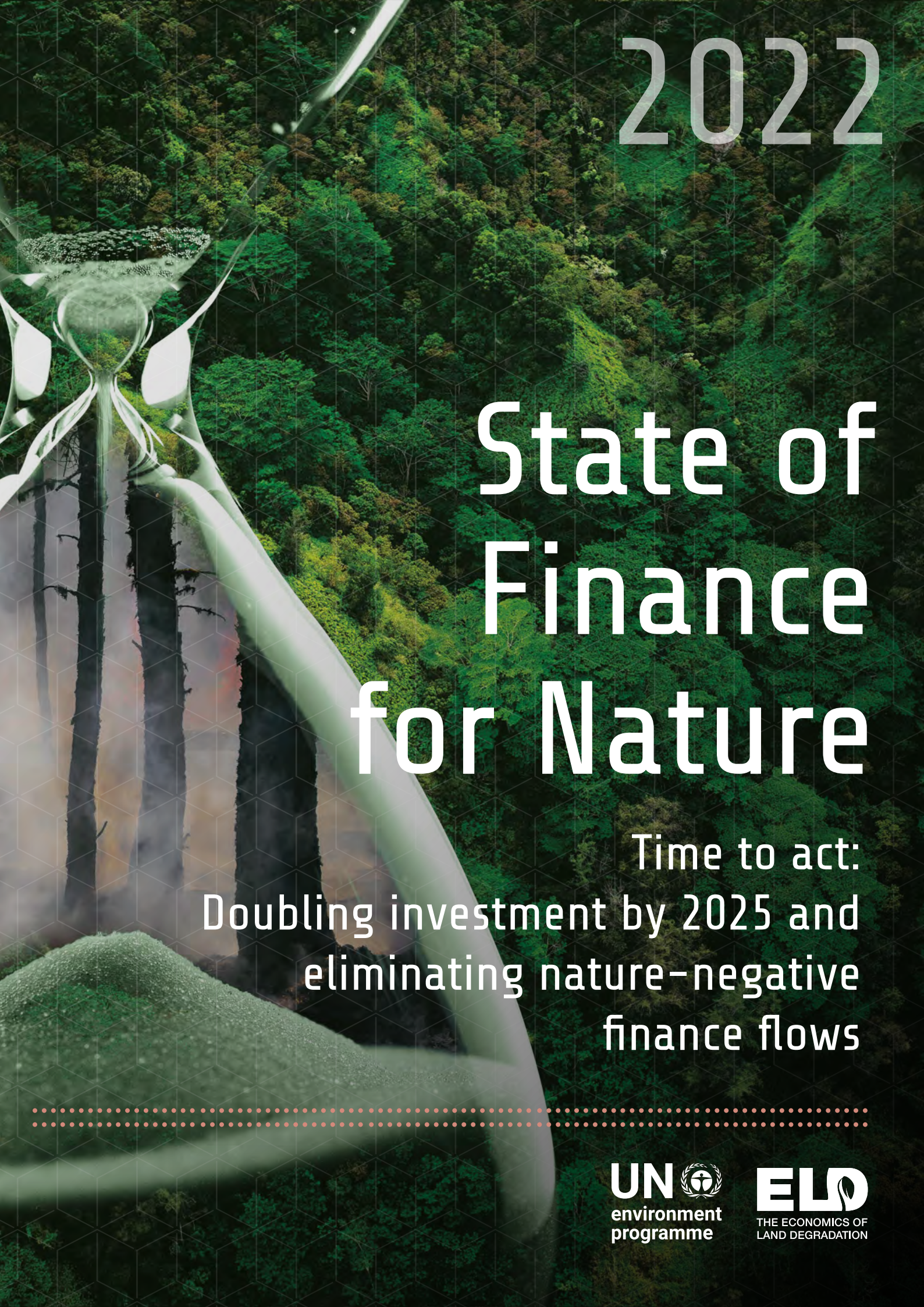

2022

State of Finance for Nature

Time to act: Doubling investment by 2025 and eliminating nature-negative finance flows

UN environment programme

ELD THE ECONOMICS OF LAND DEGRADATION

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Table of Contents

List of Exhibits and Tables

Foreword

Inger Andersen

Executive Director, UN Environment Programme

The world has changed dramatically since the first "State of Finance for Nature" report was published in 2021. War and extreme weather have caused devastation and immeasurable human suffering, and economic recession looms with inflation increasing rapidly. Food, energy and supply chain security have shot to the top of the political agenda. A growing number of people, including in developed countries, must choose between food on the table or paying energy bills. Meanwhile, natural assets continue to deteriorate due to chronic undervaluation of natural systems and systemic unsustainable production and consumption.

The scientific evidence on the trajectories and costs of climate change, biodiversity loss and land degradation is undeniable and continues to accumulate. The impacts are large and visible as people suffer from droughts and floods, the conversion of nature that provides food, water and medicine to people and falling agricultural output due to land degradation.

From the massive floods in Pakistan to the dried-up rivers across Europe and China, to the collapse of the Conger ice shelf on East Antarctica and the dwindling state of coral reefs, human activity is driving the decline of the natural environment. This in turn is causing growing impacts on businesses, finance institutions and economies around the world.

The big question that humanity faces at this pivotal moment is how to transform our economic systems, including processes of production and consumption, to ensure that we remain within planetary boundaries, limit climate change, and reverse the loss of nature and endangered species. How do we ensure economic growth while supporting human development and equality, mitigating and adapting to climate change and protecting the natural assets that underpin human well-being? Nature is the essential algorithm for the future of humanity.

Following COP 27 on climate change and ahead of COP 15 on biodiversity to be held in December, the *State of Finance for Nature* report highlights the need to significantly increase finance and investment in nature-based solutions. Finance will undoubtedly be a sticking point, but something that will have to be dealt with head on given the nexus of multifaced crises.

While nations around the world are concluding negotiations on a post-2020 Global Biodiversity Framework, we must keep in perspective the broader economic and social landscape. Stock markets are volatile with energy and food price inflation, as economies continue to reel from the toll of Covid-19. This poses governance and stability risks in regions prone to food insecurity, affecting the world's poorest and most vulnerable.

With no end in sight to the current state of uncertainty, it is important to get back to the basics: the survival of all life on earth. "Net zero" without "nature positive" simply won't make it. Heads of State together with business and finance leaders have an obligation to both the present and future generations to increase investment into nature-based solutions. We must collectively and urgently redirect and scale capital to nature, climate and restoration-positive activities that bring us back on track towards a stable and nature-abundant planet that we can all equitably benefit from.

Glossary

Biodiversity	The variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. (United Nations Convention for Biological Diversity [UNCBD])
Capital expenditure (investments)	Expenditure used to purchase and create assets that generate services for more than one year.
Finance gap	The difference between current financial flows into NbS and future financial needs to achieve climate, biodiversity and land degradation neutrality targets.
Financial flows	Capital and operating expenditure by the public or private sector.
Financing needs	The amount of financial flows needed in NbS to achieve climate, biodiversity, and land degradation neutrality targets.
Natural capital	The world's stocks of natural assets, which include geology, soil, air, water and all living things. It is from natural capital that humans derive a wide range of services, often called "ecosystem services", which make human life possible. (UNCBD)
Nature	All the existing systems created at the same time as the Earth, all the features, forces and processes, such as the weather, the sea and mountains. (UNCBD)
Nature-based solutions (NbS)	Actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services and resilience and biodiversity benefits (United Nations Environment Assembly 5 [UNEA-5])
Nature-harming/negative financial flows	Financial flows that support activities that could negatively affect nature.
Nature positive	A high-level goal and concept describing a future state of nature (e.g. biodiversity, ecosystem services and natural capital) that is greater than the current state. (Science-based Targets Network (2022))
Nature-related risk	Potential threats posed to an organization linked to its and other organizations' dependencies on nature and nature impacts. These can derive from physical, transitional and systemic risks. (Climate Disclosure Standards Board (2021)) Framework application guidance for biodiversity-related disclosures; (Task Force on Climate-Related Financial Disclosures [TCFD] (2017))
Net zero	A state in which the greenhouse gases going into the atmosphere are balanced by removal out of the atmosphere

List of Abbreviations

BII	Biodiversity Intactness Index
CAP	Common Agricultural Policy
CI	Conservation International
COFOG	Classification of the Functions of Government
COP	Conference of the Parties
CRS	Creditor Reporting System
DAC	Development Assistance Committee
DFI	Development finance institution
ELD	Economics of Land Degradation
ESG	Environmental, Social, and Governance
EU	European Union
FAO	Food and Agriculture Organization
FÖS	Forum Ökologisch-Soziale Marktwirtschaft
GDP	Gross Domestic Product
GHG	Greenhouse gases
HNWI	High-Net-Worth Individuals
IC-VCM	Integrity Council for the Voluntary Carbon Markets
IEA	International Energy Agency
IFI	International Financial Institutions
IMF	International Monetary Fund
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
LDN	Land Degradation Neutrality Commitments
MDB	Multilateral development bank
MPA	Marine protected area
NBFP	National Biodiversity Finance Plans
NbS	Nature-based solutions
NBSAPs	National Biodiversity Strategies and Action Plans
NCS	Nature-climate solutions
NDC	Nationally Determined Contributions
NGO	Non-governmental organization
ODA	Official Development Assistance
OECD	Organisation for Economic Cooperation and Development

SDG	Sustainable Development Goals
SFN	State of Finance for Nature
SOE	State-owned enterprise
TCFD	Task Force on Climate-Related Financial Disclosures
TPA	Terrestrial protected area
TNC	The Nature Conservancy
TNFD	Taskforce on Nature-related Financial Disclosure
UBA	Umweltbundesamt
UK	United Kingdom
UNCBD	United Nations Convention on Biological Diversity
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEA	United Nations Environment Assembly
UNEP FI	United Nations Environment Programme Finance Initiative
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
US$	United States dollar
VAT	Value Added Tax
WCF	Wildlife Conservation Society
WEF	World Economic Forum
WWF	World Wildlife Fund

Executive Summary

| Photo by Matt Howard on Unsplash

Executive Summary

The State of Finance for Nature (SFN) 2022 report quantifies public and private finance flows to nature-based solutions (NbS) to tackle global challenges related to biodiversity loss, land degradation and climate change. Current investments are compared to investment needed to meet targets of the Rio Conventions under the United Nations Convention on Biological Diversity (UNCBD), United Nations Framework Convention on Climate Change (UNFCCC) and the United Nations Convention to Combat Desertification (UNCCD). This report is the second in a series that aims to inform public and private actors about progress against key targets and the extent to which finance flows are aligned with global targets and the investment needed to limit global warming to below 1.5 or 2°C, halt biodiversity loss and achieve land degradation neutrality. It also provides high-level recommendations on how to scale up financial flows to NbS and improve alignment with nature-positive outcomes.

This second edition has a broader scope than the inaugural report in 2021. First, analysis of capital flows has been expanded to include marine nature-based solutions. Second, the investment in NbS needed to limit climate change to below 1.5°C (in addition to the 2°C target) is estimated, given the enormous impact this has on nature and people. Third, public nature-negative capital flows have been quantified, to put into context capital flows to NbS. Fourth, the benefits of investing in NbS have been estimated to demonstrate to politicians, business and finance leaders that nature is a large part of the solution to global crises.

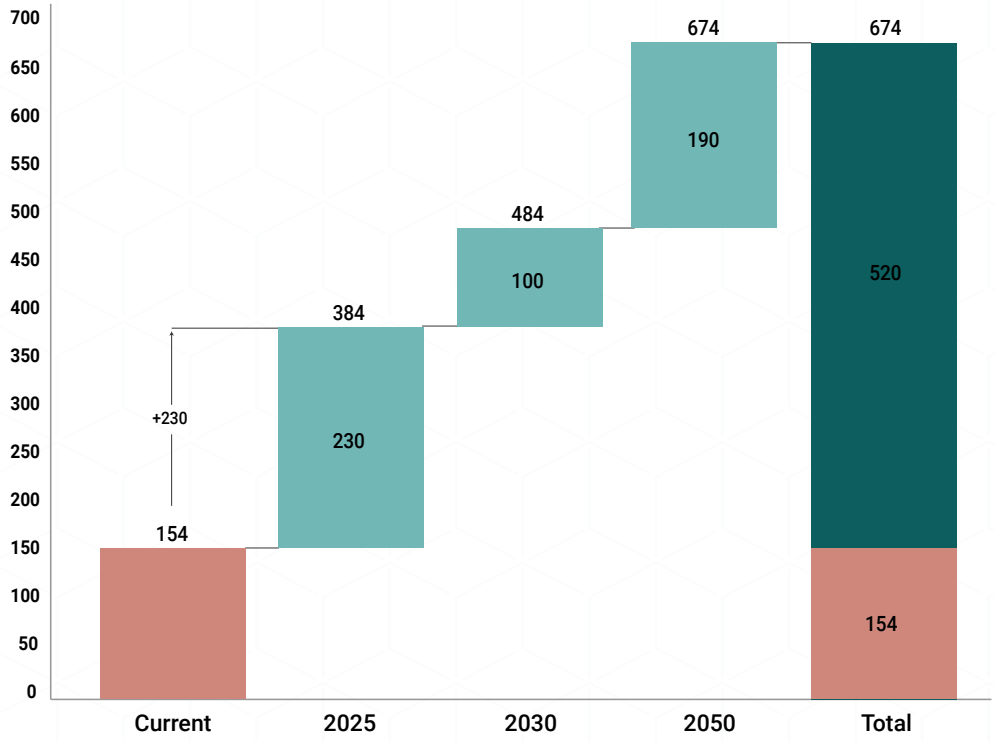
NbS can play a major role in addressing a broad range of societal challenges, from managing water scarcity to reducing disaster risk to poverty alleviation. The World Economic Forum (WEF) estimates that nature-positive policies could attract more than US$10 trillion in new annual business value and create 395 million jobs by 2030 (WEF 2020a).This report focuses specifically on the ability of NbS to tackle societal challenges related to the climate crisis, land degradation and biodiversity loss. Terrestrial and marine ecosystems are responsible for absorbing and storing about half of global carbon emissions (Griscom *et al.* 2017). The Intergovernmental Panel on Climate Change (IPCC) special report on limiting global warming below 1.5°C found that three of the five most effective strategies for reducing emissions are nature-based solutions: ecosystem protection, restoration and improved management of farmlands. Human rights and gender equality are integral to financing NbS, particularly the use of public funds to ensure equitable and effective solutions on the ground.

Key Messages

The key messages of this report are:

- **Finance flows to NbS are currently US$154 billion per year, less than half of the US$384 billion per year investment in NbS needed by 2025 and only a third of investment needed by 2030 (US$484 billion per year)** to limit climate change to below 1.5°C, halt biodiversity loss and achieve land degradation neutrality. Urgent and large increases in finance for nature are essential.

The trajectory of annual NbS investment needs to limit climate change to below 1.5°C, halt biodiversity loss and achieve land degradation neutrality, $ billion (2022 US$)

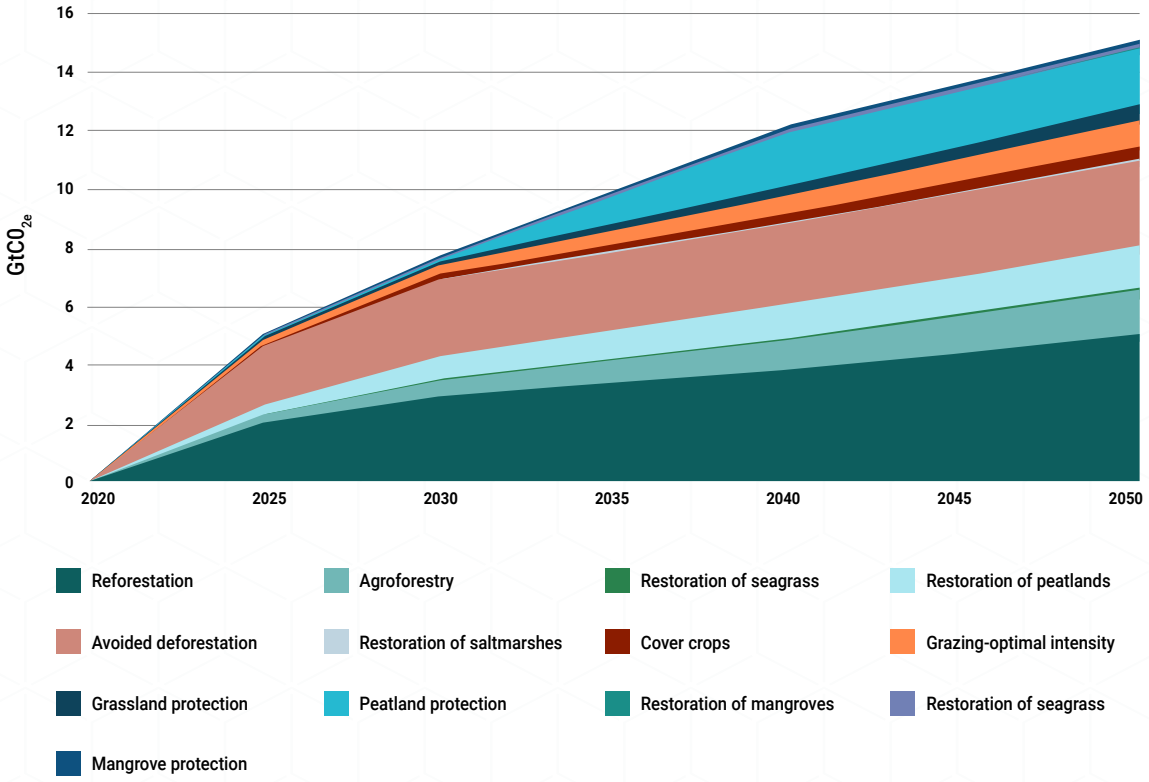


- **With sufficient finance, NbS provide the means to cost-effectively reach climate, biodiversity and land degradation neutrality targets,** particularly if investments simultaneously contribute to biodiversity (National Biodiversity Strategies and Action Plans [NBSAPs]), climate (Nationally determined contributions [NDC]) and restoration (Land Degradation Neutrality [LDN]) targets.[1] This "double" or "triple" win potential is particularly alluring given the current economic situation.

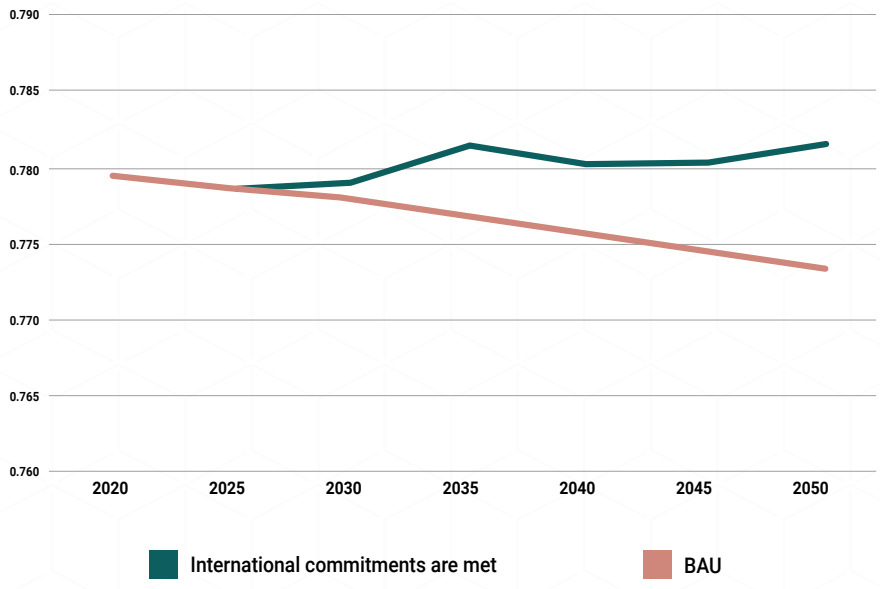
- Delayed action is no longer an option in the face of the devastating effects of climate change, the extinction crisis and severe land degradation globally. Politicians, business and finance leaders and citizens globally must transform their relationship with nature to work with it rather than against it. This report provides hope - **if we rapidly double finance flows to NbS, we can halt biodiversity loss (measured through the Biodiversity Intactness Index below), significantly contribute to reducing emissions (5 $GtCO_2$/year by 2025 further rising to 15 $GtCO_2$/year by 2050 in the 1.5°C scenario) and restore close to 1 billion ha of degraded land.**

[1] NBSAPs are national biodiversity action plans. NDCs refer to 'nationally determined contributions', essentially the climate targets that governments set for their own nation. LDN stands for 'land degradation neutrality' a key target of the UNCCD Convention.

