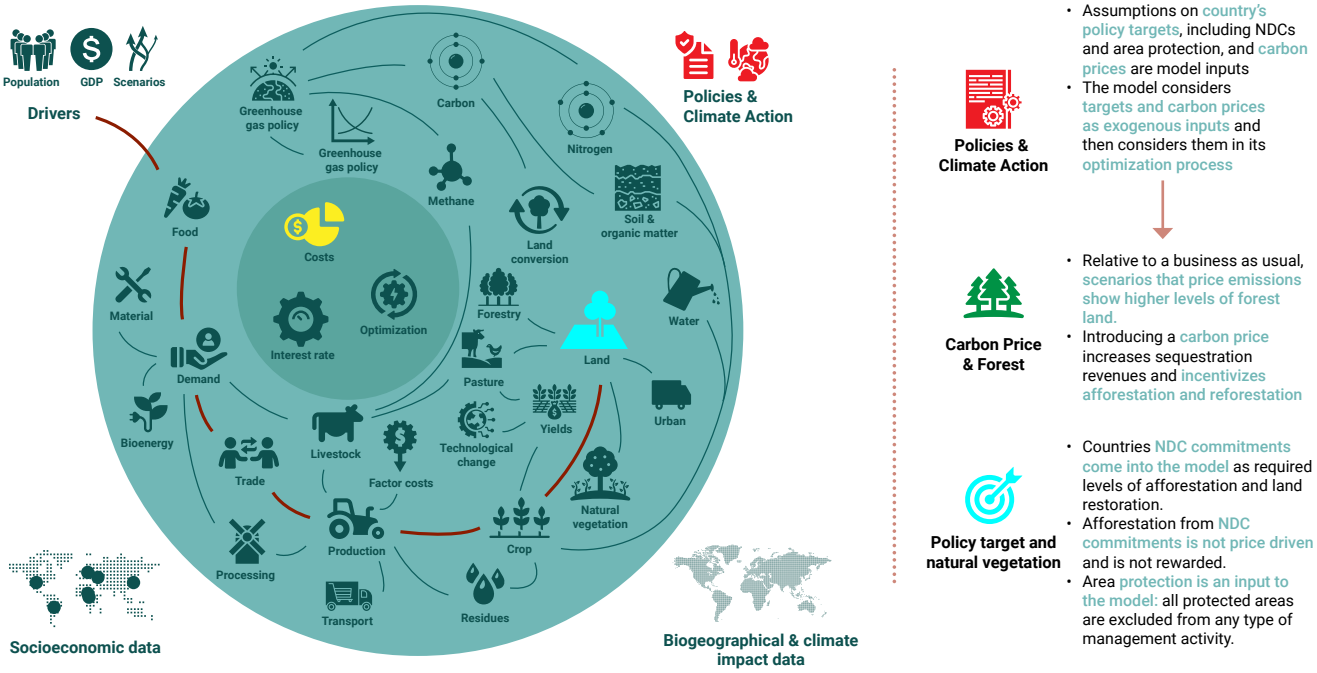
Note: * The default protection in MAgPIE is defined by the WDPA protected areas. It includes IUCN WDPA categories I and II. The WDPA protection covers approximately 400 Mha of the terrestrial land surface. For a world with increased protection, this work follows a procedure similar to the Bending the Curve project, where a "potential protected area layer" is created, i.e. areas of the world that should be a priority to protect. Two criteria served for selection: (i) Expanding the WDPA protection from Cat I and II to cover all categories, and in addition to designated WDPA protected areas proposed PAs are also included (areas which are not protected, but deemed by WDPA to be prioritized for protection in the near or distant future, using a variety of local factors). (ii) Key biodiversity hotspots, a similar layer as used in Bending the Curve. The created potential protected layer is named the WDPA+, which comes to around 2700 Mha, which is ~21-24 per cent of the terrestrial land surface and 600 per cent more than present WDPA protection. Source: Vivid Economics.

The next section lays out how model assumptions influence system costs, focusing on the impact of climate action on transition costs.

