



Nature-based Recovery Initiative

Technical Paper No. 1

A photograph of numerous monarch butterflies in flight against a backdrop of green trees and a clear blue sky. The butterflies are scattered throughout the frame, with some in sharp focus and others blurred, creating a sense of movement and natural beauty.

COVID-19 pandemic and economy: Economic outlook, policy measures, debt distress and the role of nature

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Photo credits: **Cover page:** Monarch butterfly (*Danaus plexippus*), Sylvain Cordier. **Page iii:** Coffee bushes in a shade-grown organic coffee plantation on the western slope of the Andes in Ecuador, Shutterstock/Morley Read. **Page iv:** Mangrove Forest, Shutterstock/Oliver Osvald. **Page 9:** Tree nursery (Costa Rica), Leander Raes

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List of acronyms

GDP	Gross Domestic Product
INR	Indian Rupee
IUCN	International Union for Conservation of Nature
NbR	Nature-based Recovery
NbS	Nature-based Solutions
NZD	New Zealand Dollar
PKR	Pakistani Rupee
RLI	Red List Index



Key findings

- Economic impacts of the pandemic have been severe, with implications continuing over the next several years.
- Global economy experienced a severe downturn in 2020, estimated at -3.5%.
- Almost all countries worldwide are forecast to continue to produce a lower level of output than was predicted before the pandemic. Cumulative GDP loss forecast in 2020–2024 is around US\$ 30 trillion, or 4.2% of global GDP.
- Globally, 8.8% of working hours, equivalent to 255 million full-time jobs, were lost in 2020.
- Economic losses due to the pandemic vary considerably across the globe. Countries in Africa and South America, along with India and South East Asia, are expected to see the largest gap in economic output 2020–2024 compared to pre-pandemic projections.
- Responses to economic downturn have been swift and massive. Global fiscal support to stimulate and recover economy has reached US\$ 17 trillion (May 2021).
- Nature and biodiversity have been mostly neglected in stimulus packages. Only 3% of total long-term recovery spending announced by December 2020 (US\$ 56 billion) was directed to natural capital measures.
- The share of funds allocated to support long-term economic recovery, and hence room for nature-based recovery, is relatively small so far. US\$ 1.9 trillion, or 13%, of recovery packages announced by December 2020 were directed to long-term recovery measures, while the rest (US\$ 11.1 trillion) focuses on short-term rescue spending.
- The vast majority, or more than 80%, of the global economic stimulus comes from advanced economies. Lower-middle and low income countries account for around 36% of total global GDP loss 2020–2024, but their economic recovery measures represent only about 16% of the global total.
- The purpose of the economic stimulus is to fill the gap in economic activity created by the pandemic. In most countries, and especially in low-income developing countries, a considerable ‘stimulus gap’ remains between the size of economic stimulus and economic losses due to the pandemic.
- Fiscal distress due to sovereign debt has increased due to COVID-19, leaving many developing countries with little fiscal space to boost economic recovery.
- Debt relief and restructuring are high on the agenda, which offer opportunities to add considerations for nature conservation, especially in developing countries.
- Data on debt distress, threats to biodiversity and potential for Nature-based Solutions (NbS) for climate change point to several countries in Africa, South East Asia and South America as essential for assistance in addressing the triple crisis of debt, nature and climate.



1 Introduction

In response to the COVID-19 pandemic and the economic downturn it has caused, countries have announced at least US\$ 17 trillion support by May 2021 to stimulate and recover economic activity and livelihoods. To support transitioning to sustainable development, recovery from the COVID-19 pandemic needs to avoid making investments that are harmful to nature, including supporting business-as-usual. Moreover, the recovery investments should support nature conservation and restoration nature, while also addressing economic recovery and societal challenges more broadly.

Nature is essential for human existence and good quality of life (IPBES, 2019; IUCN, 2020). Failure to recognise this not only results in a model of economic growth that significantly contributes to the loss of biodiversity, but also misses opportunities to effectively deploy Nature-based Solutions (NbS) to help resolve major societal challenges, such as human health, food security, climate change, clean water and disaster risk reduction, through conservation and restoration natural of resources.¹

1 Nature-based Solutions for Societal Challenges was defined by IUCN and adopted in 2016, during IUCN's Members' Assembly at the Planet at the Crossroads Congress in Hawai'i. Nature-Based Solutions for Societal Challenges are defined as actions to protect, sustainably manage and restore natural or modified ecosystems, that address societal challenges (IUCN, 2020).

Avoiding support for environmentally harmful activities and backing Nature-based Recovery (NBR) involves trade-offs between near-term economic benefits and longer term future options for the production of a full range of ecosystem services, as well as between different ecosystem services and beneficiaries in time and location (IPBES, 2019; Cohen-Shacham et al., 2019). NbR strategies need to recognise such trade-offs and be implemented in a fair and equitable way.

IUCN Nature-based Recovery Initiative aims to ensure that governments consider nature in policy measures to support economic recovery from the COVID-19 pandemic. To achieve this, this initiative capitalises on IUCN's strengths, including engaging with its Members to ensure that recovery investments take advantage of NbR. More concretely, IUCN's ambition is two-fold: 1) that economic investment post-COVID does no harm to nature and livelihoods; and 2) that at least 10% of overall recovery investment provides value to nature.