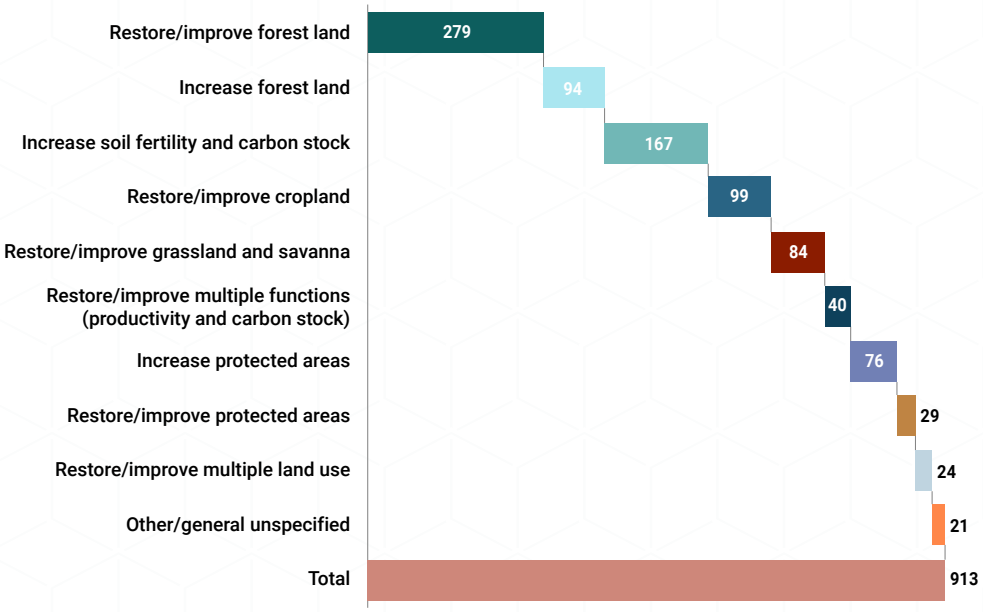
Greenhouse gas (GHG) removals by activity under the 1.5°C scenario, 2022 to 2050, $GtCO_2e$/year



Biodiversity Intactness Index under different scenarios

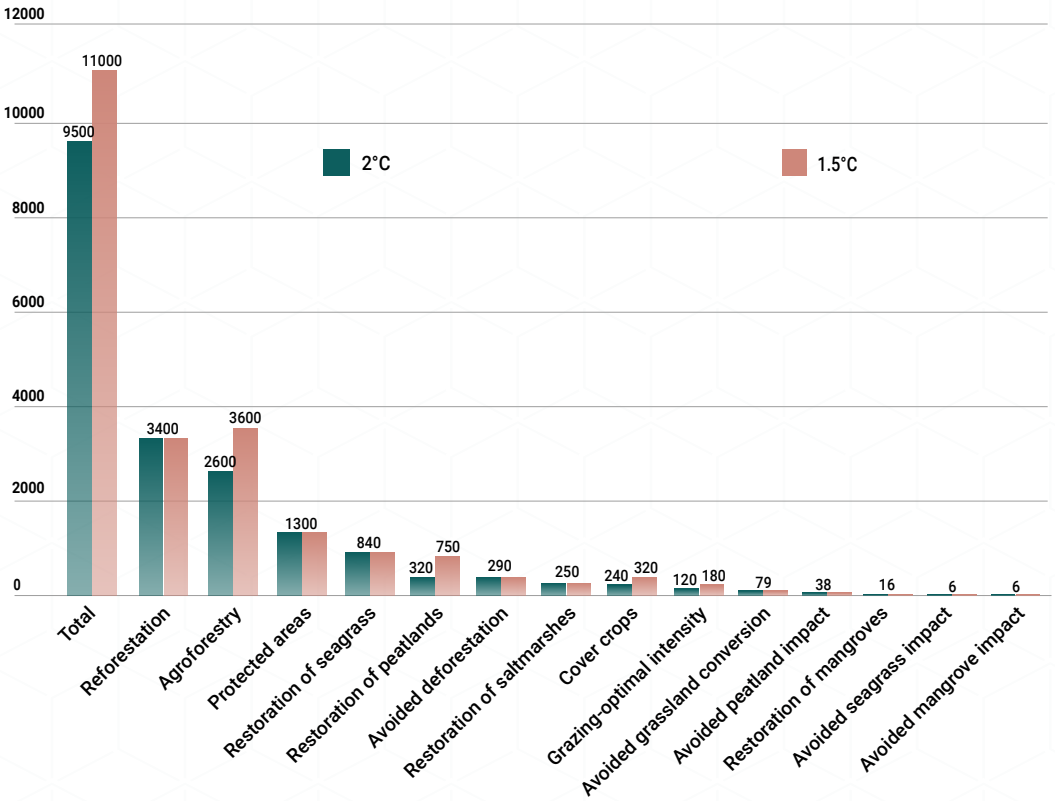


Global land restoration commitments by 2030, million hectares



- **Limiting climate change to below 1.5°C is achievable only if action is immediate.** To complement non-nature-based mitigation actions, cumulative (2022-50) investment in NbS required to achieve the 1.5°C target in line with the Paris Agreement is at least US$11 trillion (compared to an estimated cumulative investment need of US$9.5 trillion in the 2°C scenario). This cumulative investment takes the deployment of NbS close to its total potential identified given bio-physical, social and governance constraints. Strong action before 2030 is critical.

Cumulative investment needs from 2022 to 2050 in 1.5°C and 2°C scenarios, $ billion (2022 US$)



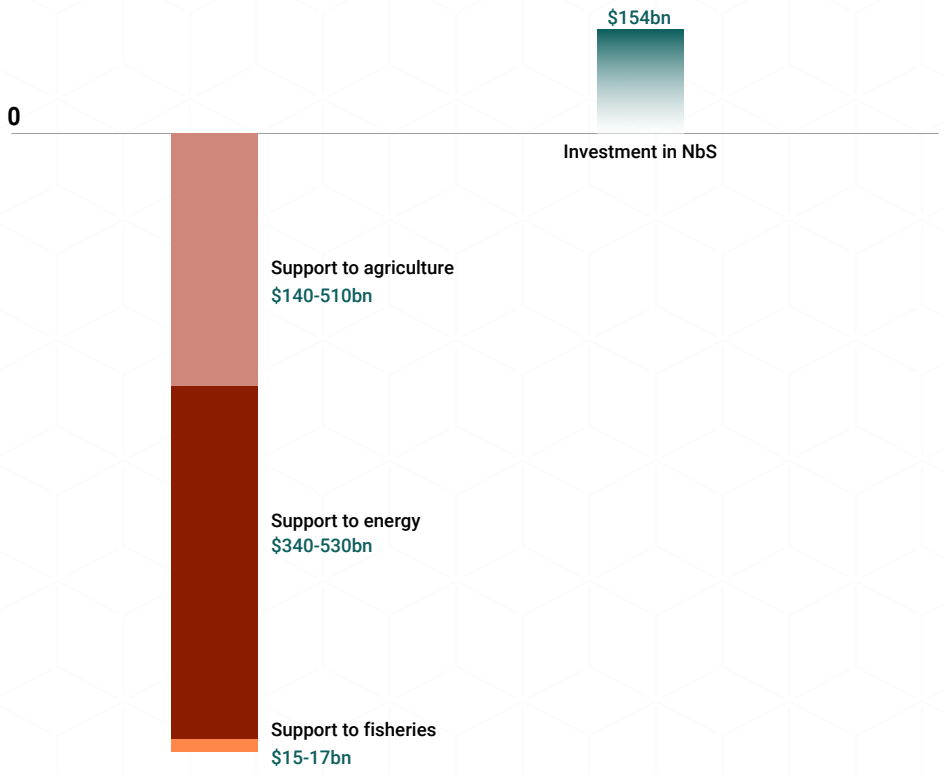
- **Private sector investment in NbS must increase by several orders of magnitude in the coming years from the current US$26 billion per year, which represents only 17 per cent of total NbS investment.** While philanthropic capital and carbon markets have grown significantly between the SFN 2021 report and this edition, impact investment and investment in sustainable supply chains have increased very little. This is in stark contrast to the myriad of net zero and deforestation-free commitments made by agri-food companies, banks and investors, which have seen too little action and too little capital deployed. Voluntary business commitments without a time-bound plan or roadmap for implementation are not acceptable.

- **Investment in marine NbS constitutes only 9 per cent of total investment in NbS**, which is very low given the role of the oceans in climate mitigation and supporting adaptation, food security and biodiversity conservation. Current annual investment in marine protected areas is US$980 million, whereas terrestrial protected areas receive almost US$23 billion. The annual finance gap to increase marine protected areas to 30 per cent by 2030 is US$8–11 billion.

- **Nature-negative expenditures far outweigh investments in nature-based solutions** – Government expenditure on environmentally harmful subsidies to fisheries, agriculture and fossil fuels is estimated at US$500 billion to 1 trillion per year, which is three to seven times greater than public and private investments in NbS. These flows severely undermine efforts to achieve critical environmental targets. While robust evidence is lacking, it is widely recognised that private finance flows are predominantly negative for nature and almost certainly exacerbate the situation.

- **It is critical to rapidly align policies, regulation, economic activity and financial flows with biodiversity values and with the Paris Agreement.** Governments need to lock in critical targets on biodiversity loss, take urgent action to raise ambition and implement emissions reduction targets in line with the Paris Agreement and action land restoration commitments. These targets must be underpinned by broad based resource mobilisation from all sources. Public and private actors need to mobilise the necessary finance and close the finance gap while governments anchor targets in national regulation/legislation.

Potentially nature-negative public financial flows, $ billion per year (2022 US$)



Recommendations

This report also examines how best to scale up and improve targeting of investment in NbS and who needs to do what over the next two to five years and to 2030. High-level recommendations are structured around the need to:

1. Financing green — increase direct finance flows to NbS through public domestic expenditure, nature-focused Official Development Assistance (ODA), ensuring that multilateral development banks (MDBs) and development finance institutions (DFIs) prioritise green finance, and providing regulation and incentives for private sector investment, particularly in nature markets and sustainable supply chains.

2. Greening finance – companies in the real economy and financial institutions need to transition to "net zero, net positive" and equitable business models in a time-bound manner with short-term targets. This requires disclosure of climate and nature-related financial risks, and where and how products are produced across supply chains. Align public and private financial flows with the goals and targets of the Global Biodiversity Framework, the Paris Agreement and restoration commitments. Accelerate reform of nature-harmful public financial flows to reduce investment needs to redress adverse effects through NbS. Integrate nature and climate-related risks and opportunities into business and financial decision-making, risk management and disclosure frameworks to reduce nature damaging private investment flows. Require national and international development finance institutions and multilateral development banks to remove climate and nature negative lending and investment from their portfolios.

3. Increase inclusion in financial systems for a just transition. Public and private sector efforts to scale up NbS investments need to integrate just transition principles, safeguarding human rights. This includes providing social protection, land rights and decent working conditions and the participation of local and indigenous communities, including women and other marginalised and vulnerable groups.

1 Introduction

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Most of humanity has historically fought *against nature*, draining wetlands, razing forests for urban development, canalising rivers and introducing monocultures with heavy use of fertilisers and pesticides. The future will have to look fundamentally different by working *with nature* if we are to reverse the severe loss of biodiversity, tackle the climate crisis and restore a billion hectares of healthy ecosystems that have been lost over the last few decades.

City planners and mayors in cities can create incentives to green roofs, expand parks and green spaces, and bring water back into cities to reduce the effect of extreme heating. Farmers can regenerate soils that have been depleted over decades by the overuse of fertilisers and rehabilitate degraded land. Mangroves can function as natural barriers against storm surges in coastal areas. Scaling up the deployment of capital to finance nature-based solutions both from public and private sources is essential, including the right mix of economic and regulatory incentives. It requires human ingenuity, and above all the willingness of politicians, business leaders, finance institutions and consumers to work *with nature* instead of *against it*.

The impacts of climate change, biodiversity loss and ecosystem degradation are already severe and widespread. Yet almost half of global gross domestic product (GDP) is dependent on well-functioning ecosystems (WEF 2020b). Global temperature increases of 1.2°C on average compared to the pre-industrial age have resulted in more frequent and extreme climatic events, causing adverse impacts on nature and society (IPCC 2022a). Livelihoods and well-being have been eroded through changes in agricultural productivity, impacts on human health and food security, destruction of homes and infrastructure, and loss of property and income, with adverse effects on gender and social equity (IPCC 2022b). This will further exacerbate the situation if no action is taken. Current estimates put the costs of climate (in)action at between 4 per cent of GDP (if the Paris Agreement is met and the temperature rise stays below 2°C) and 18 per cent if no action is taken and the world moves to +3°C warming (Swiss Re Group 2021).

NbS can play a major role in addressing a broad range of societal challenges, from managing water scarcity to reducing disaster risk to poverty alleviation. The WEF estimates that nature-positive policies could attract more than US$10 trillion in new annual business value and create 395 million jobs by 2030 (WEF 2020a). This report focuses specifically on the ability of NbS to tackle societal challenges related to the climate crisis, land degradation and biodiversity loss. Terrestrial and marine ecosystems are responsible for absorbing and storing about half of global carbon emissions (Griscom *et al.* 2017). The IPCC special report on limiting global warming to below 1.5°C found that three of the five most effective strategies for reducing emissions are nature-based solutions: ecosystem protection, restoration and improved management of farmlands.

The effective design of NbS can unlock a wide range of co-benefits that align with the Sustainable Development Goals (SDGs). In addition to cost-effective mitigation and adaptation options, NbS can reduce disaster risk and improve food and water security. As people and nature are inextricably linked, financing inclusive NbS that integrate cross-cutting principles such as gender equality and a rights-based approach is crucial. NbS investments that have strong co-benefits with other goals such as poverty alleviation, education, gender equality and food security are more likely to lead to sustainability.

Natural capital, including life on land and sea, provides the foundation for our society and economy to thrive (Stockholm Resilience Centre 2016). Transforming people's relationship with nature is key to a sustainable future and can contribute to poverty alleviation, equity, health, development, peace, food, water, sanitation, and safe cities and settlements (United Nations Environment Programme [UNEP] 2021a).

Box 1. Defining Nature-based Solutions

A clear and agreed definition of NbS enables improved understanding and implementation of NbS with their multiple benefits across biodiversity, climate and human well-being. In March 2022 at UNEA5, governments agreed a definition of NbS as:
"Actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services and resilience and biodiversity benefits".
This definition builds on the International Union for Conservation of Nature (IUCN) definition used in SFN 2021.

The ambition of governments to implement land and marine NbS has grown in recent years. Countries are including NbS in their National Biodiversity Strategic Action Plans (NBSAPs or biodiversity targets), Nationally Determined Contributions (NDC or climate targets) and Land Degradation Neutrality Commitments (LDN or restoration targets). In recent years, a movement to become **nature-positive** in addition to **net zero** has emerged, emphasising both the preservation and enhancement of ecosystems. The World Bank Group recently highlighted NbS as a key priority area in its Climate Change Action Plan (2021 to 2025) to prioritise climate adaptation and resilience (World Bank Group 2021).

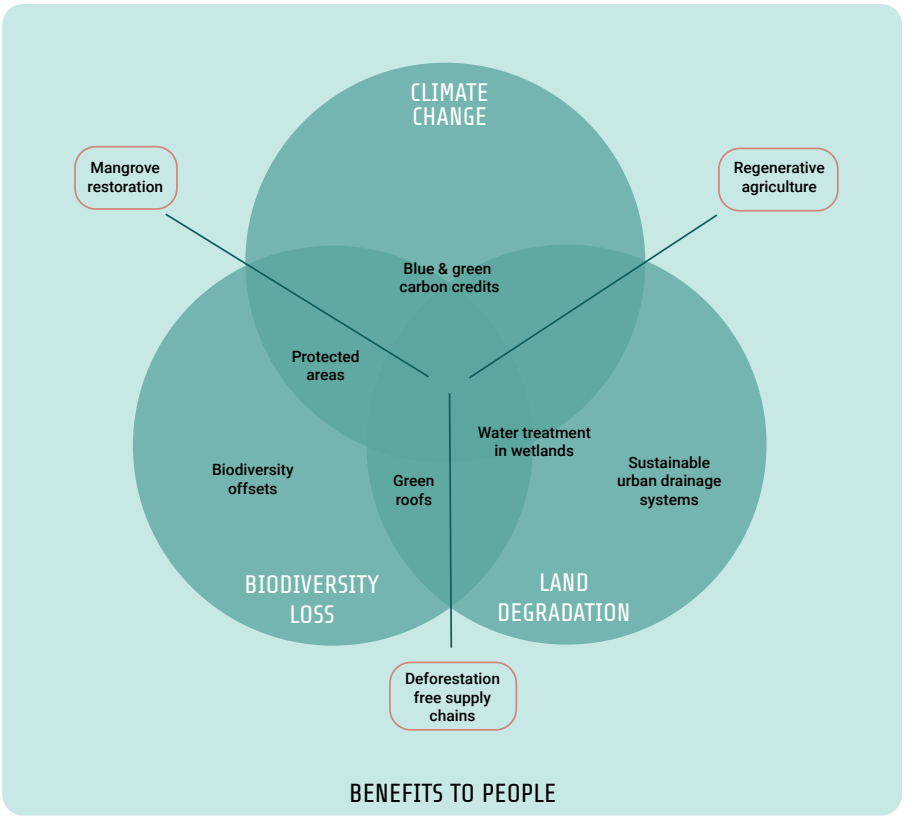
Nevertheless, this report provides strong evidence that **NbS investment is severely underfunded and requires dramatic and urgent scaling up.** Most of nature's potential contributions to solving climate change are cost-effective but remain underfunded (IPCC 2022a). With food and energy crises raging in 2022, leading to higher inflation and action by central banks to curb demand, the outlook is challenging. This is further heightened by the fact that many nations did not "build back better" after the Covid-19 crisis, but mostly "build back as usual" by not requiring environmentally sensitive sectors to factor in nature and climate requirements as a precondition for fiscal stimulus.

Crises have been used too often to avoid tackling persistent systemic problems like the nature, climate and land degradation crises. We live in an era of high economic, social and environmental indebtedness. Many governments around the world have unsustainable levels of debt. Social indebtedness is manifesting in high levels of inequality in society. And as this report and others show, we are increasingly eroding our limited natural capital through unsustainable production and consumption, leading to further "environmental indebtedness". We must learn from past mistakes and use the current situation to fundamentally rewrite our contract with nature.

Finance flows to NbS included in this report are aligned with the UNEA definition and have been selected based on data availability and their potential for climate change mitigation and the protection and restoration of ecosystems and biodiversity. Finance flows are included in this analysis if they positively contribute to nature-based actions to protect biodiversity and/or sequester and store greenhouse gases (GHG) and/or sustainably manage and/or restore degraded land and seascapes. In addition to having a positive impact on either climate, biodiversity or restoration, the activity must not adversely affect climate or biodiversity or undermine restoration efforts.

Exhibit 1 below provides some examples of NbS that have only biodiversity or climate benefits and NbS that have multiple benefits. For example, mangrove restoration stores carbon (climate benefits), provides protection and food sources for fish (biodiversity benefits) and food and fuelwood to local communities (social benefits) while protecting against storms and coastal erosion (avoided degradation benefits). However, this analysis is not limited to those NbS that have multiple benefits. As such, the scope of NbS finance included in this report is relatively broad and may not adhere to more stringent criteria for NbS, e.g. the IUCN Global Standard for NbS.

Exhibit 1. NbS to climate change, biodiversity loss and land degradation, contributing to human wellbeing



Sources: Own depiction

The remainder of this report is structured as follows:

- **Chapter 2: How much are we investing in nature-based solutions?** This chapter provides estimates of current finance flows from public and private sources for NbS in terrestrial and marine ecosystems. Current estimates are compared to findings from SFN 2021 to identify changes over time. This chapter has been expanded to look at public financial flows that are potentially harmful to nature.
- **Chapter 3: How much money is needed to create a sustainable and thriving future?** This chapter identifies finance needed to meet Rio Convention targets to keep climate change below 1.5 and 2 degrees, the 30x30 target for biodiversity and land degradation neutrality by 2030. The difference between current flows (Chapter 2) and investment needs, the finance gap, indicates where we are relative to where we need to be. Finally, the benefits of increased investment to close the finance gap are estimated in terms of GHG removals and biodiversity intactness.
- **Chapter 4: Key conclusions and recommendations.** This chapter summarises the findings and provides recommendations on urgent action needed by public and private actors to use NbS to its full potential in the battle against climate change, biodiversity loss and land degradation.
- **Chapter 5: Future directions.** This final chapter looks at how future editions of this report can better assess finance flows to NbS based on methodological development, improvements in data and expanding the scope, e.g. to include measurement of nature negative private investments.