Model interactions

In MAgPIE, land is a limited resource that needs to be allocated to either agricultural production (food, feed and other materials) or carbon sequestration. This allocation process aims to minimize the costs incurred by the land use system to meet a certain demand for agricultural products. Demand for agricultural products is a function of both population and income. The former relationship is straightforward – more food and fibre will be needed to feed and clothe a growing population. The latter refers to the fact that, as people become richer, their budget constraint loosens, allowing individuals to demand more than is "strictly" needed. As both population and GDP are set to increase under SSP2,[76] demand will grow accordingly, and the agricultural sector will have to produce more using the same amount of land. This will intensify competition among land uses, leading to investment in innovation, higher production efficiency and higher food prices.

Figure A 3. Examples of policy impacts on the land use sector



Source: Vivid Economics.

[76] Assumption that remains unvaried across scenarios.

The introduction of climate policies puts additional pressure on the land use sector, increasing the costs associated with meeting agricultural demand (Table A 6). First, expanding area protection to include biodiversity hotspots as well as setting aside land to meet NDC commitments reduces the hectares of land available for agricultural production. Additionally, the introduction of a price on greenhouse gases has two direct effects on the land use system: on the one hand, it increases production costs for emission-intensive activities, such as production of beef and animal feed; on the other hand, it increases the benefits associated with non-productive activities, such as regrowth of natural vegetation for carbon sequestration. To meet demand under increasingly stringent land constraints and with cleaner/less costly production systems, the land use system faces substantial transition costs both in the form of investments to increase efficiency as well as operational costs associated with more intensive production systems.

Section 1.2.3 provides more detail on the types of cost considered in the estimation of investment needs.

Model outputs and analysis of investment needs

As the model accounts for all costs in the land use sector, we differentiate between direct and indirect costs of climate action. The former category includes costs related to GHG emissions and mitigation actions. The latter category includes costs in the agricultural sector, either investments or recurring costs, which are likely to increase with policy ambition. In this case, the difference across scenarios is going to be driven by the additional pressure put on the land use system by climate action. As mentioned in Section 1.2.2, the reason for this is that, to reach climate and biodiversity targets, the land use sector allocates larger areas to forestry and regrowth of natural vegetation, reducing the amount of land available for agricultural production. To "feed" an increasingly populous and rich world, agricultural producers need to become more efficient by investing in innovation and increasing spending on the overall production process. For example, firms trying to increase their crop yields will have to invest some capital in acquiring innovative machinery or develop new production systems and spend more money on skilled labour.

Table A 6. Costs from MAgPIE

Category	List of costs	Description
Indirect costs	1. Costs of input factors	Costs of input factors for producing food and materials includes labour, energy, physical inputs and non-land capital cost
Indirect costs	2. Investment in technical change and adoption	Investment in technical change and adoption includes R&D, adoption and irrigation expansion
Indirect costs	3. Costs of processing, transport and trade	Costs of processing, transport and trade includes all downstream costs to consumer
Indirect costs	4. Cost of land conversion	Cost of land conversion from one land use to another, including land clearing, land preparation, for agriculture or restoration
Indirect cost	5. Cost of forest management	Cost associated with forest management
Direct costs	6. Costs of climate policy	Split into a. Emissions costs associated with a Paris-aligned carbon pricing trajectory and b. Rewards for negative emissions

Source: Vivid Economics.

To estimate investment needs, we look at the difference in indirect costs of climate action. Focusing on this category of cost allows us to estimate the global spending needed to meet climate and biodiversity targets. Total investment needs between 2020 and 2050 are calculated as the difference in cumulative discounted cashflows of indirect costs of climate and biodiversity action between policy and baseline scenario:

$$Total\ investment\ needs_{2020-2050} = \sum_{t=2020}^{2050} \Delta\ Costs_t$$

$$= \sum_{t=2020}^{2050} \Delta\ Costs_{t,\ Policy\ Scenario} - Costs_{t,\ Baseline\ Scenario}$$

The following section provides an overview of the analysis of investment needs for NbS that are not covered in the model. We start with a discussion on the sources of data for the off-the-model analysis and conclude with an overview of the methodology and outputs.