2 Current financial flows to NbS

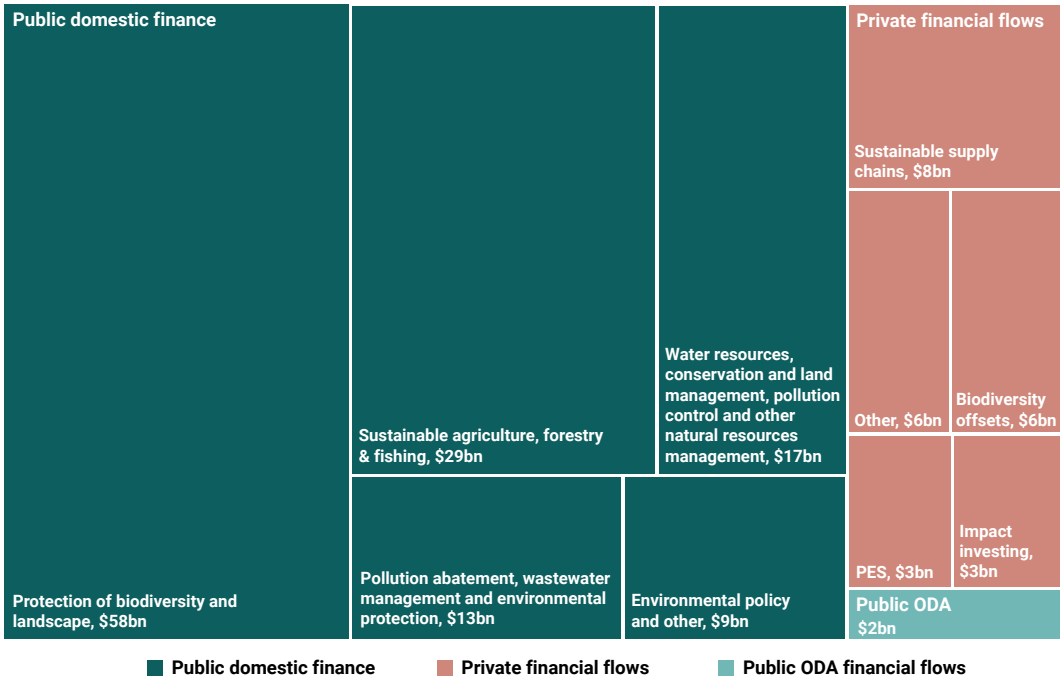
| Photo by Pat Josse on Pixabay

This chapter looks at current volumes of **public and private capital directed to nature-based solutions.** The scope of the analysis has been expanded to included marine nature-based solutions and assessment of protected area expenditure. This edition also looks at **nature-negative flows** from public sources to demonstrate that scaling up investments into NbS will not be sufficient unless we also reduce and redirect nature-negative capital flows, providing a holistic overview of where and how capital is being deployed at present and changes needed.

2.1. Current financial flows

Current public and private financial flows to NbS are estimated to be US$154 billion per year (see Exhibit 2). Public funds make up 83 per cent of the total, directing US$126 billion per year towards NbS through government domestic expenditure and US$2 billion per year through Official Development Assistance (ODA). The private sector contributes approximately 17 per cent at US$26 billion per year.

Exhibit 2. Public and private finance in terrestrial and marine NbS: US$154 billion (2022 US$)



Sources: (Organisation for Economic Cooperation and Development [OECD] Classification of the Functions of Government [COFOG] 2018-2019); (International Monetary Fund [IMF] COFOG 2016-2017); (OECD Official Development Assistance [ODA] 2018-2019); (USA Spending 2020-2021); (Convention on Biological Diversity [CBD] China's Financial Reporting Framework 2015); (OECD Creditor Reporting System [CRS] 2017 and18); (OECD ODA Sustainable Ocean Economy 2019/2020); Geneva Impact Investing Network [GIIN] (2020); Hamrick (2017); Donofrio (2019); Deutz et al. (2020); FundingtheOcean.org (2020); OurSharedSeas (2021); Ecosystem Marketplace (2022); Food and Agriculture Organisation [FAO] (2018); Rainforest Alliance (2013); Solidaridad (2020); Behan de Jong (2019); Impact Assets (2020); Conservation International [CI] (2021); Royal Society for the Protection of Birds [RSBP] (2021); The Nature Conservancy [TNC] (2021); Wildlife Conservation Society [WCS] (2021); World Wide Fund for Nature [WWF] (2021).
Note: The "other" category includes private finance from philanthropy, carbon markets, conservation NGOs and finance mobilised through the Global Environment Facility, Green Climate Fund and Development Assistance Committee (DAC). A detailed breakdown is available in Exhibit 4.

Box 2. Scope and methods: SFN 2021 and SFN 2022

This SFN 2022 edition builds on the 2021 inaugural edition (SFN 2021). Improvements include both updated and upgraded estimates of current financial flows and future needs. SFN 2022 estimates on current finance flows are based on more granular data, including on protected areas and marine ecosystems. Estimates of investment needs are broader in scope and include additional NbS investment categories in the agriculture sector and the marine realm. SFN 2022 also includes estimates of the bio-physical benefits of closing the finance gap, and reviews estimates of nature-negative public investments.

To assess changes over time, this report estimates the latest finance flows to NbS using the same data sources as SFN 2021, updating with the latest data available (see Annex for a summary of the data sources used).

To make estimates comparable between editions, prices and estimates from SFN 2021 are presented in this report in constant 2022 prices. The data and derived estimates of SFN 2021 and SFN 2022 have been adjusted for inflation using a GDP deflator (International Monetary Fund [IMF] World Economic Outlook). These adjustments increased SFN 2021 annual finance flows to NbS from US$ 133 to US$146 billion and cumulative investment needs (see Chapter 3) from 2021 to 2050 from US$8.1 trillion to US$8.8 trillion.

This report also upgrades estimates by expanding the scope to include:

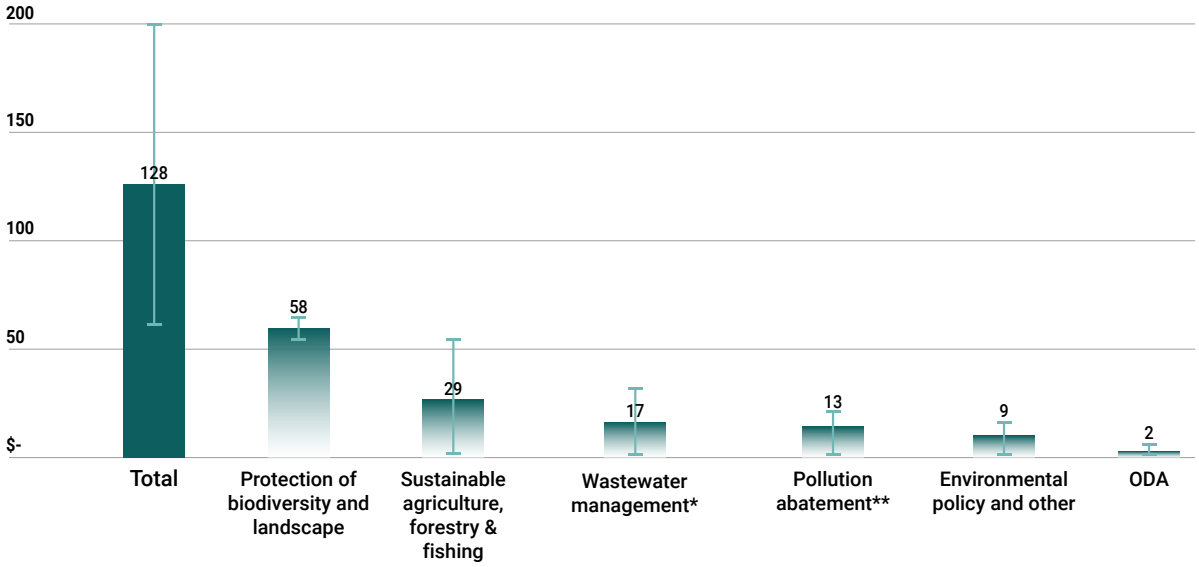
- investment in marine NbS
- detailed finance flows to protected areas
- evidence from published studies to assess public finance flows to energy, agriculture and fishing that (potentially) harm nature.

To ensure comparability, SFN 2021 estimates were recalculated to have the same scope as SFN 2022 finance flows. Specifically, finance flows to NbS in marine ecosystems, payments for ecosystem services and investments in sustainable cocoa, coffee and soy supply chains are now included and have increased 2021 annual finance flows to NbS from US$146 billion (after adjustment to 2022 prices) to US$150 billion.

2.2. Public financial flows

Public financial flows of US$128 billion per year are disaggregated in Exhibit 3. Almost half of government finance for NbS goes to the protection of biodiversity and landscapes (US$58 billion), followed by sustainable agriculture, forestry and fishing (US$29 billion per year or 23 per cent).

Exhibit 3. Annual public financial flows to terrestrial and marine ecosystems: US$128 billion (2022 US$)



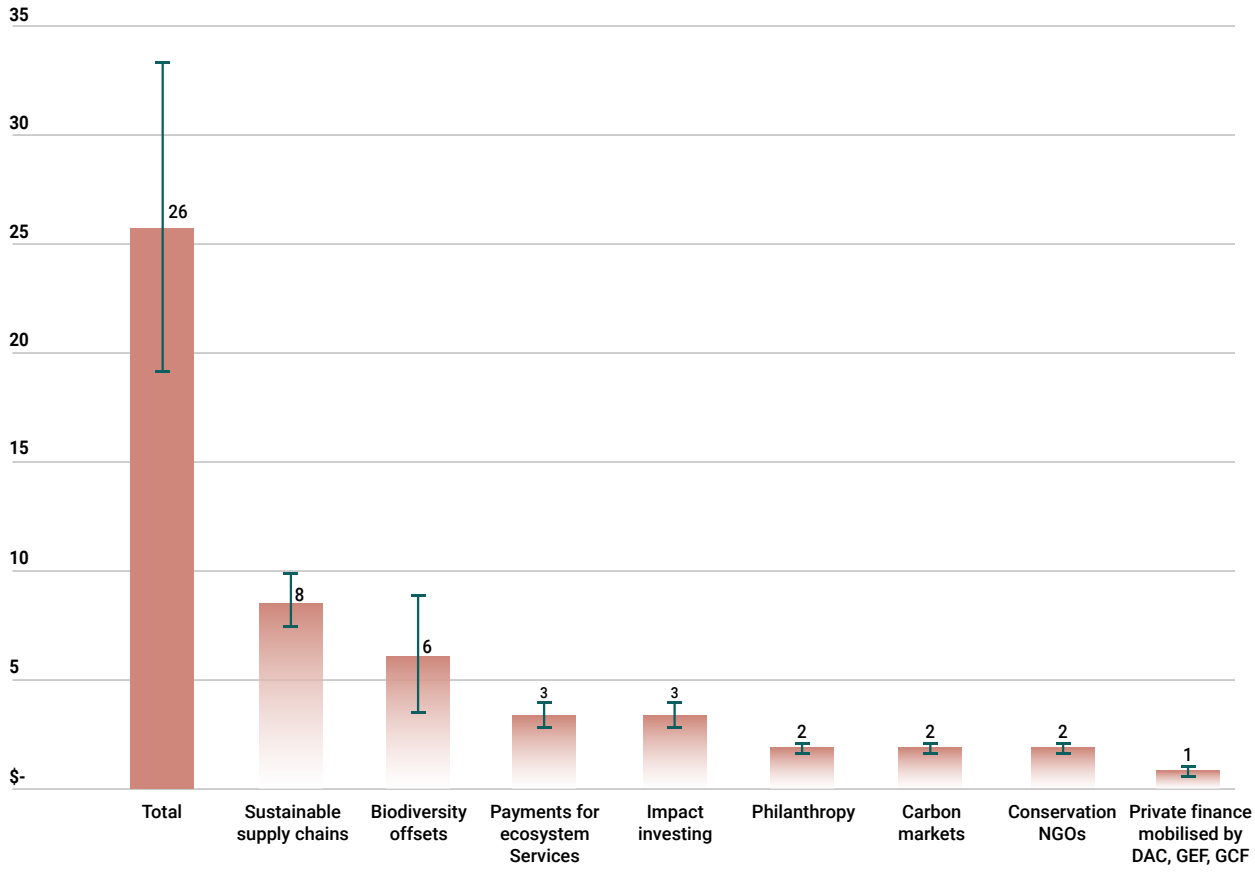
Sources: (OECD COFOG 2018-2019); (IMF COFOG 2016-2017); (OECD ODA 2018-2019); (USA Spending 2020-2021); (CBD China's Financial Reporting Framework 2015).
Note: The estimates displayed correspond to the midpoint between upper- and lower-bound estimates.
* Water resources, conservation and land management, pollution control and other natural resources management
** Pollution abatement, wastewater management & environmental protection

The uncertainty of the estimates varies across activities. For example, the protection of biodiversity and landscapes is closely associated with NbS interventions such as restoration and protection of marine and terrestrial ecosystems — the US$58 billion annual investment is included in the NbS finance estimate. However, there is greater uncertainty around the US$29 billion annual investment in sustainable agriculture. Sustainable agriculture covers NbS activities such as cover crops and sustainable fishing but may include non-NbS investments.

2.3. Private financial flows

Private financial flows to NbS of US$26 billion annually constitute 17 per cent of total NbS finance. Sustainable supply chain investments are the largest private finance component, channelling about US$ 8 billion per year (5 per cent of total NbS flows; see Exhibit 4) followed by biodiversity offsets at US$6 billion per year and private payments for ecosystem services and impact investments, each contributing US$3 billion per year. Finance flows to carbon markets and from non-governmental organizations (NGOs) and philanthropy are around US$2 billion per year each. Private finance channelled through multilateral development banks and bilateral cooperation amounts to less than US$1 billion per year.

Exhibit 4. **Annual private financial flows in NbS: US$26 billion (2022 US$)**



Sources: (OECD CRS 2017-18); (OECD ODA Sustainable Ocean Economy 2019/2020); GIIN (2020); Hamrick (2017); Donofrio (2019); Deutz et al. (2020); FundingtheOcean.org (2020); OurSharedSeas (2021); Ecosystem Marketplace (2022); FAO (2018a); FAO (2018b); Rainforest Alliance (2013); Solidaridad (2020); Behan de Jong (2019); Impact Assets (2020); CI (2021); RSBP (2021); TNC (2021); WCS (2021); WWF (2021).
Note: The estimates displayed correspond to the midpoint between upper- and lower-bound estimates.

The small share of private finance to NbS compared to public funding reflects the relative novelty of investing in natural capital and suggests that the investment case, i.e. the return to the investor relative to the level of risk, needs to be stronger. In contrast, the volume of climate finance is much larger than NbS or nature finance. Returns to investments in low-carbon transport, renewable energy and energy efficiency are attractive and becoming well understood by development finance institutions (DFIs), commercial banks, investment banks and institutional investors. NbS investments, on the other hand, are poorly understood, have high (perceived) risks and often lack sufficient predictable, long-term revenue streams, thereby deterring banks and investors. Other barriers reflect the current immaturity and small scale of the asset class, such as high transaction and structuring costs. Table 1 below provides a summary of current public and private investment flows.

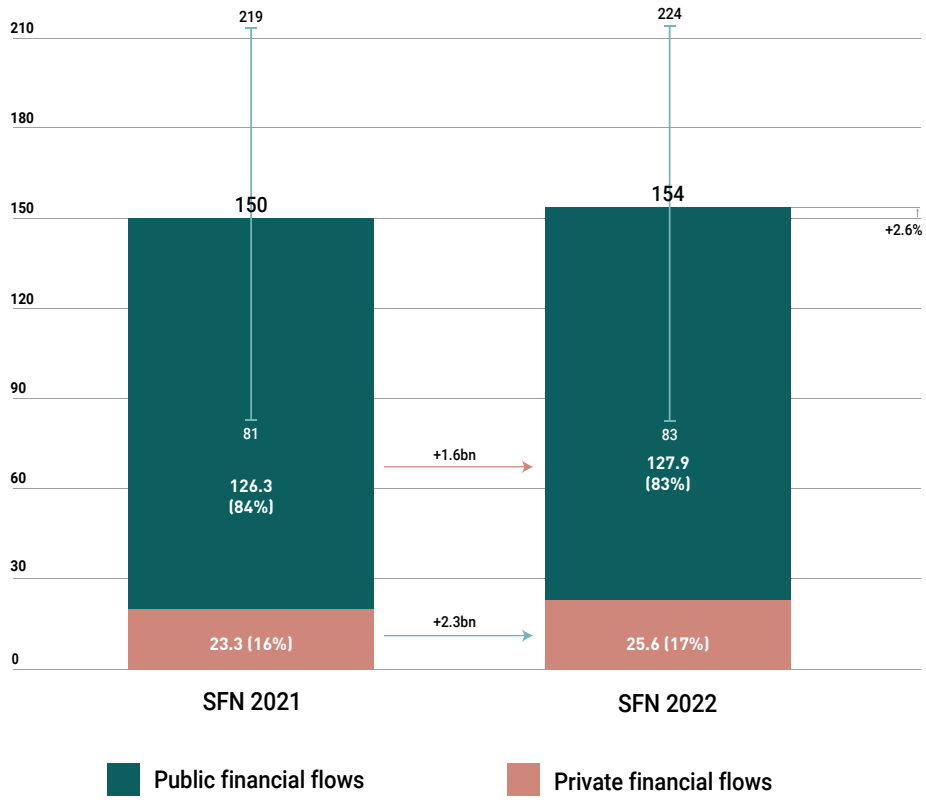
Table 1. Summary of NbS finance flow estimates, $ billion (2022 US$)

Financial flow category	Financial flow sub-category	Description	Lower bound	Upper bound	Mid-point	Share of total NbS flows
Public	Domestic government expenditure	Sustainable agriculture, forestry and fishing including subsidies to sustainable fisheries	3	55	29	19 %
		Water resources, conservation and land management, pollution control and other natural resources management	2	33	17	11 %
		Pollution abatement, wastewater management and environmental protection	3	23	13	8 %
		Protection of biodiversity and landscape	52	64	58	38 %
		Environmental policy and other	2	16	9	6 %
	ODA	Bilateral and multilateral aid in support of sustainability, biodiversity, climate change mitigation or desertification	2	3	2	2 %
Private	Carbon markets	Transactions in voluntary carbon markets and investments in REDD+ (Reducing Emissions from Deforestation and Forest Degradation)	1	2	2	1 %
	Sustainable supply chains	Investment in biodiversity conservation from sustainable-certified commodity markets	6	9	8	5 %
	Biodiversity offsets	Investment in programmes to compensate for unavoidable impacts of development projects	3	8	6	4 %
	Impact investing	Equity and debt investments to generate positive, measurable Environmental, social, and governance (ESG) impacts and financial returns	3	4	3	2 %
	Conservation NGOs	Expenditures reported by 5 largest conservation non-governmental organizations (NGOs)	1	2	2	1 %
	Payments for Ecosystem Services	Voluntary financial flows between service users and providers conditional on agreed rules of resource management for generating offsite services	2	5	3	2 %
	Philanthropy	Grants and non-grants reported by philanthropic foundations	2	2	2	1 %
	Private finance by multilateral organizations	Private finance leveraged by development finance institutions, other agencies working on development and 2 multilateral climate and biodiversity funds	0.4	1	0.7	0.4 %

2.4. Changes in NbS finance flows

Total finance flows to NbS have increased by US$3.9 billion from US$150 billion (SFN 2021) to US$154 billion per year (Exhibit 5). This represents year-on-year growth in investment of 2.6 per cent in real terms across the sum of public and private financial flows.[2] This growth is driven by a net increase of US$1.6 billion in public financial flows and US$2.3 billion increase in private financial flows.

Exhibit 5. **Change in annual financial flows to terrestrial and marine ecosystems, $ billion (2022 US$)**



Sources: (OECD COFOG 2018-2019); (IMF COFOG 2016-2017); (OECD ODA 2018-2019); (USA Spending 2020-2021); (OECD CRS 2017-18); (OECD ODA Sustainable Ocean Economy 2019/2020); GIIN (2020); Hamrick (2017); Donofrio (2019); Bennett and Gallant (2017); Climate Funds Update (2021); Deutz et al. (2020); FundingtheOcean.org (2020); OurSharedSeas (2021); Ecosystem Marketplace (2022); Environmental Markets Lab (2018); FAO (2018a); FAO (2018b); Rainforest Alliance (2013); Solidaridad (2020); Behan de Jong (2019); Impact Assets (2020); CI (2021); RSBP (2021); TNC (2021); WCS (2021); WWF (2021).
Note: The estimates displayed correspond to the midpoint between upper- and lower-bound estimates.

[2] Real growth is calculated by comparing changes from SFN 2021 to SFN 2022 after updating SFN2021 estimates and adjusting for inflation. See Annex for a description of how each financial flow category was updated.