The off-model analysis focuses on three types of NbS asset: mangroves, peatlands and agroforestry:

- **Mangroves** are dense coastal forests covering the planet's tropical and sub-tropical belt. Mangrove forests not only sequester close to 32 Mt CO_2 annually but also protect coastal areas from extreme events, improve water and food security, and provide a safe breeding ground for marine biodiversity. This study includes restoration of mangrove forests.[77]

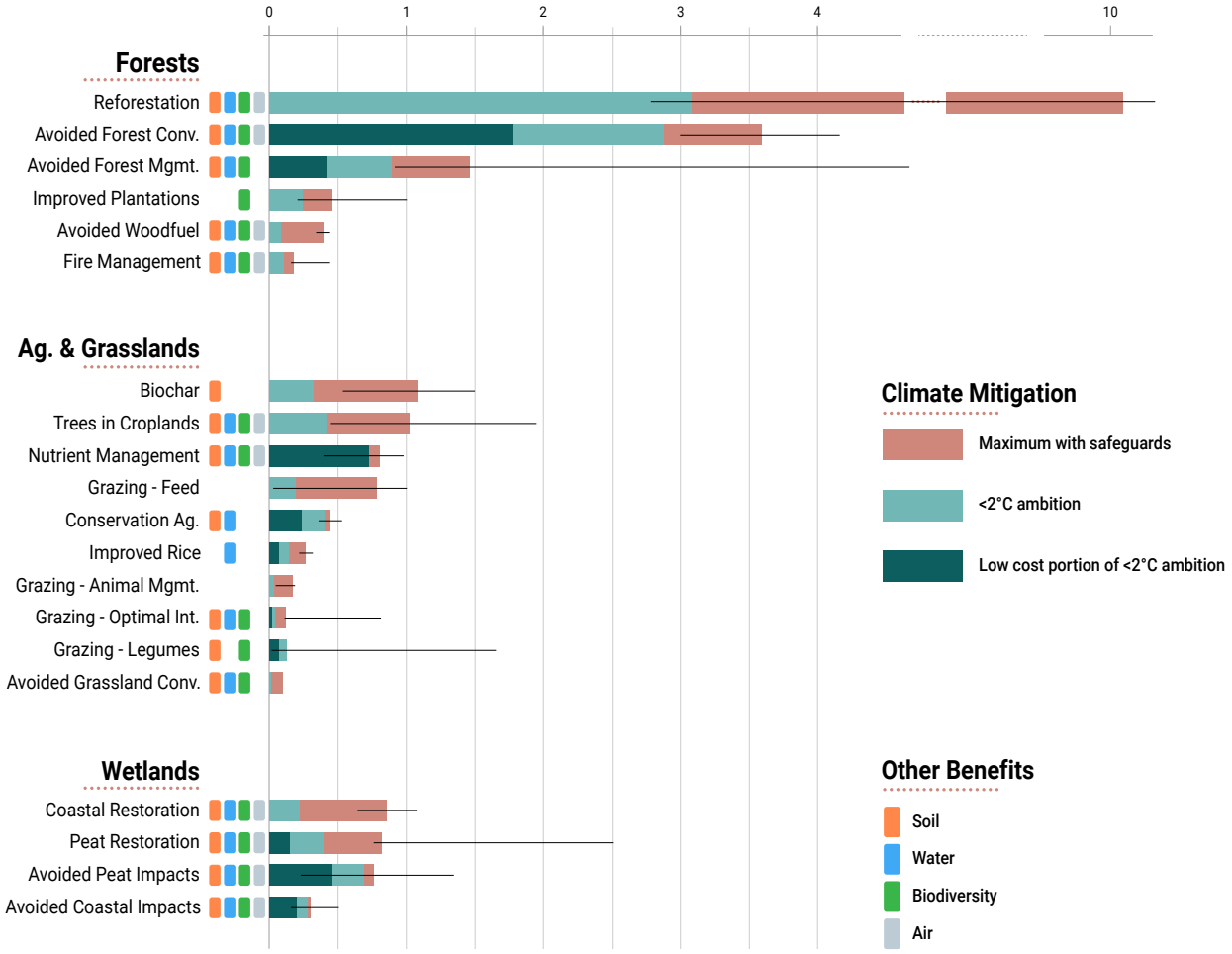
- **Peatlands** are terrestrial wetland ecosystems where "year-round waterlogged conditions slow the process of plant decomposition to such an extent that dead plants accumulate to form peat".[78] Peatlands provide the largest natural terrestrial carbon stock storage (550 Gt CO_2), but damaged peatlands contribute to approximately 5-6 per cent of GHG emissions from land use,[79] and that can rise to 10 per cent when they are on fire. This study looks at the costs related to restoration of damaged and degraded peatlands, typically from overgrazing, drainage and fires.