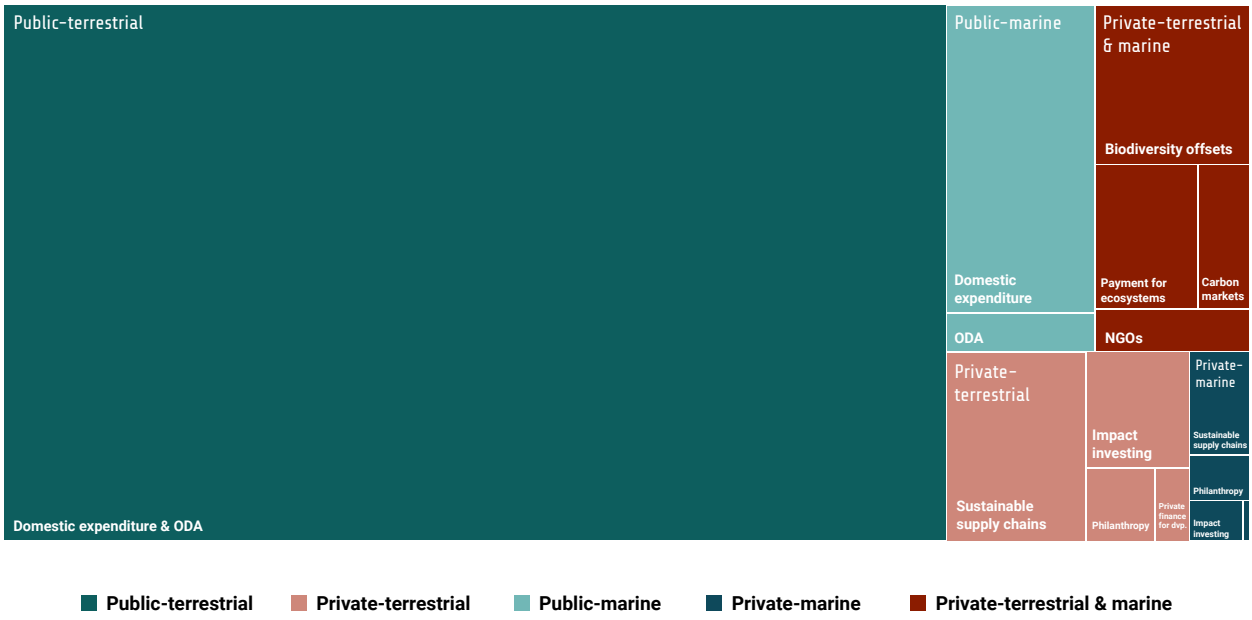
Public financial flows in NbS have increased by US$1.6 billion due to increased domestic expenditure on NbS-relevant activities in the agriculture, forestry and fishing sectors. The increase in public flows has been significant despite a decrease (US$0.3 billion) in ODA directed to NbS.

Private financial flows increased by US$2.3 billion compared to SFN 2021 due to increased investment in carbon markets, philanthropic contributions and impact investments that offset a moderate decrease (US$0.3 billion) from conservation NGOs. Investment in voluntary carbon markets increased dramatically from US$230 million to US$1.77 billion, an increase of US$1.5 billion (World Bank Group 2021). Impact investments grew by only US$0.2 billion supported by the development of innovative blended finance vehicles, which attracted some commercial capital (Schroders 2020; Eccles and Klimenko 2019; Convergence 2019) The increase of US$0.8 billion from philanthropies reflects growing donor commitments to protecting and enhancing nature, with recent pledges from the Bezos Earth Fund, Bloomberg Philanthropies and the Gordon and Betty Moore Foundation, among others, to support global biodiversity targets (Bloomberg Philanthropies 2021; Bezos Earth Fund 2022; Gordon and Betty Moore Foundation 2021).

2.5. Investment in marine NbS and protected areas

SFN 2022 broadened the scope by including marine nature-based solutions and detailed assessment of protected area finance. Finance flows to marine NbS are roughly US$14 billion, 9 per cent of total (terrestrial and marine) NbS finance (see Exhibit 6). Data for carbon markets, payments for ecosystems, biodiversity offsets and NGO flows did not distinguish between marine and terrestrial and are therefore presented separately.

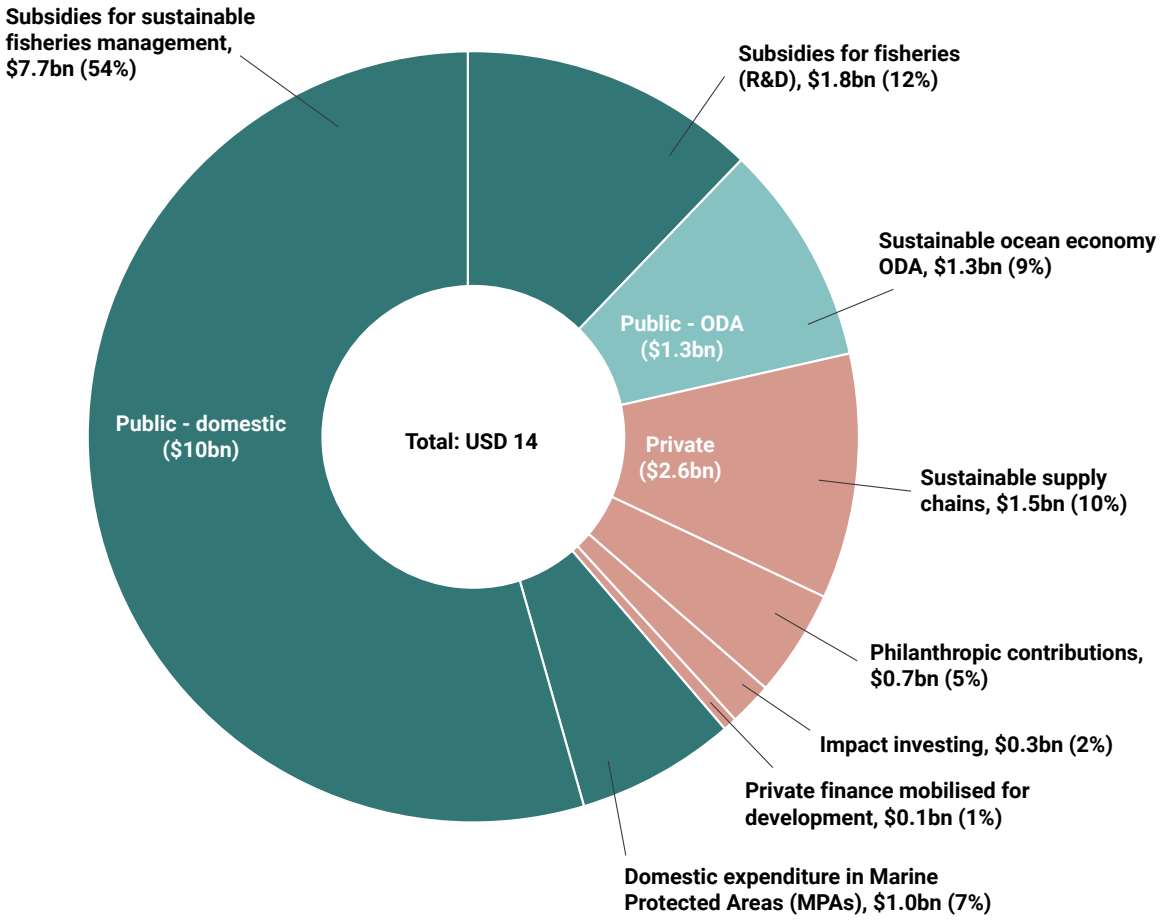
Exhibit 6. **Annual public and private financial flows to marine and terrestrial NbS**



Sources: (OECD COFOG 2018-2019); (IMF COFOG 2016-2017); (OECD ODA 2018-2019); (USA Spending 2020-2021); (OECD CRS 2017-18); (OECD ODA Sustainable Ocean Economy 2019/2020); GIIN (2020); Hamrick (2017); Donofrio (2019); Bennett and Gallant (2017); Climate Funds Update (2021); Deutz et al. (2020); FundingtheOcean.org (2020); OurSharedSeas (2021); Ecosystem Marketplace (2022); Environmental Markets Lab (2018); FAO (2018a); FAO (2018b); Rainforest Alliance (2013); Solidaridad (2020); Behan de Jong (2019); Impact Assets (2020); CI (2021); RSBP (2021); TNC (2021); WCS (2021); WWF (2021).

Two-thirds of marine NbS finance derives from public sources. Annual domestic government expenditure in marine NbS is over US$10 billion per year, including spending on marine protected areas, sustainable management of fisheries and research and development of fisheries. In addition, public flows of ODA in the form of grants, loans and equity to support a sustainable ocean economy contribute US$1.3 billion per year. Annual private finance flows to marine NbS are estimated at US$2.6 billion, including private investment in certified sustainable seafood supply chains (US$1.5 billion), philanthropies (US$0.7 billion), impact investments (US$0.3 billion) and private finance for development (US$0.1 billion).

Exhibit 7. Annual public and private financial flows to marine NbS: US$14 billion (2022 US$)

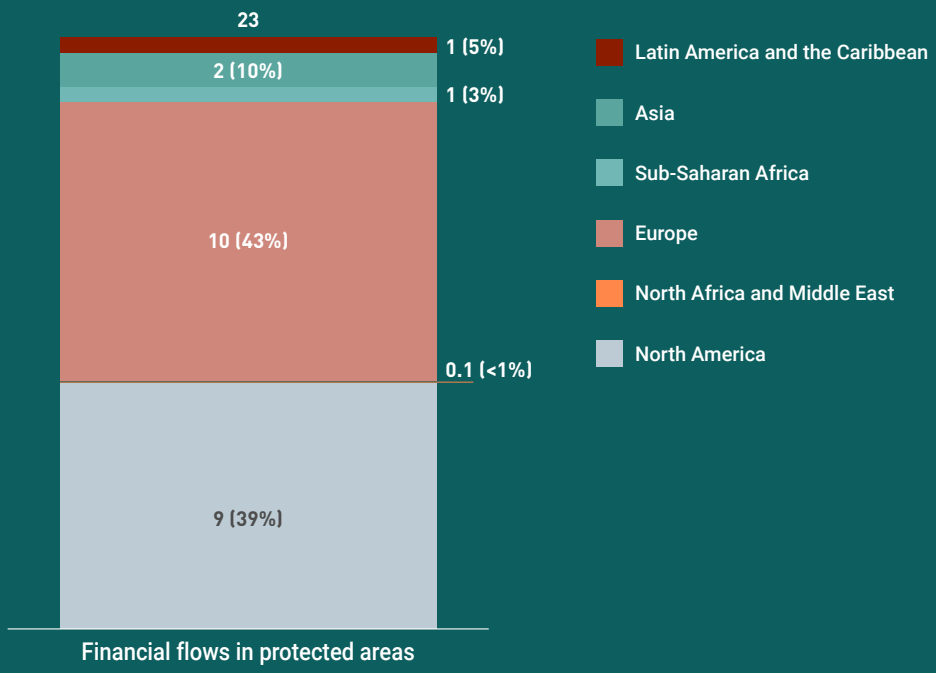


Sources: (OECD Bilateral and Multilateral Aid Sustainable Ocean Economy 2019), (OECD Private Financial Flows Sustainable Ocean Economy 2020); FundingtheOcean.org (2020); OurSharedSeas (2021); Environmental Markets Lab (2018); FAO (2018a); FAO (2018b); Deutz et al. (2020); Impact Assets (2020); Impact Yield (2021).
Note: Domestic expenditure in marine protected areas cannot be disaggregated into public and private sources, therefore the estimated US$ 1 billion may include private flows, which are usually small.

Box 3. Global spending on protected area management

Global spending on protected area management is estimated at 23 billion annually, with US$22 billion going to terrestrial and US$1 billion to marine protected areas. Spending on protected area management is highest in Europe at US$10 billion per year, followed by North America at US$9 billion per year.

Exhibit 8. Financial flows allocated to protected areas, $ billion (2022 US$)



Source: Waldron *et al.* (2020).
Note: 1. Current spending in protected areas in Oceania is not included due to limited data reported in the region. 2. Current spending in marine protected areas in North America is not included due to the complex division of enforcement responsibilities across multiple agencies in the USA, which makes it difficult to distinguish expenditure on marine protected areas. 3. Domestic expenditure in protected areas cannot be disaggregated into public and private sources.

2.6. Nature-negative financial flows

There is increasing recognition of the extensive damage to nature of government fiscal support for some economic sectors, notably fossil fuels, agriculture and fisheries. The magnitude of fiscal support in the form of subsidies is very large and undermines efforts to increase finance flows to NbS. This report therefore looks at published public finance flows that are potentially damaging to nature to understand how the scale compares to finance that benefits nature.

The absence of robust and comprehensive data on the impact of private finance flows on nature prevented the inclusion of estimates in this edition. However, given the likely very large negative impact of private finance flows on nature, future editions will prioritise the inclusion of emerging data and analysis. Similarly, challenges linked to data and conceptual framing make it difficult to estimate NbS negative finance flow in an equivalent manner to positive finance flows to NbS, so the analysis below is framed around nature-negative financial flows. Nature-negative finance flows do not mirror positive financial flows to NbS and so a net flow to NbS cannot be derived from these estimates.

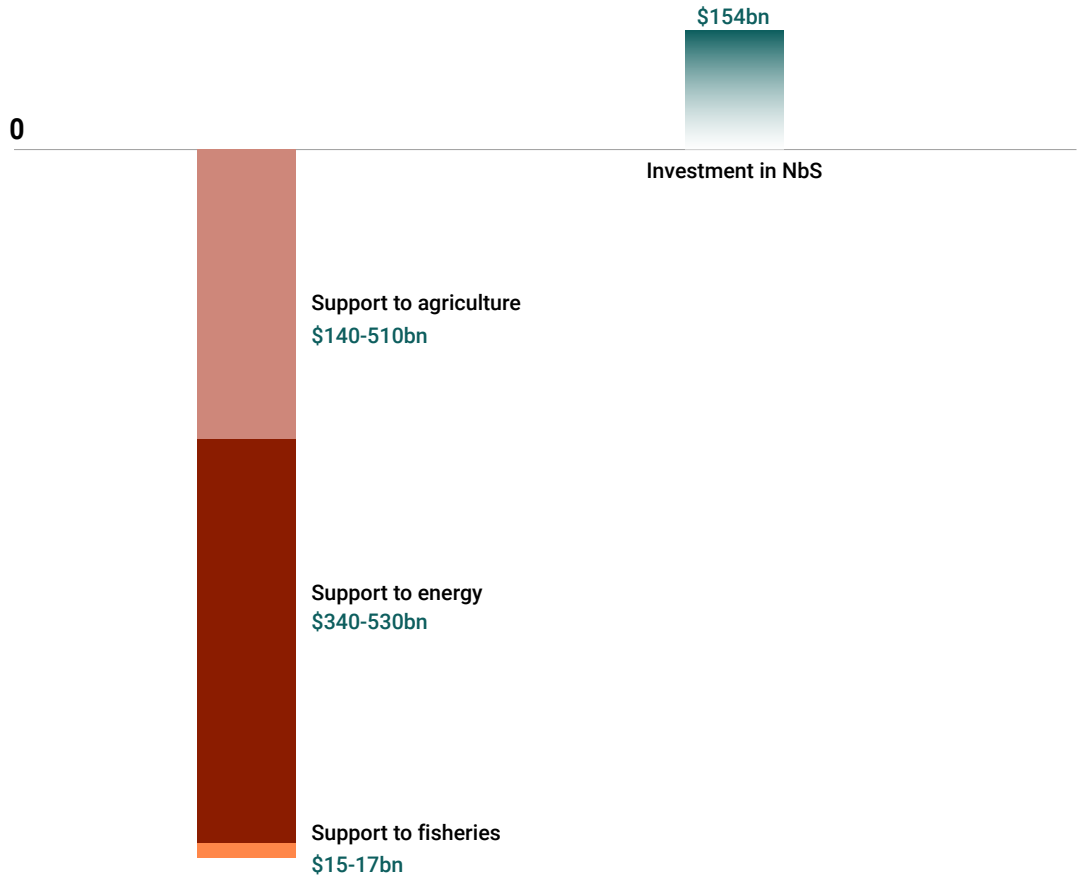
Public financial support for nature-negative activities[3] ranges from US$500 to 1,100 billion per year at present, which is three to seven times larger than current investments in NbS. Evidence from published studies indicates that nature-negative financial flows to agriculture in the form of price incentives and fiscal transfers could reach US$500 billion per year (Exhibit 9). In the energy sector, global fossil fuel subsidies across oil, electricity, gas and coal are estimated to be US$340–530 billion per year. Harmful support for fisheries, defined as support that encourages fishing capacity to develop beyond the point that would be sustainable, is estimated to be US$15–17 billion per year globally (Sumaila *et al.* 2019). These estimates are consistent with the literature. The WEF found that "of the US$540 billion of agricultural subsidies that are handed out by governments each year, nearly all of them (87 per cent) are price-distorting and environmentally and socially harmful" (Echandi and Seymour 2022).

While nature-negative public financial flows are increasingly scrutinised, the number of country-level studies is small. Green budget tagging studies have applied a national or international taxonomy to classify public expenditure by whether they have positive, neutral or negative impacts on nature. For example:

- The **United Kingdom (UK) government** recently developed a budget tagging tool to analyse spending and taxation policies at the national level, including impact on climate change, circular economy, water management, air quality and biodiversity. Of the £2.6 trillion autumn 2021 budget, roughly £2.5 trillion (over 95 per cent) was neutral, £82 billion (3 per cent) was negative or strongly negative and £34 billion (1.3 per cent) was positive or strongly positive with regard to biodiversity (World Wildlife Fund [WWF]-UK 2021).
- The **Colombian National Planning Department** tracked the environmental impact of public spending with a taxonomy for fiscal spending that combines the Biodiversity Finance Initiative's approach with a National Climate Taxonomy. The results indicate that 15 per cent of public expenditure in agriculture has a negative impact on nature, 75 per cent is neutral and 10 per cent is positive (Department of National Planning of Colombia 2022).

[3] Definition based on Paulson Insitute (2020): Nature-negative financial flows refer to financial flows for activities that could potentially have a negative effect on nature. Financial flows in the form of subsidies are those that induce production or consumption activities that exacerbate nature loss

Exhibit 9. Nature-negative public financial flows, $ billion per year (2022 US$)



Sources: FAO, United Nations Development Programme (UNDP) and UNEP (2021); International Energy Agency (IEA) (2021); OECD (2020b); OECD (2022); Environmental Markets Lab (2018); Skerritt and Sumaila (2021).

- An assessment of **France's State Budget** analysed 250+ budget measures and classified budget lines according to their impact on six environmental objectives, including biodiversity, climate and land use. Of the €495 billion central government expenditure in 2022, €453 billion (92 per cent) was neutral or not tagged, €33 billion (7 per cent) was favourable and €11 billion (2 per cent) was unfavourable for the environment (Ministère de l'économie, des finances et de la souveraineté industrielle et numérique 2021).

Reliable and accessible data on nature-negative flows from private sources are scarce, but existing evidence suggests that a significant proportion of private financial flows harm nature. Portfolio Earth analyses the portfolios of 50 of the largest banks in the world and concludes that on average, each of them is linked to US$52 billion of funding with embedded biodiversity risk. This figure amounts to at least US$2.6 trillion of potentially nature-negative investments. Of the funding assessed, 66 per cent was related to activities that directly cause biodiversity loss (e.g. fishing and mining) and 34 per cent to activities that indirectly drive biodiversity loss – for example, by driving demand (Portfolio Earth n.d.). This estimate is in line with the finding that fewer than half of the Fortune Global 500 list companies acknowledge biodiversity loss, and only 5 per cent have established nature-related commitments beyond carbon (McKinsey and Company 2022).

Case Study

Germany – repurposing of harmful flows in agriculture

Nature-negative and -positive financial flows in the agricultural sector in Germany

German agriculture and forestry are impacted by financial flows originating on the national and the European level, mainly from the European Union's (EU) Common Agricultural Policy (CAP). Most effects are harmful to nature; some are environmentally friendly. In total, we identify US$15.5 billion – about 71 per cent (US$11.1 billion) with negative impacts on the environment, 19 per cent (US$2.9 billion) with positive and 10 per cent (US$1.5 billion) with ambivalent effects. **The ratio of negative to positive flows is almost 4:1.**

Exhibit 10. Impact on nature of subsidies to German agriculture, US$ billion

Source: Bundesamt für Naturschutz (2019); Bundesministerium der Finanzen (2021, 2022); Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz (2022); Directorate-General for Agriculture and Rural Development (2022); Sumaila et al. (2019); Umweltbundesamt (UBA) (2021)

The EU's CAP, including German co-payments, exerts enormous influence due to the sheer volume of support at US$6.7 billion.[4] Nearly half of EU payments are based on agricultural area. Mostly large farms benefit, as requirements for nature conservation, environmental protection and animal welfare under the first pillar of the CAP are not high. However, requirements will be tightened from 2023 to include environmental and climate criteria.

In Germany, the reduced value added tax (VAT) rate on animal products, such as meat, milk and eggs,[5] represents the largest environmental harmful subsidy (US$5.1 billion). The quota for biofuels (worth US$0.9 bn[6]) raises demand for agricultural land and incentivises the production of monocultures (Forum Ökologisch-Soziale Marktwirtschaft [FÖS] 2021a). Agricultural vehicles in Germany are exempt from the annual motor vehicle tax (US$0.5 billion), which incentivises the use of heavy machines

[4] For EU direct payments (first pillar CAP), it is difficult to quantify the share of harmful payments. Those without environmental criteria are listed as negative as they provide incentives to expand agricultural production.
[5] The reduced tax rate is also used for traditional plant-based foodstuffs, such as cereals and vegetables. Other plant-based products, such as oat milk, plant-based meat or yoghurt are taxed with the regular full 19% VAT rate.
[6] UBA (2021) points out that the quota is not "budget relevant". Thus, its ending does not increase government revenue.

that emit GHG and increase soil compaction (Umweltbundesamt [UBA] 2021). Agricultural diesel benefits from a lower tax rate than regular diesel (US$0.4 billion). Both harmful and nature-positive flows originate from the improvement of agricultural structure and coastal protection programme by federal and state governments to provide for rural development and the support of agriculture, forestry and fisheries (US$1.5 billion). A nature-positive investment programme for natural climate mitigation was started in 2022 with US$0.3 billion for investments in ecosystems. Its fiscal volume will grow to around US$1.5 billion annually from 2024 to 2026.

Managing subsidy reform: multiple benefits by repurposing funds

Reforming agricultural subsidies offers a wide range of benefits – from various environmental (especially climate and biodiversity), economic (more efficient use of agricultural inputs) and fiscal benefits (generating revenue, shifting payments from nature-negative to nature-positive activities) (e.g. Cottrell *et al.* 2021; FÖS 2020).

Subsidy reforms have been successful in the past when they used windows of opportunity[7] and considered a specific context, such as rising food and energy prices. Repurposing of financial flows and sequencing of reforms are key to ensuring political support. Subsidy reform is a lever to increase tax revenue or free expenditures by repurposing them to public spending on nature-based solutions or as social spending to manage the distributive impacts of the subsidy reform. Proposals are more likely to be successful if they do not solely focus on ending subsidies but on repurposing negative into positive flows. Beneficiaries of the status quo are more likely to support reforms if they don't just lose subsidies, but gain new income opportunities (e.g. from payments for ecosystem services). Reform packages should be sequenced so that benefits do not come years after the "costs" of losing a subsidy.

Reforming German[8] agricultural subsidies and repurposing revenue could take place in two steps. The first short-term package could include an accelerated ending of the agri-diesel subsidy, the motor vehicle tax exemption and reform of the biofuel quota. This package would reduce harmful subsidies worth €1.9 billion and create positive climate impacts. Ending the agri-diesel subsidy sooner would reduce 0.3 million t of CO_2 per year. Higher tax revenues could be repurposed to payments for environmental services to farmers, restoration of ecosystems and the use of paludicultures in restored marshlands. A second medium-term reform package could include a systematic greening of the coastal protection programme payments and adopting the regular VAT tax rate on animal products. The latter would reduce domestic demand[9] for animal products and shift consumption to more plant-based food, thus reducing GHG emissions, land use and water needs (cp. Poore and Nemecek 2018). The reform would increase tax revenue by US$4–5 billion and reduce GHG emissions by 1.6–6.3 million t CO_2e. In repurposing this revenue both its environmental and redistributive impacts should be considered.[10] This can be done by lowering VAT rates on plant-based foodstuffs currently taxed at the full rate and by funding programmes and targeting low-income households through programmes (FÖS 2021b; Postpischil *et al.* 2022).

[7] Political commitments for subsidy reform have been made for years on the European, G7 and G20 levels and in the German government's coalition agreement. They all acknowledge the inconsistency between fiscal and environmental policies but lack follow-through.
[8] Reforming EU agricultural subsidies is an ongoing and long-term process, which is not considered here.
[9] Demand and production of meat in Germany have largely decoupled in recent decades and a large share is exported.
[10] See (chapter 3.1.6.4. in Postpischil *et al.* 2022) for data on the impacts of reform on different income groups.

Beyond a narrow definition of subsidies: internalising external effects

While the reforms outlined above would be a major step forward, the definition of harmful subsidies does not include non-internalised externalities.[11] Billions of dollars of environmental damages can only be addressed if economic instruments are developed to internalise damages.

In Germany, environmental damages from excess nitrogen and phosphorus from fertiliser use leading to eutrophication of water bodies cost society US$6.2–12.9 billion annually. Similarly, external costs from pesticide usage are estimated at up to US$24.1 billion annually (see Roolfs *et al.* 2021). Other studies estimate the non-internalised damages from German agricultures even higher at US$87 billion (Boston Consulting Group 2019). Economic instruments, such as a tax on excess nitrogen and on pesticides, could be efficient economic instruments to reduce externalities while generating financial revenues for the needed investments in NbS.

[11] For example, the International Monetary Fund also include non-internalized externalities in its subsidy definition while the Organisation for Economic Co-operation and Development (OECD) or the International Energy Agency (IEA) use narrower definition (see Cottrell *et al.* 2021).

Case Study

Cote d'Ivoire – Greening Export Tariffs and Repurposing Revenue

Drivers of deforestation in Côte d'Ivoire: expansion of land for cocoa and falling productivity

Over the last 30 years, the forest area in Côte d'Ivoire (CIV) has declined by 63.9 per cent – from 24.7 per cent in 1990 to 8.9 per cent of land area in 2020 (UN Statistics Division 2022). This loss is higher than almost anywhere in the world. The driving forces behind deforestation are structural: to sustain livelihoods by increasing cocoa exports using forest area as a cheap input.[12] The area used for cocoa production increased by a factor of 2.4 (from 2 million ha in 2000 to 4.8 million ha in 2020) while the production of cocoa beans only increased by 57 per cent (from 1.4 million t in 2000 to 2.2 million t in 2020). Thus, yields per ha fell significantly and were less than two-thirds in 2020 compared to 2000. Observers point to two factors: the displacement of many cocoa farmers during the civil war that went to "protected areas, where they cut down the rain forest and planted cocoa trees" and a lack of government enforcement of rules against cocoa farming in environmentally protected areas. This "illegal" production is estimated to account for 30–40 per cent of cocoa beans. This low-yield production continues to exert pressure to expand production and thus deforestation.

Addressing the root causes of deforestation is difficult due to the huge political, economic and fiscal importance of cocoa. Côte d'Ivoire is the world's largest producer of cocoa beans. In 2018, its production of 2 million tons accounted for 37 per cent of global cocoa bean production (FAO 2022). CIV's agricultural sector accounted for almost 21 per cent of GDP in 2019 and 40 per cent of the Ivorian workforce – including 600,000 working for less than a dollar a day and 900,000 children (Bhutada 2020). Research estimates that only 4–6 per cent of the final consumer price is retained in cocoa-producing countries. The share has fallen greatly over the last few decades – increasing this to expand production (Abdulsamad *et al.* 2015).

Finally, cocoa is key for exports and government revenue as well. It accounts for almost half of Ivorian exports (US$5.3 billion in 2020): 33.3 per cent of total export value stems from unprocessed cocoa beans and shells, a further 14.9 per cent from semi-processed cocoa products (paste, butter, powder), and only 1.6 per cent originates from chocolates produced domestically. All cocoa products are primarily exported to the European Union (OECD 2022). CIV's total tax revenue is low compared to its GDP (12 per cent in 2019) (OECD 2022). Export tariffs (as well as some taxes and fees) on cocoa account for 9.6 per cent of public revenue (Ministère de l'économie et des finances in OECD 2021). The current tariff rate is flat at 14.6 per cent – the same rate applies to raw cocoa beans as well as fully processed chocolates. This is significant as it provides no economic incentives to invest in shifting domestic production from land-intensive exports of unprocessed beans with little value added to higher stages of processing at which higher value added (and income) would remain in CIV, easing the pressure on deforestation.

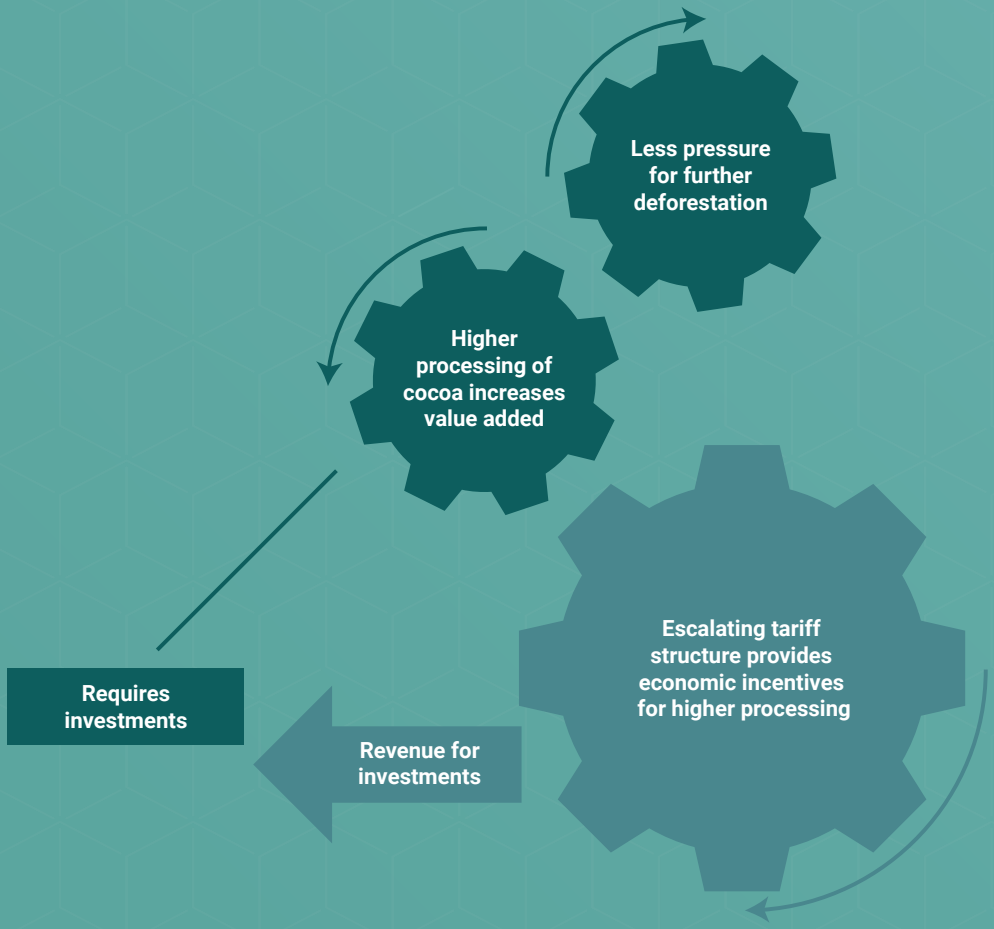
[12] The production of cashews did also expand while others, such as coffee stagnated over time (see data in FAO 2022). Similarly, timber consumption or exports are not a significant driver of deforestation.

A proposal for "greening" export tariffs

The following proposal outlines how higher revenue can be repurposed for infrastructure investments to modernise agriculture (such as in the Plan National d'Investissement Agricole), retain higher value added in the domestic cocoa supply chain and thus reduce environmental pressures. It contributes to CIV's strategic goals for zero deforestation agriculture and is complementary to other deforestation and agricultural policies (Côte d'Ivoire 2015; Global observatory on non-state climate action 2019).

A reformed, staggered export tariff structure could combine fiscal (revenue generation), environmental (reduced deforestation) and economic goals (higher domestic value added).[13] Exhibit 11 illustrates how the instrument would work. The primary goal is "not to downscale (…) but to shift the agricultural production from land-intensive production to capital-intensive production" (Wehkamp and Schwerhoff 2021 p. 198).

Exhibit 11. Tariff reform and public investments could reduce pressure on deforestation



[13] A few international examples for this principle exist (see Kim 2010; Wehkamp and Schwerhoff 2021)

A reform scenario could apply:

- a 20 per cent tariff rate for unprocessed raw beans and shells
- a 12 per cent tariff rate on semi-processed products (cocoa paste, butter and powder)
- an 8 per cent tariff rate on processed goods (chocolates).

Using 2020 trade data, revenue would increase and shift between categories. Revenue from unprocessed beans and shells would rise while revenue from semi-processed and processed goods would fall. The total revenue would increase to US$799 million (+ US$122 million), equivalent to 1.8 per cent of total tax revenue. This additional revenue should be repurposed for investments in transportation infrastructures and rural electrification, which are currently holding back higher domestic value creation. The reform would not negatively affect cocoa farmers as domestic cocoa prices are regulated and the higher tariffs would be paid by exporters.

Relevance and limitations

The policy proposal is an example of an instrument complementary to other agriculture and deforestation policies. It recognises the negative environmental impact of the status quo, raises revenue and repurposes it for needed investments that combine economic and environmental goals. The instrument itself works in concert with other policies to increase the sustainability of agriculture. It is therefore interesting beyond CIV for other (developing) countries that are dependent on exporting agricultural products with high environmental impacts.

The results for repurposing of harmful flows in agriculture in Germany and the proposals for "greening" the Ivorian export tariffs for cocoa products have been developed as part of studies conducted by FÖS for the German Development Cooperation and the Economics of Land Degradation (ELD) Initiative.

2.7. Limitations

Box 4. **Limitations of estimates of current finance flows to NbS**

Data and disclosure: Data for this report are harvested from databases, secondary literature and stakeholder interviews. This analysis has been hampered by the lack of data on public and private nature finance, and particularly NbS finance. In the public sector, the absence of a harmonised and granular classification system or taxonomy for nature finance or nature-positive (or -negative) expenditure prevents the regular and accurate collection of data on nature-related expenditure. Even more challenging is assessing private sector investment in nature and NbS due to the absence of a common framework for assessing, managing and disclosing nature impacts and dependencies. The TCFD has been instrumental in improving knowledge around GHG emissions from the private sector and the Taskforce on Nature-related Financial Disclosure (TNFD) aims to do the same for nature. This study has further limitations associated with:

Identifying NbS finance flows: While the Classification of the Functions of Government (COFOG) provides comprehensive and comparable data on government expenditure, there is no "marker" for NbS. It was therefore necessary to identify public expenditure categories that were environmental and, based on expert assessment, the literature and OECD sectoral guidance, adjust these estimates to only include activities that can confidently be defined as NbS. The scaling factors for public expenditure data range from 0.1 for agriculture, forestry and fishing to 0.9 for protection of biodiversity and landscapes. However, there is a large margin of error associated with this scaling. A similar adjustment was made for ODA expenditure (see details in Annex).

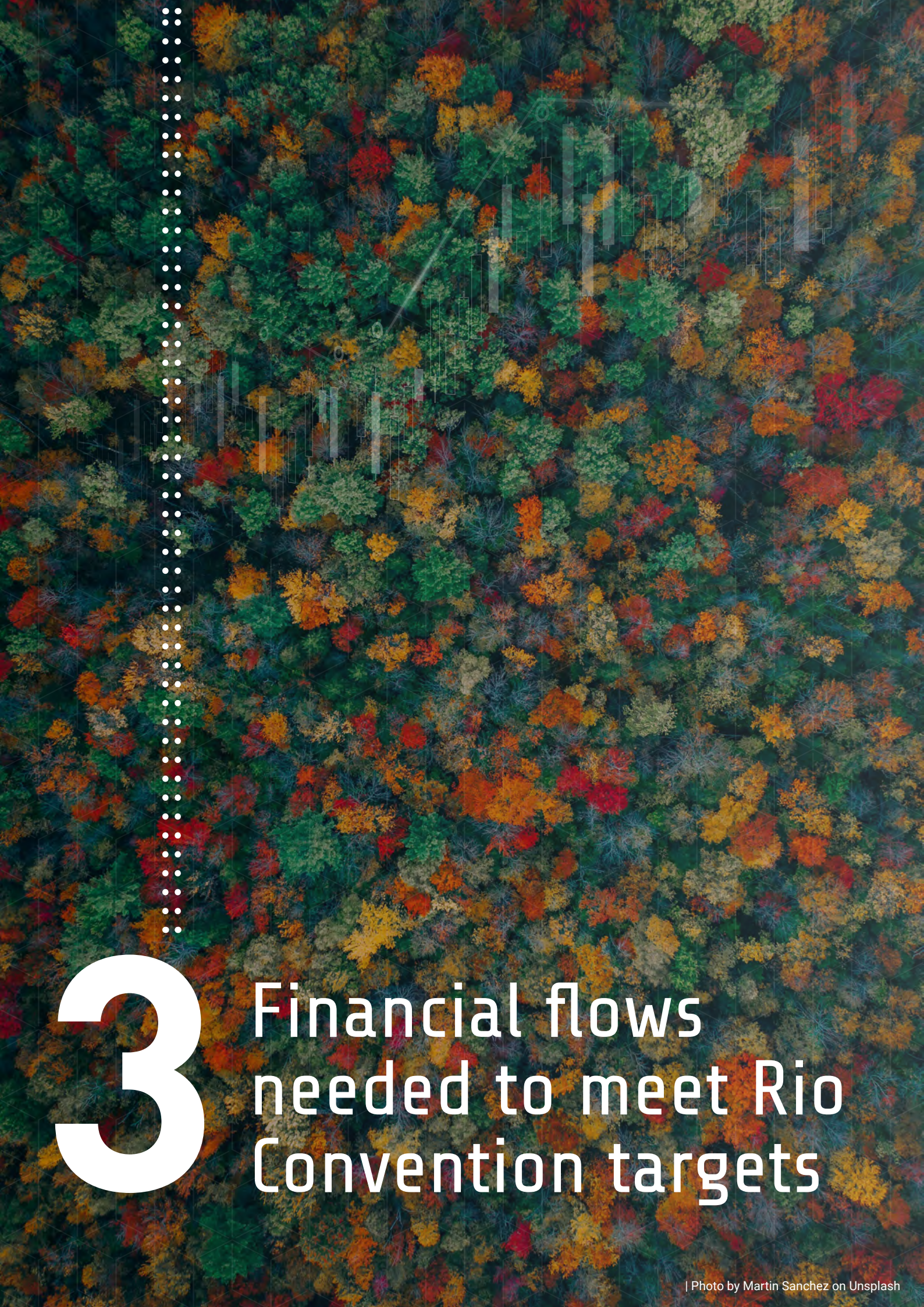
Scope of NbS: It was also necessary to classify the level of uncertainty for each sector and to calculate upper- and lower-bound estimates that reflect the degree of uncertainty. The upper bound estimates include a broader set of NbS activities than the lower bound estimates. The final estimates used in this report are the midpoint between the upper and lower bounds.

Geographic scope: This analysis uses data sets that do not include all countries. Since not every country publishes detailed data on public finance and on nature finance, some public finance to NbS will have been omitted.

Double-counting of current financial flows: There is a risk of double-counting due to ambiguity around whether projects are included in multiple categories within data sets. The data analysis triangulated data between sources and definitions to reduce double-counting, but some may remain.

Concluding remarks

Annual public and private investment in nature-based solutions has increased by US$3.9 billion to US$154 billion (2.6 per cent). At the same time, the amount of public capital that has a negative impact on nature is three to seven times higher at US$500–1,100 billion. Without significantly scaling up both public and private capital towards NbS by several orders of magnitude, while at the same time reducing environmentally harmful subsidies and other nature-negative finance flows, it will be difficult to achieve the targets of the Rio Convention and the SDGs more broadly.

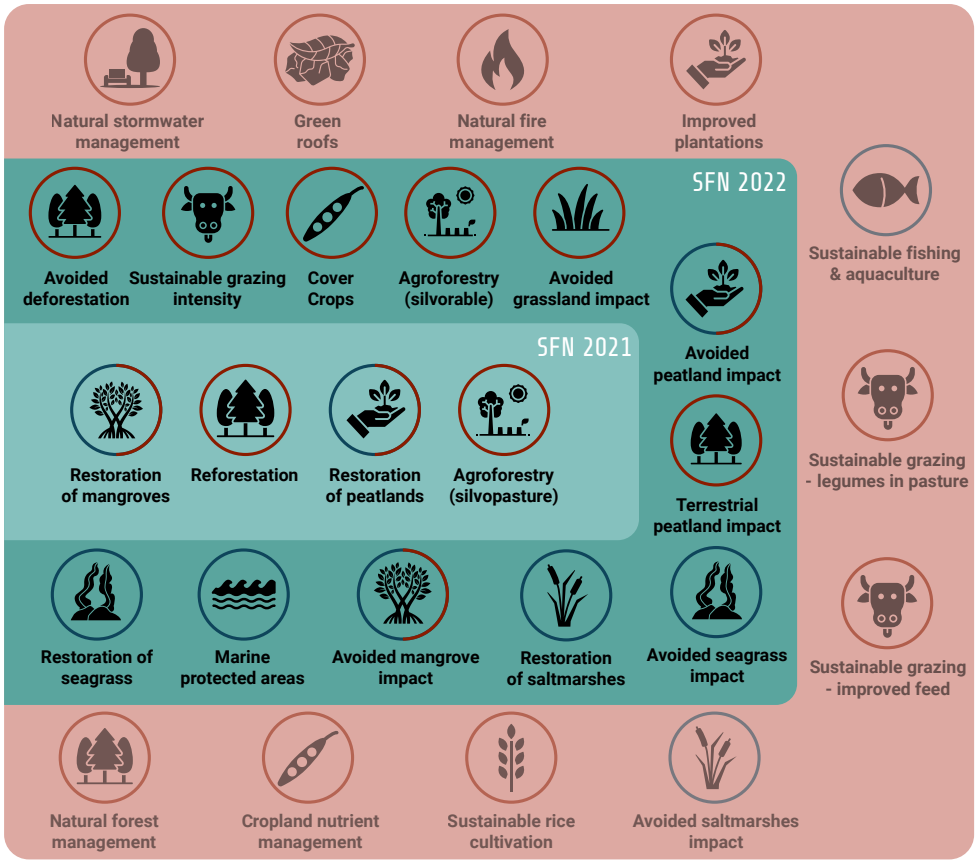


3 Financial flows needed to meet Rio Convention targets

| Photo by Martin Sanchez on Unsplash

While Chapter 2 documents current investment in nature-based solutions, the question remains whether these finance flows are sufficient to meet Rio Convention targets. This chapter therefore looks at the investment in NbS needed to meet international commitments related to biodiversity (halting further loss of biodiversity by protecting 30 per cent of land and marine areas by 2030), climate (keeping temperature rises to below 1.5°C (and 2°C) compared to the pre-industrial age), and land restoration (achieving land degradation neutrality by restoring close to 1 billion ha of degraded land). Exhibit 12 below illustrates the NbS that are included in the modelling of investment needs based on their potential to store and sequester carbon, protect biodiversity and restore terrestrial and marine ecosystems. NbS interventions used in the modelling scenarios to quantify investment needs respect social and environmental safeguards.