- **Agroforestry** comprises "land use systems in which trees are grown in combination with agriculture on the same land".[80] This category also includes silvoarable agroforestry – the combination of trees and crops –, forest farming – cultivation of crops within a forest environment, – and other systems that entail planting trees between fields, e.g. hedgerows, shelterbelts and riparian buffer.[81] This study focuses on silvopasture, which is the combination of trees and livestock.

The proposed focus on mangroves, peatlands and agroforestry in this study is due to their mitigation potential, data availability and compatibility with modelled results. Estimates collected from Griscom et al. (2020) ensure that solutions with high climate mitigation potential are included in the analysis. A second stage of the analysis includes data collection on both costs and potential future uptake for each solution. Solutions that could not be integrated with the modelled results are excluded. For instance, trees on croplands are not included in the analysis, while trees on pastureland are.[82] In the case of silvopasture, the assumption is that trees are planted on grazing land, with no impacts on yields and production.

[77] The Case for Mangroves as a Nature-based Climate Solution (Earth Security, 2020).
[78] IUCN Issues Briefs – Peatlands and Climate Change.
[79] Joosten, H. (2015) https://www.ramsar.org/sites/default/files/documents/library/ny_2._korrektur_anp_peatland.pdf, IPCC (2020). https://wedocs.unep.org/bitstream/handle/20.500.11822/29261/IPCCLand.pdf?sequence=1&isAllowed=y; Wetlands International (2015). https://www.wetlands.org/publications/saving-peat-less-heat-update/.
[80] European Union, Article 23 of Regulation 1305/2013.
[81] Mosquera-Losada MR et al. (2018).
[82] This is because a methodology to integrate on-model assumptions around increase in crop yields and monoculture agriculture with off-model assumptions around silvoarable agroforestry has not yet been developed.

Table A 7. Climate mitigation potential in 2030 ($PgCO_2e$/year)



Source: Griscom et al. (2020).

Because MAgPIE focuses on forests and innovation in the agricultural sector, we integrate our modelled results with some off-the-model analysis to include investment needs associated with NbS not covered by the model. For this analysis we rely on available literature on capital costs and operating expenses associated with a subset of relevant NbS not covered in the modelling exercise. Table A 8 provides a list of sources and, for each, it details what type of information is going to be integrated in the analysis.

Table A 8. List of sources for NbS not covered by MAgPIE

Category	Source	Relevant Information
Mangroves protection	Adapt Now: A Global Call For Leadership On Climate Resilience. (Global Commissions on Adaptation, 2019)	Cost-benefit analysis of mangroves protection: costs by 2030 are close to $167bn (benefits $1tn, benefit to cost ratio 6:1)
Mangroves restoration	The Role of the Natural Environment in Adaptation, Background Paper for the Global Commission on Adaptation. (Kapos et al., 2019)	Median restoration costs for mangroves: $0.10/m^2 (between $0.05/m^2 and $6.50/m^2)
Mangroves restoration	Mapping Ocean Wealth Explorer and Mangrove Restoration Potential: A global map highlighting a critical opportunity (Worthington et al., 2018)	Restoration potential: 812,003 ha (regional information available in the paper)
Peatland restoration and protection	The Economics of Peatland Restoration (Glenk and Martin-Ortega, 2018)	Capital costs associated with restoration: £200/ha to £10,000/ha Recurring costs: £25/ha to £400/ha per year
Peatland restoration	Peatland protection and restoration are key for climate change mitigation (Humpenöder et al., 2020)	Peatland rewetting: One-time costs: USD05 7000/ha Recurring costs: USD05 200/ha Also includes information on total peatland restored under three different policy scenarios
Agroforestry	Vivid Economics	Silvopasture: (all numbers in 2019 £/ha) Capital Expenditure 1298,47 Operating Expense 18,94

Source: Vivid Economics.