Exhibit 12. NbS activities included in the estimation of investment needs



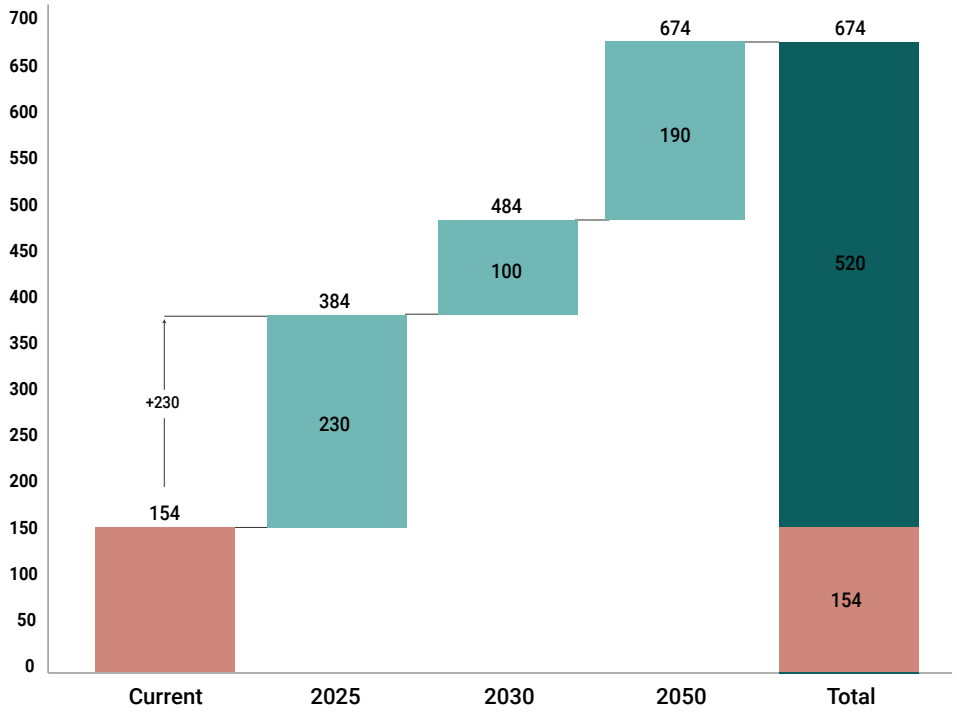
Sources: Miralles-Wilhelm (2021); UNEP and IUCN (2021). For a description of each solution see Annex.
Note: 1. All marine NbS categories are displayed in blue. Mangrove forests occur at the interface between land and sea and, like peatlands, may be considered both terrestrial and wetland ecosystems. 2. Urban solutions include urban forests, parks, green spaces, green streets, green roofs, water supply and natural stormwater management.

3.1. Investment needs and the finance gap

Immediate needs – investment 2023-25

Over the next three years, annual financial flows to NbS need to more than double to meet international commitments set by the Rio Conventions. Exhibit 13 illustrates the levels of investment in NbS needed to limit climate change to below 1.5°C, halt biodiversity loss and achieve land degradation neutrality. **By 2025, annual investment in NbS needs to increase to US$384 billion, more than double the finance currently flowing to NbS (US$154 billion)**. Immediate action is needed from public and private actors to scale up annual investments over the next three years to close the finance gap by investing an additional US$230 billion per year. By 2050, annual investments need to reach US$674 billion, four times current investment levels.

Exhibit 13. Annual NbS investment needs to limit climate change to below 1.5°C, halt biodiversity loss and achieve land degradation neutrality, $ billion (2022 US$)



Sources: MAgPIE scenario analysis. Vivid Economics and Natural History Museum (2020); Project Drawdown (2020); WEF and McKinsey and Company (2020); Humpenöder et al. (2020); McKinsey and Company (2022); Worthington and Spalding (2018).

Investment needs to 2030

By 2030, annual investment in NbS needs to more than triple from US$154 billion to US$484 billion. Moreover, a growing body of evidence suggests that it is twice as expensive to delay action as it is to act immediately (Vivid Economics and Natural History Museum 2020). With delayed action, the scale of NbS needed will be greater to compensate for the additional ecosystem losses and land conversion that will have occurred.

NbS activities needed

A range of NbS interventions can be implemented to deliver required climate, biodiversity and restoration outcomes. Exhibit 14 presents NbS that can most cost-effectively deliver emissions reductions sufficient to limit climate change to 1.5°C and land degradation neutrality by 2030 while protecting 30 per cent of the planet by 2030. As indicated in the introduction, only NbS that benefit people and have a positive contribution to climate and/or biodiversity and/or land restoration are included. NbS which have negative effects on any of the above, due to trade-offs in the provision of ecosystem services, for example, are excluded. Investment needs are estimated based on modelling which is described in detail later in this chapter.

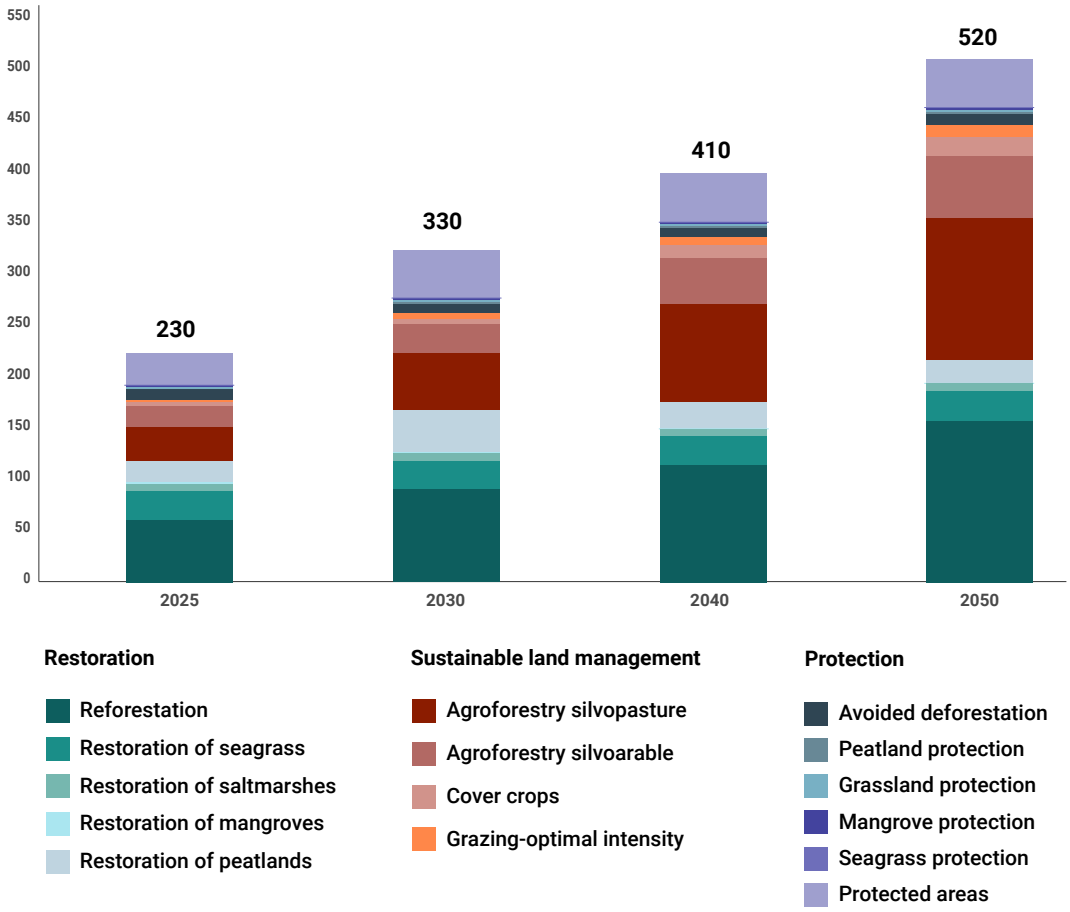
Exhibit 14 groups NbS activities into restoration, protection and sustainable land management. Sustainable land management includes agroforestry (silvopastoral and silvoarable), cover crops and optimal managed grazing in pastureland, which help improve soil fertility and prevent land degradation. These interventions make up one quarter of investment needs in 2025. The relative importance of sustainable land management increases to 45 per cent by 2050. This is driven by the need to produce food in a sustainable manner in line with population growth and the widespread implementation of a carbon price which provides incentives to farmers to introduce tree planting into existing crop and pastureland.

Restoration absorbs over half of investment in 2025, with reforestation as well as seagrass and peatland restoration providing the bulk of investment opportunities. Restoration commitments feature in voluntary land restoration targets as part of the Bonn Challenge, the Rio Conventions and regional initiatives such as the African Forest Landscape Restoration Initiative (AFR 100) (Netherlands Environmental Assessment Agency [PBL] 2020a). In the modelling, ecosystem restoration occurs only on degraded land. In the specific case of reforestation, reforestation occurs only on degraded land (with less than 25 per cent tree cover as per the FAO definition of forests) that was previously forested. The model is constrained such that the expansion of agro-forestry and all forms of restoration proposed does not negatively impact existing ecosystems.

The share of investment directed to protection, including protected areas and avoided degradation and conversion of peatlands, forests, mangroves and seagrasses, increases to 2030 and levels off as the 30x30 target is reached. Protection receives 20 per cent of investment in 2025, increasing to 2030 and then stabilising at around 13% by 2050. However, it is important to note that Exhibit 14 reflects the costs of implementing the modelled optimal area of different NbS to reach target outcomes. Because per hectare costs of protection are lower than the per hectare costs of sustainable land management and restoration, the relative importance of protection appears smaller than it actually is based on the area under each NbS. Protection of existing forests and other ecosystems remains a highly cost effective NbS.

In terms of biomes, forest-based solutions such as reforestation and avoided deforestation can absorb one-third of total annual investment in 2025. Annual investments in peatland restoration and avoided peatland impact account for 10 per cent of the total annual NbS investments in 2025 and support national commitments like the Peatland Action Programme in the UK and the National Action Plan for Peatland Management in Malaysia. Annual investments to restore and prevent conversion or degradation of marine ecosystems, including seagrass meadows, mangrove forests and coastal saltmarshes, make up 22 per cent of annual investments and are integral to achieving global targets.

Exhibit 14. **Where do additional investments need to be directed under a 1.5°C scenario (in US$ billion, 2022)**



Sources: MAgPIE scenario analysis. Vivid Economics and Natural History Museum (2020); Project Drawdown (2020); WEF and McKinsey and Company (2020); Humpenöder et al. (2020); McKinsey and Company (2022); Worthington and Spalding (2018).

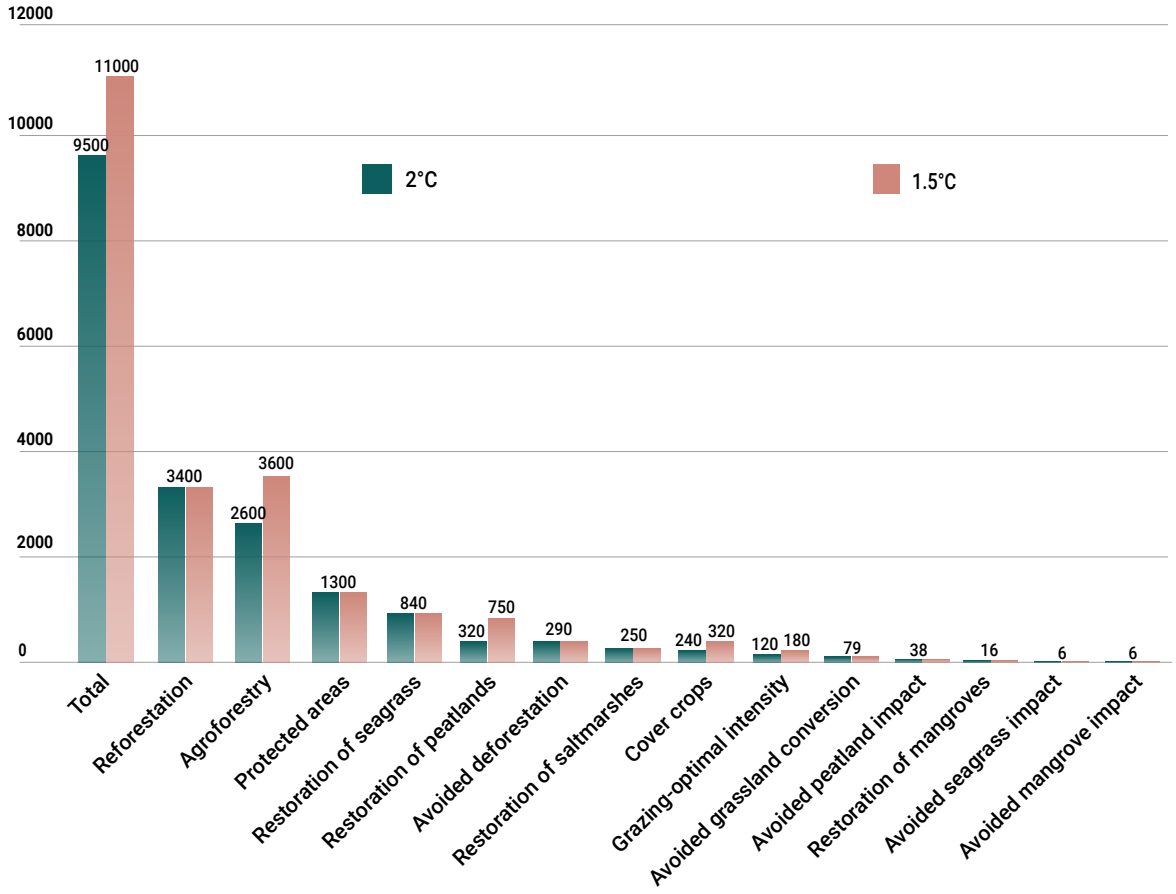
Cumulative investment needs to 2050

The ambition to limit global warming to 1.5°C in line with the Paris Agreement, rather than 2°C, can be met by mobilising US$11 trillion in cumulative investment in NbS to 2050. (see Exhibit 15).[14] Almost two-thirds of this investment is needed for reforestation and agroforestry. Moreover, investment in protected areas requires US$1.3 trillion (12 per cent of total investment needs). Seagrass and peatland restoration require US$840 billion and US$750 billion, respectively (14 per cent in total).[15] Other agriculture-related NbS such as cover crops and optimal-intensity grazing absorb US$500 billion (5 per cent).

[14] SFN 2021 modelled financial flows needed to limit global warming to below 2°C and to reverse biodiversity loss by 2050. In SFN 2022 we compare investment needs to limit global warming to meet the 1.5°C target (as well as 2°C), and more explicitly include land restoration commitments.

[15] The estimates for the restoration and protection of seagrass and saltmarshes are subject to high uncertainty in terms of area, feasibility and costs. While seagrass meadows and saltmarshes are an integral part of marine ecosystems, their global extent remains uncertain, and more research is needed to accurately map investible restoration and protection of these ecosystems.

Exhibit 15. Cumulative investment needs from 2022 to 2050 in 1.5°C and 2°C scenarios, $ billion (2022 US$)



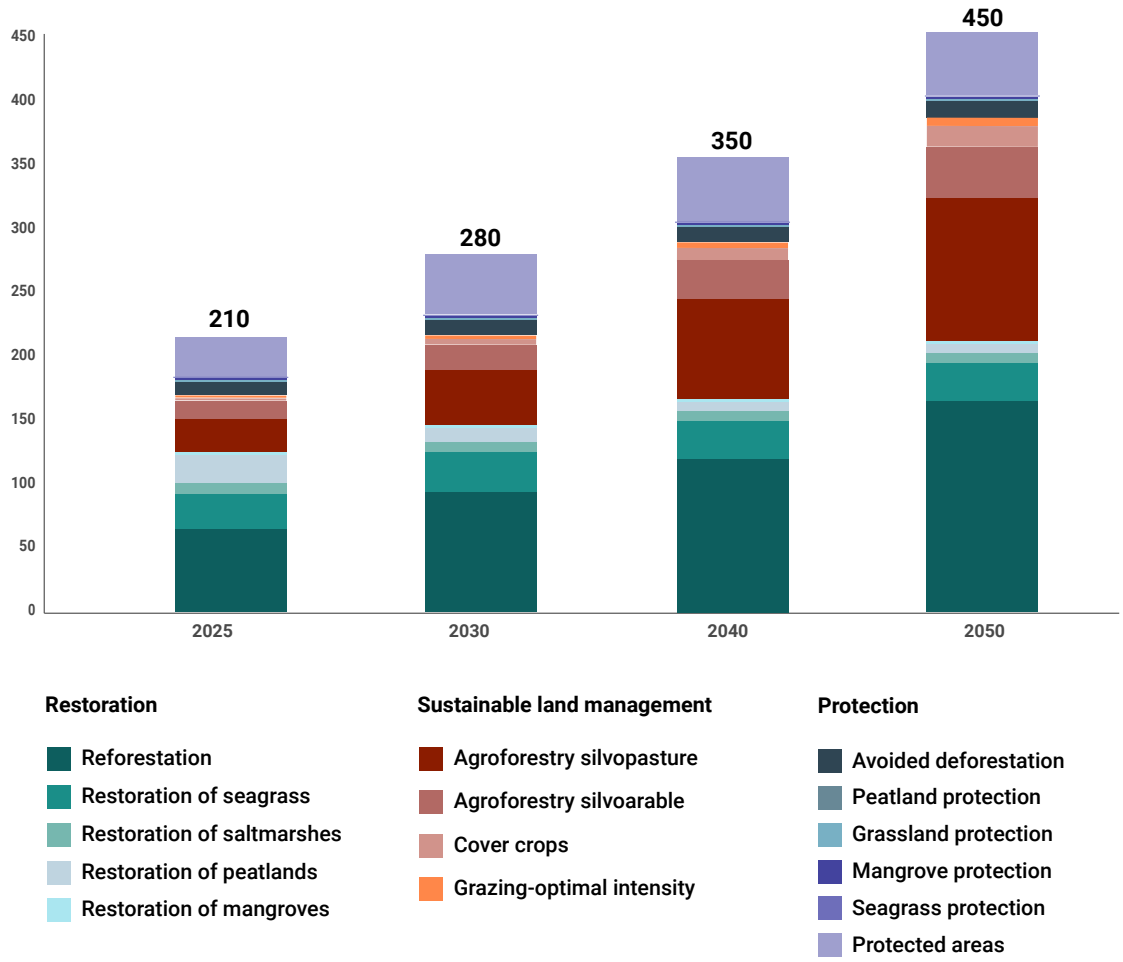
Sources: MAgPIE scenario analysis. Vivid Economics and Natural History Museum (2020); Project Drawdown (2020); WEF and McKinsey and Company (2020); Humpenöder et al. (2020); McKinsey and Company (2022); Worthington and Spalding (2018).
Note: The estimates presented in Exhibit 15 exclude reforestation, marine restoration and avoided terrestrial and marine restoration. This happened because most 1.5ºC scenarios are not directly comparable to the corresponding 2ºC scenarios that present disaggregated NbS investments needs.

The investment in NbS needed to limit global warming to below 1.5ºC pushes NbS deployment close to its full potential. In addition to net zero deforestation by 2025, a 1.5ºC aligned scenario requires annual CO_2 sequestration of well above 15 $GtCO_2$/year (UNEP and IUCN 2021). This level of NbS deployment approaches biogeochemical constraints and/or environmental, economic and governance issues (Nolan *et al.* 2021).

The 2°C scenario

Exhibit 13 illustrates annual investment needed in NbS under a 2°C scenario. As in the 1.5°C scenario, most annual investment is required in reforestation and agroforestry interventions.

Exhibit 16. **Where do additional investments need to be directed under a 2°C scenario (in US$ billion, 2022)**



Sources: MAgPIE scenario analysis. Vivid Economics and Natural History Museum (2020); Project Drawdown (2020); WEF and McKinsey and Company (2020); Humpenöder et al. (2020); McKinsey and Company (2022); Worthington and Spalding (2018).

US$9.5 trillion is needed cumulatively from 2022 to 2050 to keep climate change below 2°C, stabilise biodiversity levels and achieve land degradation neutrality (Exhibit 15). The types of NbS activities to keep climate change below 2°C are similar to those for 1.5°C, except there is less agro-forestry and peatland restoration.

3.2. Scope and methods

Investment need estimates are based on economic modelling that combines projected global land use changes and cost estimates to derive total investment needs. The methodology uses the Model of Agricultural Production and its Impact on the Environment (MAgPIE) to estimate investment needs under a scenario in which climate, biodiversity and land degradation neutrality targets are met jointly. Based on those targets, the model optimises ecologically appropriate land use cover. See Box 5 for more information on MAgPIE.

Box 5. Model of Agricultural Production and its Impact on the Environment (MAgPIE)

MAgPIE is a partial equilibrium land use model developed by the Potsdam Institute for Climate Impact Research. The model is spatially explicit and solves for least-cost allocations of land uses and investment in technical change to meet future demand for food and materials of agricultural origin, based on assumed population, GDP and dietary trajectories. The model allows for land to be protected and set aside. It produces a land use change raster based on policy assumptions, such as carbon pricing and land-related policies. MAgPIE also accounts for biophysical constraints on yield, land and water (Dietrich *et al.* 2020).

Model outputs:

- MAgPIE generates cost estimates associated with a given scenario, including land conversion costs, inputs to global food and material production and investment in productivity enhancement and irrigation.
- MAgPIE estimates the greenhouse gas emissions intensity of land use. It models three GHG gases: carbon dioxide, nitrogen compounds and methane. It accounts for carbon dioxide emissions from loss of terrestrial carbon stocks, including the depletion of organic matter in soils. Nitrogenous emissions are estimated based on nitrogen budgets for croplands, pastures and the livestock sector. Methane emissions are based on livestock feed and rice cultivation areas. When regrowth of natural vegetation occurs, it is recorded as negative emissions in the GHG accounts.

As MAgPIE focuses on forests and agricultural innovation, additional off-model analysis of investment needs focused on nine NbS: peatland restoration and avoided degradation, agroforestry (silvopasture and silvo-arable), cover crops, optimal grazing management, avoided grassland conversion and avoided impact and restoration of mangrove forests, seagrass meadows and saltmarshes. Further details are available in the annex.

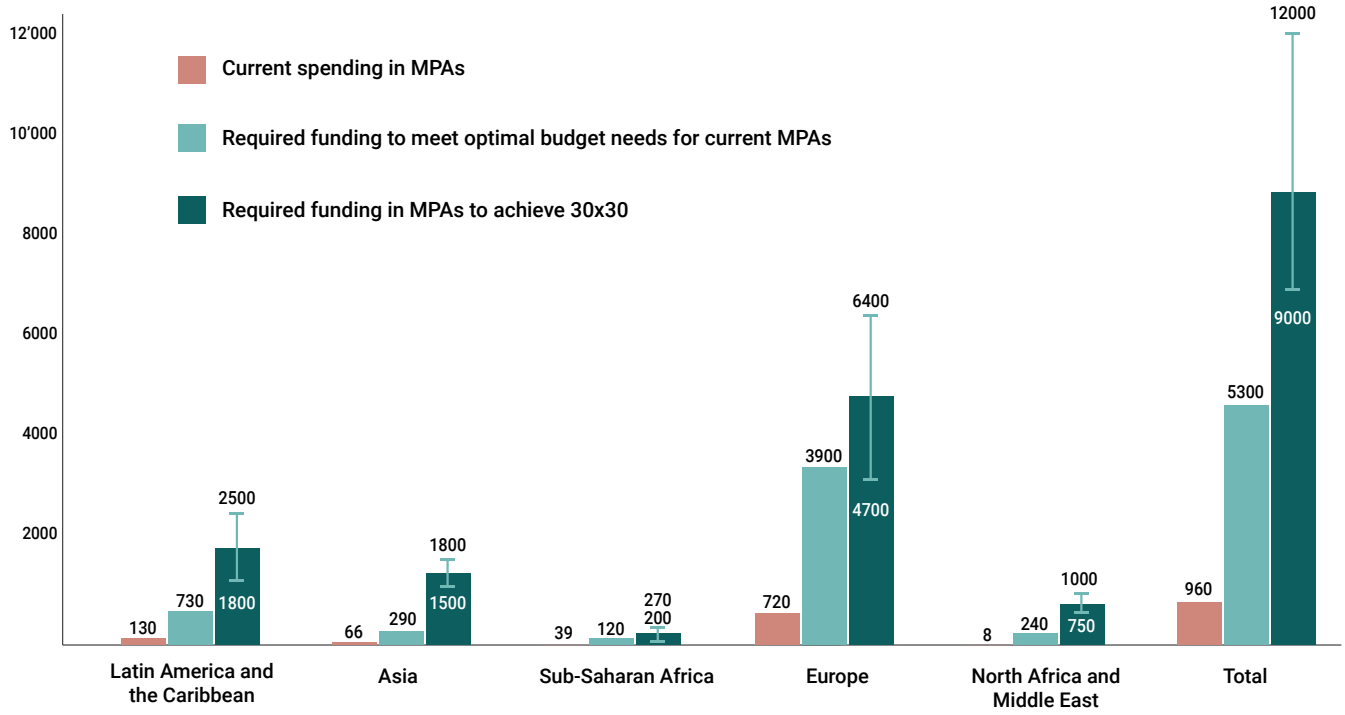
3.3. The finance gap to achieve 30x30

The 30x30 target proposed in the Post-2020 Global Biodiversity Framework aims to galvanize urgent and transformative actions by governments and society. The annual finance gap to increase protected areas to 30 per cent of the planet by 2030 (30x30) is estimated to be between US$17 and US$22 billion per year. The finance gap for marine protected areas (MPAs) is between US$8 and US$11 billion, measured as the difference between current MPA funding and funding (i) needed to protect 30 per cent of the ocean by 2030 and (ii) to meet optimal budget needs for the current MPA system. The finance gap for terrestrial protected areas (TPAs) is estimated to be between US$9 and US$11 billion, measured as the difference between current funding and funding (i) needed to protect 30 per cent of land by 2030 and (ii) to cover the minimum budget needed to maintain the existing TPA system. The optimal level of funding for TPAs is on average roughly 40 per cent higher than the minimum budget.[16]

Funding needed to protect 30 per cent of the ocean (US$9-12 billion per year) is 9 to 12 times greater than current spending in MPAs (US$980 million per year) (Exhibit 17). The resulting annual finance gap associated with 30x30 implementation varies across regions. In Europe, the MPA finance gap is mainly driven by the difference between current funding and the funding needed to optimally manage existing MPAs, which is five times higher than current spending. In North Africa and the Middle East current annual spending in MPAs needs to increase from US$8 million to US$750-1,000 million to meet the 30x30 target.

[16] The lower and upper bound estimates for MPAs are based on the minimum and maximum values, over six different scenarios of how the target could be implemented. See annex for details of scenarios. For TPAs, the lower and upper bound correspond to two different scenarios of how the target could be implemented. The finance gap estimates are conservative since they do not include opportunity costs or one-off establishment costs from implementing new protected areas.

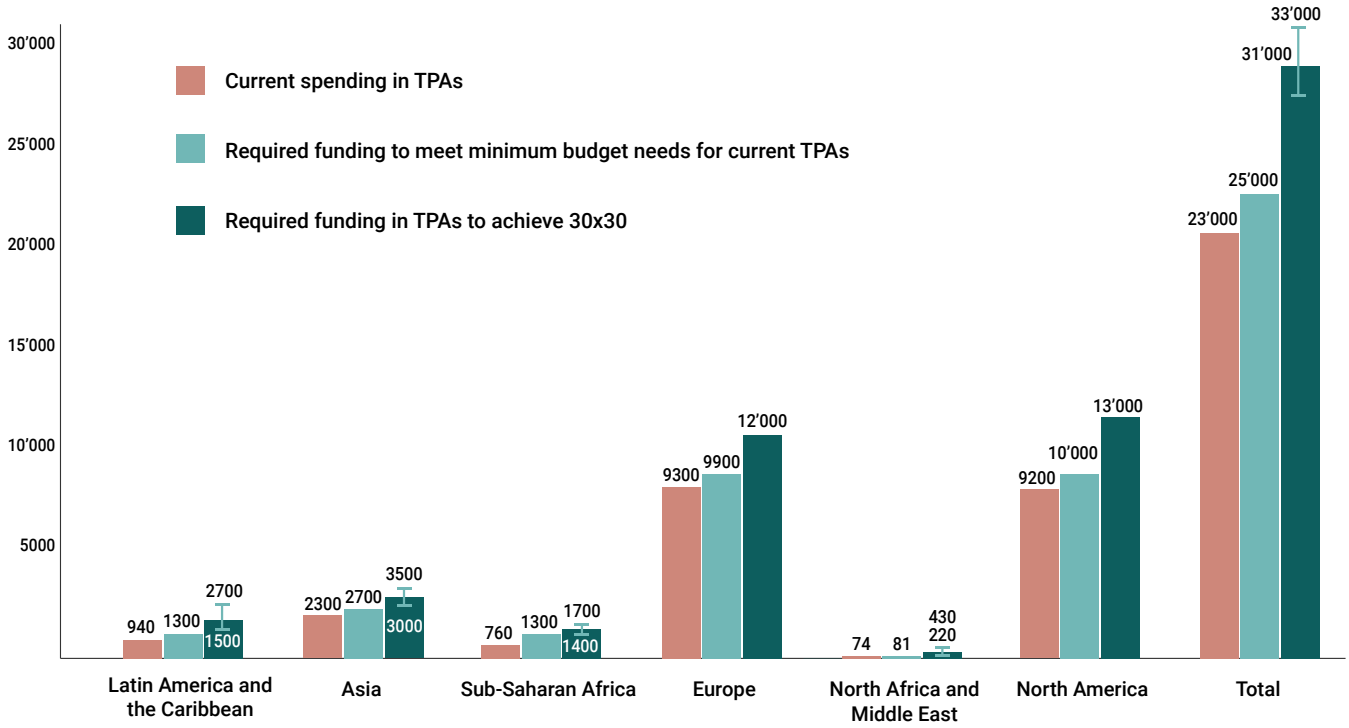
Exhibit 17. Marine Protected Areas - current funding vs funding needed for 30x30, by region, $ million (2022 US$)



Sources: The Nature Conservancy (2022); Waldron et al. (2020).
Note: 1. The required funding for MPAs is estimated as the optimal budget needed to manage existing MPAs 2. Current spending in protected areas in Oceania is not reported due to limited data reported in the region. 3. Current spending in marine protected areas in North America is not included due to the complex division of enforcement responsibilities across multiple agencies.

Annual finance needed to reach 30x30 in TPAs is on average 1.5 times larger than current funding, see Exhibit 18, but this varies markedly across regions. To achieve 30x30 in TPAs, funding needs to double in Sub-Saharan African and nearly triple in Latin America and the Caribbean. In North Africa and the Middle East, funding in TPAs needs to be five times larger than current funding.

Exhibit 18. Terrestrial protected areas - current funding vs funding needed for 30x30, by region, $ million (2022 US$)



Source: Waldron et al. (2020)
Note: 1. The required funding for TPAs is estimated as the minimum budget needed to manage existing TPAs 2. Current spending in protected areas in Oceania is not reported due to limited data reported in the region.

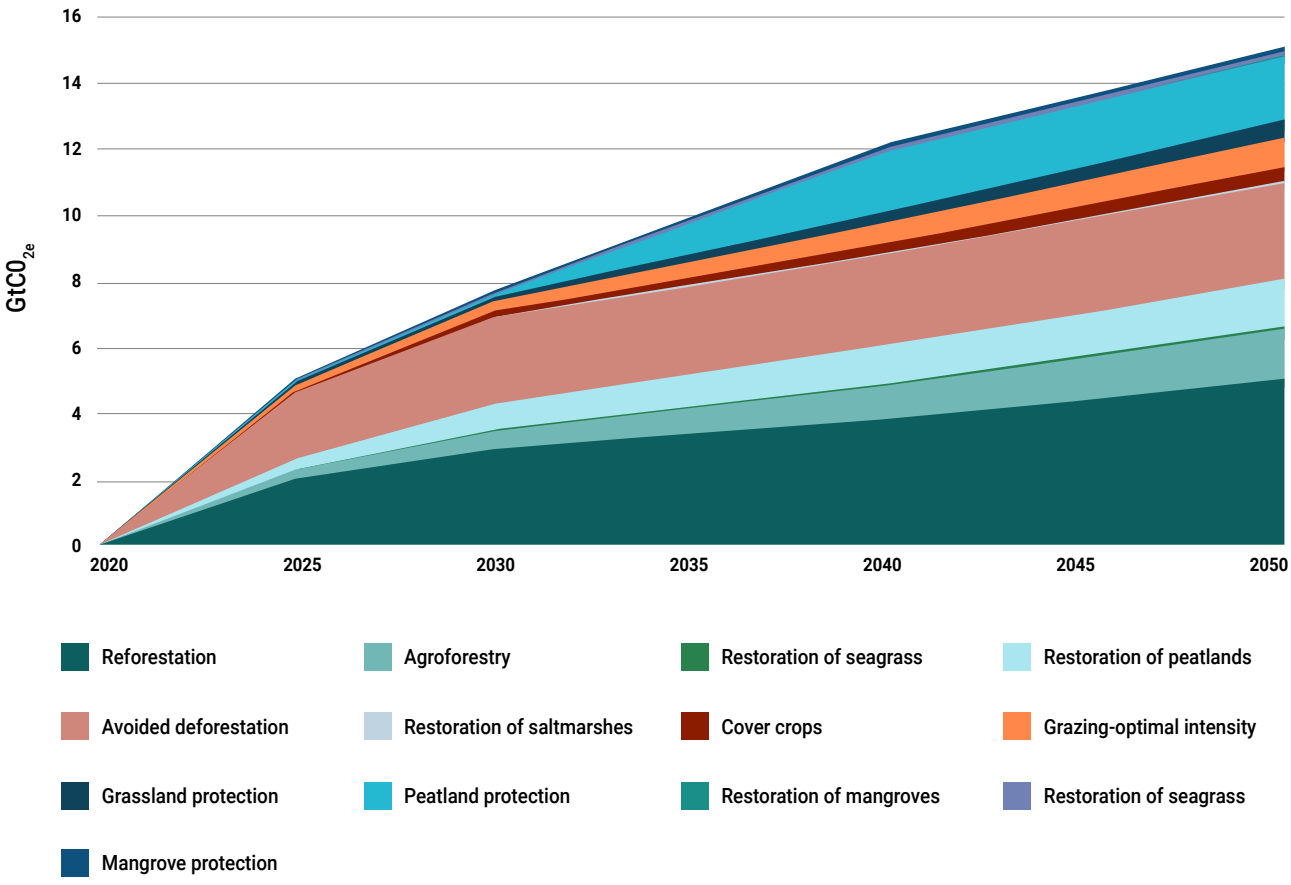
Differences in the finance gap between MPAs and TPAs are due to both differences in current funding levels relative to what is needed and differences in scope. The MPA gap is based on optimal funding needs while the TPA finance gap is based on minimum funding needs. The finance gap for marine 30x30 is larger than that for 30x30 of terrestrial protected areas in large part because marine 30x30 would require a much greater expansion in the area under protection, i.e. the current area of MPAs of roughly 8 per cent would need to quadruple. For 30x30, TPA area would need to double from current coverage of roughly 15-16 per cent.

3.4. Benefits of closing the NbS finance gap

This analysis finds that the GHG abatement associated with closing the NbS finance gap will be more than 5 $GtCO_2e$ per year by 2025, rising to 15 $GtCO_2e$ per year by 2050 in the 1.5°C scenario and up to 13 $GtCO_2e$ in the 2°C scenario. This is compared to global annual net emissions of 25 $GtCO_2e$ in 2050. This is in line with other studies - UNEP and IUCN estimate that by 2030, NbS across all ecosystems can deliver annual emission reductions and removals of at least 5 $GtCO_2e$, with a maximum estimate of 11.7 $GtCO_2e$. This will grow to at least 10 $GtCO_2e$ per year by 2050, with a maximum estimate of 18 $GtCO_2e$, providing a significant proportion of mitigation needed under the Paris Agreement (UNEP and IUCN 2021).

Total abatement potential is calculated by comparing the 1.5°C scenario with a business-as-usual scenario with no additional climate or land protection policies. More than 40 per cent of total abatement, equivalent to 5.4 $GtCO_2e$/year by 2050, originates from interventions that protect both terrestrial and marine ecosystems, including emissions avoided from protecting forests, peatlands (which deliver the most intensive NbS sequestration rate), mangroves, seagrass, saltmarshes and grasslands. Moreover, NbS for agriculture, such as cover crops and optimally managed grazing, could remove 1 $GtCO_2e$/year by 2050 (see Exhibit 19 for 1.5°C scenario).

Exhibit 19. **NbS global GHG removals by activity in 1.5°C scenario, 2022 to 2050, $GtCO_2e$/year**

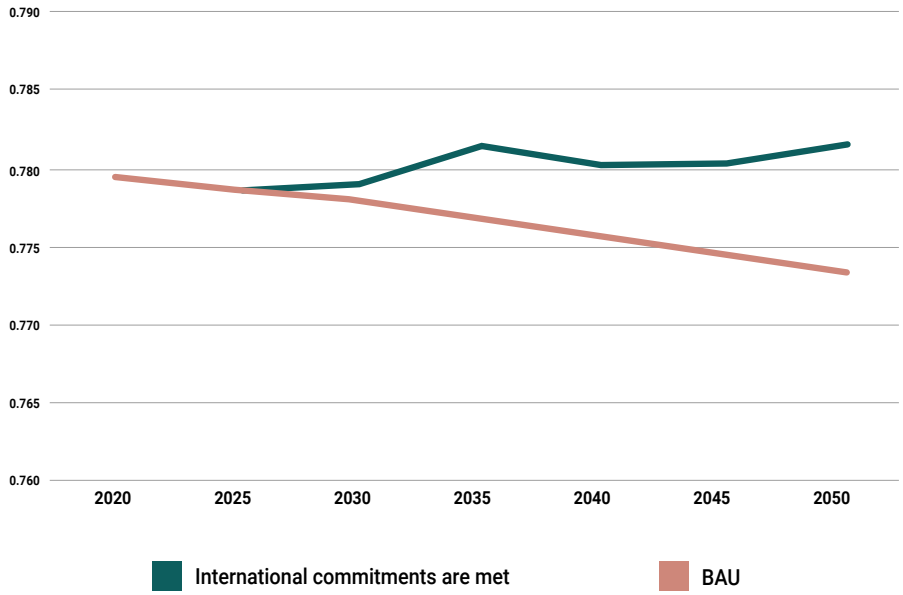


Sources: MAgPIE scenario analysis; Vivid Economics and Natural History Museum (2020); Project Drawdown (2020), McKinsey (2020); Humpenoder et al. (2020); McKinsey (2022); Worthington and Spalding (2018).

Ecological function, approximated here using the Biodiversity Intactness Index (BII), can be stabilised by 2030 and increased from current levels by 2050 if we close the NbS finance gap. The BII is a measure of biodiversity loss and proxy for ecological function, summarising the change in ecological communities in response to human pressures. It estimates the percentage of the original number of species that remain in an area, in this case a global average.

Under a business-as-usual scenario, where there is no climate policy or action to increase protected areas from current levels, biodiversity intactness will fall from 0.78 in 2020 to 0.773 by 2050, a serious decline of over 0.7 index points. However, if the finance gap is closed and international commitments are met, biodiversity intactness levels will return to 2020 levels by 2030 and increase 0.28 index points by 2050 compared to 2020 levels (see Exhibit 20) indicating the halting and gradual reversal of biodiversity loss.