The objective of the off-model analysis is to estimate direct costs of future restoration and protection of mangroves and peatland. To this end, for each ha of protection and restoration we calculate the associated cash flows as the sum of the capital investment and the cumulative operations expenditure between the initial investment period and 2050. For peatland, the timing of the investments follows the dynamics set out in Humpenöder et al., 2020; for mangrove protection and restoration we assume a linear increase in land protected/restored between 2020 and 2050. Direct costs of mangrove and peatland restoration are summed to the value obtained from MAgPIE to obtain total future investment needs. Because none of these options is considered by the model, the costs calculated on and off model are mutually exclusive.

6.3 Limitations

There are several limitations and notes regarding this report.

- **Land-related NbS:** This report focuses predominantly on finance of terrestrial NbS. To some extent this is due to the thematic focus of the organizations involved in issuing this report. However, another reason was data availability, especially in relation to private finance. Note that due to the aggregated nature of some data sets, some marine spending might be included. The authors advocate for future reports to include marine NbS.

- **Geographic scope:** This report collects data from the whole world. Since not every country publishes detailed data on public finance of NbS, some public finance will have been omitted.

- **Double counting:** There is a risk of double counting, which arises because it is unclear in some cases whether entities are included in multiple categories within data sets. During the data analysis, the authors triangulated data between sources and definitions with the intent to reduce the amount of double counting, but some might remain.

- **Investment at the "asset level":** This report focuses on actual investment in assets rather than pledged or budgeted figures.

- **Data limitations and related issues:** The authors encountered lack of comparable data, aggregation and limited disclosure of proprietary information. These risk double counting and partial quantification of costs, benefits and impacts.

- **Nature-neutral or negative finance:** This report tracks nature-positive finance, although it might also include nature-neutral or negative finance to some extent.

    - "Neutral finance" conditionally aligns with NbS activities, making sometimes negative or positive contributions depending on circumstance. Examples include agricultural intensification, bioenergy and timber harvesting.

    - "Negative finance" harms ecosystems and the biosphere. Examples include clearance of natural vegetation and/or drainage of peatlands for commodity production, unsustainable forest management and infrastructure development.

List of Abbreviations

AFD	French Development Agency
BECCS	Bioenergy with Carbon Capture and Storage
BEIS	UK Department for Business, Energy and Industrial Strategy
BFFI	Biodiversity Footprint for Financial Institutions
CBD	Convention on Biological Diversity
COFOG	Classification of the Functions of Government
COP	Conference of the Parties
CPI	Climate Policy Initiative
CPIC	Coalition for Private Investment in Conservation
CRS	Creditor Reporting System
DAC	Development Assistance Committee
DCA	Development Credit Authority
DFI	Development Finance Institution
DNB	De Nederlandsche Bank
ESG	Environmental, Social and Governance
EU	European Union
EUR	Euro
FAO	Food and Agriculture Organization
FONAFIFO	National Forestry Financing Fund
FSC	Forest Stewardship Council
GBP	Great British Pound
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GHG	Greenhouse Gas
GIIN	Global Impact Investing Network
GSI	Greenness of Stimulus Index
IATI	International Aid Transparency Initiative
IIASA	International Institute for Applied Systems Analysis
IISD	International Institute for Sustainable Development
IMF	International Monetary Fund
IPBES	Intergovernmental Panel on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IPR	Inevitable Policy Response
IUCN	International Union for Conservation of Nature

KPI	Key Performance Indicators
MDB	Multilateral Development Bank
NbS	Nature-Based Solutions
NCFA	Natural Capital Finance Alliance
NDC	Nationally Determined Contributions
NCS	Natural Climate Solutions
NYDF	New York Declaration on Forests
ODA	Official Development Assistance
OECD	Organization for Economic Co-operation and Development
OOF	Other Official Flows
PEFC	Programme for the Endorsement of Forest Certification
PES	Payment for Ecosystem Services
PIK	Potsdam Institute
P4F	Partnerships for Forests
REDD+	Reducing Emissions from Deforestation and Forest Degradation
RLU	Royal Lestari Utama
SAVi	Sustainable Asset Valuation
SOPIC	State of Private Investment in Conservation
SSP	Shared Socioeconomic Pathways
TLFF	Tropical Landscape Finance Facility
UK	United Kingdom
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
USD	United Stated Dollar
WDPA	World Database of Protected Areas
WISE-UP	Water Infrastructure Solutions from Ecosystem Services
WRI	World Resources Institute
WWF	World-Wide Fund for Nature

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