Exhibit 20. **Biodiversity Intactness Index under different scenarios**

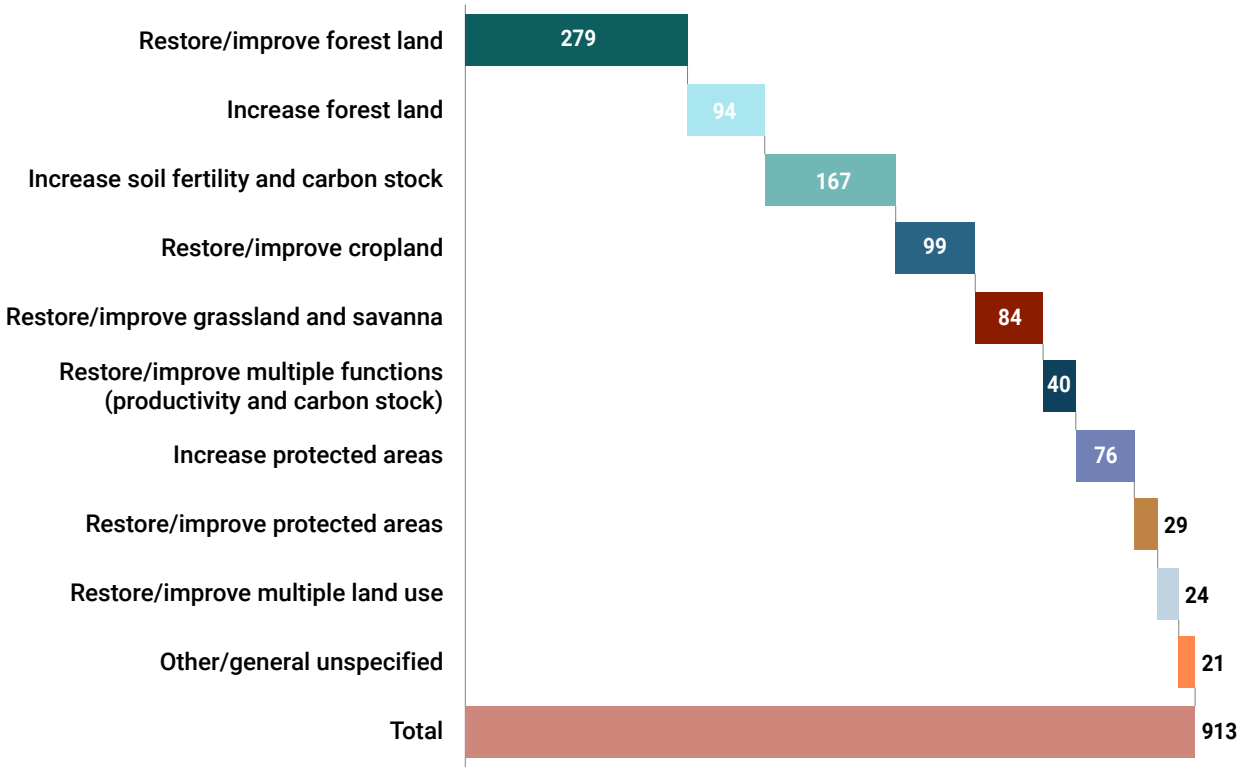


Sources: MAgPIE scenario analysis. Vivid Economics and Natural History Museum (2020).

SFN 2022 land restoration outcomes are aligned with the nearly 1 billion hectares of global restoration commitments needed to achieve land degradation neutrality by 2030. The investment presented earlier in this section delivers NbS related to land restoration within the goals and commitments for the UN Decade on Ecosystem Restoration (PBL 2020).

Exhibit 21 illustrates the nearly 1 billion hectares of global restoration commitments set by 2030 based on national plans, country reports, the Bonn Challenge and regional initiatives. While the land categories presented here represent a subset of the ecosystems included in the UN Decade on Ecosystem Restoration, still missing are urban ecosystems and their complex interactions with other ecosystems such as forests, wetlands and marine. It is important to extend analyses for land restoration outcomes and investments to urban areas, given the ever-increasing transformation of the natural world through urbanisation.

Exhibit 21. Global land restoration commitments by 2030, million hectares



Source: PBL Netherlands Environmental Assessment Agency (2020).

4 Key messages and recommendations

| Photo by Pawel Czerwinski on Unsplash

This chapter summarises the key messages of the report and provides recommendations on how to scale up NbS finance and nature finance more broadly, transform finance flows to nature-positive and repurpose nature-negative finance flows and the need to ensure inclusion in financial systems. Upcoming summits on biodiversity, climate and land degradation provide critical opportunites to raise ambition and accelerate action which is essential to limit climate change, halt biodiversity loss and reach land degradation neutrality.

4.1. Key messages

The key messages of this report are:

- **Finance to NbS is currently US$154 billion per year, less than half of the US$384 billion per year investment in NbS needed by 2025 and only a third of the investment needed by 2030 (US$484 billion per year)** to limit climate change to below 1.5°C, halt biodiversity loss and achieve land degradation neutrality.

- **With sufficient finance, NbS can provide the means to cost-effectively reach climate, biodiversity and land restoration targets**, particularly if investments simultaneously contribute to biodiversity (NBSAPs), climate (NDC) and restoration (LDN) targets. This "double" or "triple" win potential is particularly alluring given the tight economic situation at present.

- Delayed action is no longer an option in the face of the devastating effects of climate change, the extinction crisis and severe land degradation globally. Politicians, business and finance leaders and citizens globally must transform their relationship with nature to work with it rather than against it. This report provides hope - **if we urgently double investment in NbS, we can halt biodiversity loss, significantly contribute to reducing/removing emissions (5 $GtCO_2$/ year by 2025 further rising to 13–15 $GtCO_2$/year by 2050) and restore close to 1 billion ha of degraded land.**

- **Limiting climate change to below 1.5°C is achievable only if action is immediate.** To complement non-nature-based mitigation actions, the cumulative (2022–2050) investment in NbS required to achieve the 1.5°C target in line with the Paris Agreement is at least US$11 trillion. This cumulative investment takes the deployment of NbS close to the total potential identified in the literature, taking into consideration biophysical, social and governance constraints. Strong action before 2030 is critical to achieving a lower temperature target.

- **Private sector investment in NbS must increase dramatically and quickly from the current US$26 billion per year – only 17 per cent of total NbS investment.** While philanthropic capital and carbon markets have grown significantly, impact investment and investment in sustainable supply chains have increased very little. This is in stark contrast to the myriad of “net zero” and “deforestation-free” commitments made by agrifood companies, banks and investors.

- **Investment in marine NbS constitutes only 9 per cent of total investment in NbS,** which is very low given the role of the oceans in climate mitigation and supporting adaptation, food security and biodiversity conservation. The current annual investment in marine protected areas is US$980 million, whereas terrestrial protected areas receive almost US$23 billion. The annual finance gap to increase marine protected areas to 30 per cent by 2030 is between US$8 billion and US$11 billion.

- **Nature-negative expenditures dwarf investments in nature-based solutions –** Government expenditure on price-distorting and environmentally harmful subsidies to fisheries, agriculture and fossil fuels is estimated to be between US$500 billion and 1 trillion per year, three to seven times greater than public and private investments in NbS. These flows severely undermine efforts to achieve critical environmental targets. While robust evidence is lacking, it is widely recognised that private finance flows are predominantly negative for nature and almost certainly exacerbate the situation.

- **It is critical to rapidly align policies, regulation, economic activity and financial flows with biodiversity values and with the Paris Agreement.** Governments need to lock in critical targets on biodiversity loss, take urgent action to raise ambition and implement emissions reduction targets in line with the Paris Agreement and action land restoration commitments. These targets must be underpinned by broad based resource mobilisation from all sources. Public and private actors need to mobilise the necessary finance and close the finance gap while government anchor targets in national regulation/legislation.

4.2. Recommendations

This final section examines what needs to happen to scale up and improve the targeting of investment in NbS and who needs to do what over the next two to five years. High-level recommendations are structured around the need to:

1. **Finance green – increase direct finance flows to NbS** through public domestic expenditure, nature-focused ODA, ensuring MDBs/IFIs prioritise green finance and providing incentives for private sector investment.

2. **Green finance – business and financial institutions to transition to net zero, net positive and equitable** through improved accountability, assessment of impact and dependencies on nature and reporting.

3. **Increase inclusion in financial systems for a just transition.** Public and private sector efforts to scale up NbS investments need to integrate just transition principles, safeguarding human rights.

1. Recommendation 1: Financing green – increase direct finance flows to NbS through public domestic expenditure, nature-focused ODA, MDB/IFI lending and incentives for private sector investment in NbS, including nature markets and sustainable supply chains.

- **Increase government investment in NbS through public expenditure, domestically and through ODA.** This is currently the biggest source of source of capital for NbS and is critical to ensure provision of public goods and to catalyse private sector investment.
    - Rapid implementation of ambitious biodiversity targets needs to be supported by NBSAPs and National Biodiversity Finance Plans (NBFPs) to ensure the mobilisation of necessary finance and the alignment of finance flows with biodiversity values.
    - Governments need to scale up NbS finance to support the achievement of existing targets on climate and land degradation via Nationally Determined Contributions (NDCs) and various restoration commitments (Seddon 2022).

    - Action to scale up NbS finance should recognise linkages between gender equality and the environment and reflect this in NBSAPs, NDCs and other national planning reports.

- **Channel NbS finance to investments that provide multiple benefits,** i.e. NbS that contribute to climate mitigation/adaptation, biodiversity protection and restoration simultaneously. Governments can exploit "triple wins" by directing funding to 30x30 programmes, nature climate solutions and land restoration rather than tackling them separately.

- **Invest in nature in urban areas** (green infrastructure, e.g. sustainable urban drainage, green roofs) to keep cities liveable while tackling challenges associated with urbanisation. High and increasing levels of urbanisation combined with climate change will affect the liveability of cities that are unable to adapt. City planners, mayors and other key decision-makers need to deploy NbS to ensure cities remain liveable through innovative financing mechanisms for cities.

- **Increase investment in marine NbS.** Given the importance of coastal ecosystems and ocean health for well-being and the fact that 70 per cent of the planet is ocean, much more than 9 per cent of NbS investment needs to go to marine NbS.

- **Require national and international development finance institutions and multilateral development banks to set targets around financing nature, climate and restoration.**

- **Debt for nature** – use the opportunity to restructure debt in developing countries to invest in nature; "debt for climate" and "debt for nature" are critical tools for countries with severe financial constraints.

- **Increase the share of ODA that goes to nature** (nature-proofing ODA). Through "tagging", governments have the ability to ensure that ODA contributes to biodiversity conservation, climate mitigation/adaptation and restoration.

- **Governments need to provide an enabling environment through regulation and incentives to catalyse private sector action and investment in nature.** Private sector investment needs to increase from 17 per cent at present to over 50 per cent of NbS finance to close the NbS finance gap.
    - **Regulate for, and incentivise, sustainable supply chains**, e.g. EU action to halt the import of commodities from deforested areas.
    - **Support development of high-integrity nature markets** (e.g. The Taskforce on Scaling Voluntary Carbon Markets). Support the development, scaling and verification of nature markets with necessary standards and safeguards to ensure additionality, impact and equity. Develop market governance arrangements and market infrastructure and seek to crowd in investors.
    - **Scale up availability of concessional capital** to accelerate the transition to "net-zero, nature-positive" sustainable agriculture, forestry and other types of nature-based solutions. Governments and development finance institutions (DFIs) can provide catalytic capital via blended finance to funds and projects, absorbing some risks present in nascent markets. A growing number of governments, private foundations and multilateral funds provide first loss capital, guarantees and other means to reduce the risk for private investors.
    - **Put in place taxonomies that demarcate economic activities that can be considered sustainable from conventional ones** and progressively require businesses and finance institutions to ensure that the majority of activities are sustainable.

With high levels of government debt and growing economic hardship, the large increases needed in investment in NbS will have to come from the private sector.

- **Businesses and finance institutions must implement voluntary commitments:** Commit and take action that leads to "net zero", alignment of 1.5°C and nature positive, based on real emissions and nature impact reductions with unavoidable impacts offset through high-integrity carbon and biodiversity offsets.

[17] In 2017, 56% of NBSAP documents from 107 countries contained at least one gender keyword and 83% identified gender equality as a guiding principle. In 2021, UNFCCC's synthesis report indicated that 85% of 164 NDCs included reference to gender in their reports.

- **Scale up investments to make agricultural commodity supply chains sustainable and transparent:** Investment in NbS by agrifood companies, banks and (impact) investors remains far below where it needs to be. Businesses and finance institutions need to ensure supply chains are sustainable with no associated deforestation, land degradation, pollution, social costs, etc.

- **Unlock capital from institutional investors, high-net-worth individuals (HNWI) and private equity** investors for sustainable agriculture, forestry, marine NbS and other forms of nature-based solutions that have clear and predictable flows of revenues. There are a growing number of innovations, from corporate and sovereign bonds and nature/sustainability-linked loans to specialised funds that focus on lending or equity investments in businesses that improve rural livelihoods, nature, climate and restoration. The growing number of loans and impact funds provides fertile ground to enable mainstream investors and HNWI to increase their exposure in this nascent space by investing in fund of funds mechanisms, different types of bonds being underwritten by investment banks, etc. By developing a track record of deals, market transparency can be created and through that also a secondary market.

- **Harness the potential of carbon and nature markets** with robust environmental and social standards and fair and equitable sharing of the benefits. Businesses need to reduce emissions before turning to carbon markets. However, given that many businesses that have made "net zero" commitments cannot reduce all emissions themselves, there is a significant opportunity for natural climate solutions. Many NbS business models do rely on cash flows from carbon and nature markets to be of sufficient interest to investors.

- **Partner with DFIs, NGOs, the UN and governments** to reduce the risks of the transition to innovative and more sustainable business models, in terms of socio-economic risks and reputation, through blended finance mechanisms and other means.

2. Recommendation 2: Transform finance flows to nature positive (greening finance) and align global finance flows with the Paris Agreement and the Global Biodiversity Framework

- **Align finance flows to 1.5°C target** – this requires ambitious science-based targets across economic sectors, strict implementation and enhanced accountability and reporting. Research by S&P Global suggests that only 11 per cent of the 12,000 funds (with total assets under management (AUM) of US$20 trillion) is aligned with the Paris Agreement to keep temperature rises well below 2°C. Funds branded as ESG or "climate-themed" are not doing any better. Of the 51 climate-focused funds, with US$30 billion AUM, only 10 per cent were Paris aligned.

- **Align public and private financial flows with the goals and targets of the Global Biodiversity Framework.** In addition to ambitious text and targets, the means to measure, verify and report need further development. The TNFD, for example, will provide a risk management and disclosure framework for organisations to assess, report and manage nature-related risks and opportunities to support the shift in global financial flows away from nature-negative outcomes and toward nature-positive outcomes.

- **Reform and repurpose public expenditure that is environmentally harmful, including environmentally harmful subsidies.** Accelerated reform of harmful public financial flows can help close the NbS finance gap, reducing the need to redress its adverse effects through NbS investments. Environmentally harmful subsidies and tax incentives currently far outweigh public and private positive financial flows towards NbS. Countries need to detect financial flows that are harmful through enhanced evaluation and reporting and then identify subsidy pathways that achieve similar objectives in a less damaging manner, e.g. shifting away from subsidies that reward production in agriculture to subsidies that reward water productivity and drought-resistant crops. Fiscal instruments such as taxes on pesticides and fertilisers can incentivise producers and consumers to reduce the consumption of goods with a negative impact on nature and support the transition to more sustainable land management practices. Evidence suggests that reforming harmful agricultural subsidies could result in a significant increase in GDP. Emerging toolkits like UNEP's Sustainable Budget Approach tool or the WWF's Net Zero Test can support this transition.

- **Government should support NbS investment in State-owned Enterprises (SOEs) using their owner's rights to influence strategic direction and the transformation to nature positive.** SOEs constitute some of the largest companies globally; for example, companies in which the state is a majority shareholder account for two-thirds of local stock market capitalisation in China. Moreover, the issuance of SOE green bonds can accelerate local green bond market development and create channels for financing NbS investment. Similarly, green public procurement can have a large impact on sustainable consumption patterns given the market value of publicly procurement.

- **Integrate nature- and climate-related risks and opportunities into business and financial decision-making frameworks.** Encourage, incentivise and eventually legally mandate financial institutions to assess natural capital impacts and dependencies, manage and disclose risks related to climate (Taskforce on Climate-related Financial Disclosure (TCFD)) and nature (Taskforce on Nature-related Financial Disclosure (TNFD)), and disclose carbon intensity (scope 1, 2 and 3 emissions). Aim for consistent and widespread measurement, verification and reporting of corporate and finance institution dependencies and impacts on nature and climate to provide incentives for nature-positive investment.

- **Require national and international development finance institutions and multilateral development banks** to remove climate and nature negative lending and investment from their portfolios.

3. Recommendation 3: Increase inclusion in financial systems for a just transition

- **Inclusive finance in NbS is required to support a just nature transition.** Public and private sector efforts to scale up NbS investments need to integrate just transition principles, safeguarding human rights. This includes providing social protection, land rights and decent working conditions and the participation of local and indigenous communities, including women and other marginalised and vulnerable groups. Moreover, since NbS implementation will transform the agriculture and land use sector, and almost 75 per cent of the world's agricultural lands are family-owned farms, while nearly 25 per cent of the global population depends on forests for their livelihoods, inclusive arrangements are needed to address social risks and ensure the benefits of the transition are shared justly. Furthermore, NbS investments can benefit from engagement with indigenous communities, tapping into their knowledge and expertise about local ecosystems.

- **An increase in NbS capital is not enough without improvements in access and capacity.** An increase in NbS finance must be combined with better access to funds and markets by women and marginalised groups. Equitable participation and access to financial services, resources, knowledge, data, information and technology, especially for small-scale NbS projects in developing countries, typically attract less investment than large-scale projects in developed economies.

- **The failure to adopt approaches that are inclusive and participatory** whilst omitting to prioritise risk reduction and social equity further pushes the most vulnerable into poverty and increases inequalities both within and between countries. Failing to work with a broad cross section of stakeholders across all levels, including traditionally marginalised groups such as indigenous peoples, women and young people from local communities and ethnic minorities, is more likely to yield outcomes that mainly benefit the richest in society, who are better protected from the consequences and dangers of a degraded environment.

5 Future directions

| Photo by Dimitris Poursanidis on Grida

Future editions aim to explore critical elements in the scaling up of finance for nature:

1. **Broaden the scope of NbS investments included as data availability is enhanced.** This year's edition expanded the scope to include marine NbS and protected area spending. In future editions, we will include additional types of NbS, depending on data availability. This edition includes 16 types of NbS (compared to four in SFN 2021). Yet many types of NbS were excluded because of lack of data. This includes tracking public and private investment in NbS in cities, a key issue in a warming world where more and more people live in urban areas. Data availability can be improved by working collaboratively with, for example, the IMF, WB, OECD, FAO, UNDP, UNEP, UNSD, IUCN and others to ensure regular data collection at a sufficiently granular level to feed into measurement, reporting and verification systems. We will be exploring new partnerships for the next edition.

2. **Tracking nature-positive and -negative financial flows would be facilitated by a nature finance taxonomy and harmonisation of nature finance classifications, metrics and reporting.** While progress has been made to develop climate taxonomies, there are no equivalent definitions of nature-related financial flows. This is relevant for financial flows that have a positive impact on the climate but not on nature. For example, the European Union has introduced the "do no significant harm" principle as part of its sustainable finance framework to prevent investments that focus on decarbonisation but do not consider other environmental services such as biodiversity. Following a similar path, the Network for Greening the Financial System, a network of 114 central banks and financial supervisors, has recommended that "biodiversity-positive" and "biodiversity-harmful" activities be defined and has set up an interdisciplinary consultation process that involves scientists and conservation experts (Network for Greening the Financial System [NGFS] 2022).

3. **Improved tracking of public nature-negative finance flows.** Identifying public financial flows that are harmful to nature requires a more detailed view of public finances than those currently tracked by the OECD and IMF Classification of the Functions of Government (COFOG) databases. However, the level of detail provided by the IMF stimulus tracker – which summarises fiscal, economic responses from governments to Covid-19 – has enabled studies to identify and track the "greenness" of government stimulus plans (IMF 2020; Vivid Economics, Greenness of Stimulus Index 2021; The Environment's Global Recovery Observatory 2021). The IMF stimulus tracker serves as a model for how data on public expenditure could be collected and harmonised in future to track potentially nature-harmful public financial flows.

4. **Improved tracking of private nature-negative finance flows.** A large caveat in this edition is the absence of comprehensive data and analysis on private finance flows that are harmful to nature. It is hoped that the numerous ongoing initiatives, e.g. TNFD and TCFD, to provide this information will allow the inclusion of this highly significant finance flow in the next edition.

5. **More granular analysis based on disaggregated data on NbS finance at different scales through case studies and exemplars to explore:**

- the distribution of costs and benefits, including across social, economic and gender groups by location;
- opportunities to target NbS finance in terms of ecosystems (forests, mangroves), sectors (conservation, agriculture), activities (restoration, green infrastructure) and regions to optimise investment. A systematic assessment of the costs and benefits of types of NbS interventions in different geographies could help countries to deliver nature-positive outcomes at least cost and provide the business case for the private sector to invest in natural capital.

6. **Investing in NbS in cities** - given the centrality of cities in the global economy, it is important to explore how investments in urban NbS can be mainstreamed and accelerated to protect and restore nature in and around cities, and to reach local and global ecosystem restoration and climate targets.

7. **Nature- and gender- proofing ODA** - given the need for financial support for developing countries to implement actions to achieve Rio Convention targets and the key role of ODA, efforts could usefully focus on measuring the impact on nature of ODA and opportunities to deploy NbS for multiple benefits in development contexts. Moreover, we know little about the degree of gender responsiveness of ODA-financed NbS investments. ODA data analysed by the OECD reveal that US$56.5 billion (45 per cent of bilateral aid) was allocated to programmes that integrate gender equality. While we do not know what share of NbS-focused ODA integrates gender equality, efforts to use tracking mechanisms such as the “Development Assistance Committee gender equality policy marker” to track gender-responsive NbS investments are crucial and urgent in this SDG Decade of Action.

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For data sources for the exhibits please see reference list in the Annex

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