This document is the first in a series of three technical papers that serve as background documents to inform and support the IUCN Nature-based Recovery Initiative. The objectives and scope of this technical paper are to:

- 1) Describe the economic and social impact of the pandemic, including on economic output and labour markets;
- 2) Analyse policy measures implemented by countries to mitigate the economic impacts of the pandemic, including the role of nature in the policy measures; and

- 3) Examine the needs for supporting countries, especially developing countries, to alleviate the triple crisis of debt, nature and climate.

Most assessments in this report were conducted and are presented at a country-level. The geographic scope of the assessment is global, although at times.

Methodologically, this report reviews and synthesises literature while also developing new analyses using data on economy and nature. The main purpose of the paper is to inform and support the initiative, instead of producing new research findings. Moreover, rather than seeking prescriptive and generally applicable recommendations, this assessment summarises and highlights different policy options for consideration by countries, international organisations and other actors to support nature-based economic recovery in different situations.

Technical Reports 2 and 3 provide and discuss evidence that nature-based recovery supports economic development, jobs and value for nature, and that NbS in particular have a role to play within this context.

2 Economic outlook

2.1 Impact across the globe and sectors

Global economy experienced a severe downturn in 2020, estimated by IMF at -3.5% (IMF, 2021a).

The longer-term economic impact in 2020–2024 is forecast at a loss of around US\$ 30 trillion, representing estimated 4.2% of global GDP in that period.² Contrasting IMF’s country-level projections of GDP in 2020–2024 made before and after the pandemic shows that almost all countries worldwide are forecast to produce a lower level of output in 2020–2024 than was predicted before the pandemic (Figure 1).

Economic impacts in 2020–2024 are expected to be especially severe in low-income countries (IMF, 2021a). Only a few countries in the world, such as China and the United States, are expected to see

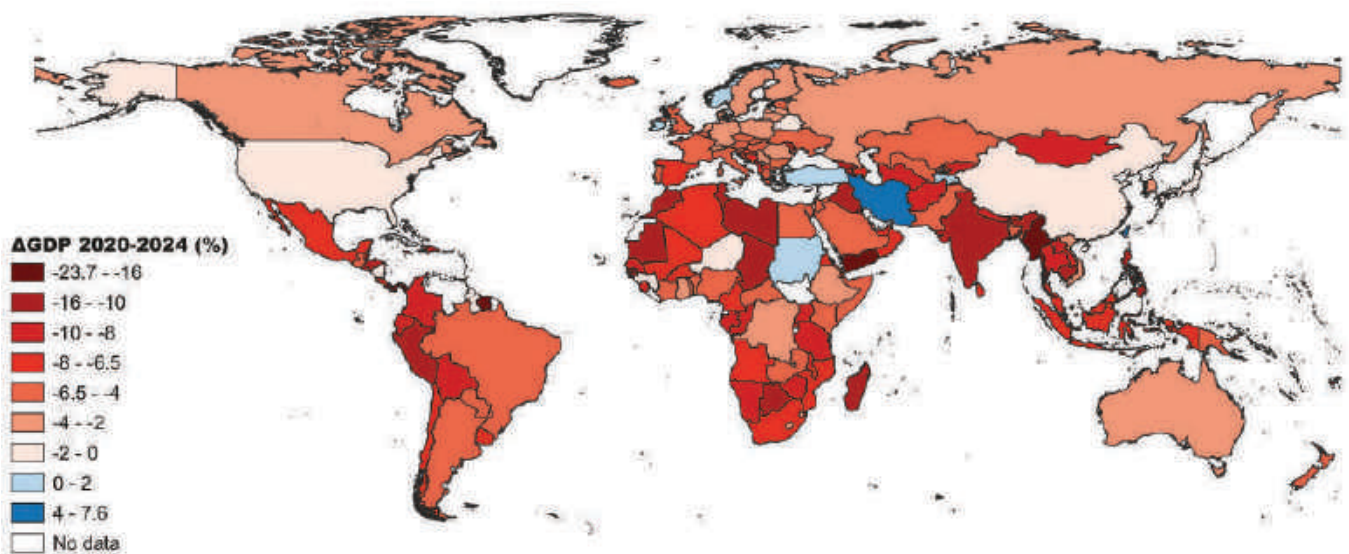
relatively moderate losses (between 1% and 2%). Although China did not see negative growth in 2020 (IMF, 2021b), its cumulative GDP projected for the next four years is 1.6% lower than what was expected pre-pandemic.

Global extreme poverty is set to rise markedly as a result of the pandemic, with sharp increases in South Asia and Sub-Saharan Africa (World Bank, 2021). The number of people living in poverty globally is expected rise by more than 100 million by 2021, compared to pre-pandemic trends, reversing several years of poverty reduction.

Countries where the renewable natural resource sector, including agriculture, forestry and fishing, contributes relatively high to the economy seem to have experienced more moderate economic losses due to the pandemic than those less dependent on nature. Working hours lost due to the pandemic are

FIGURE 1

Difference in GDP 2020–2024 projections before and after the pandemic (%). Darker red shows countries where GDP losses are highest.



Source: Map construction by the authors based on calculations using data from IMF (2019; 2021a).

2 Calculated using data from IMF (2021a).

relatively low in countries where agriculture, forestry and fishing contribute a high share of GDP and where rural employment contributes a large share to the total employment (Figure A1 in the Appendix).

There are likely many factors behind this relationship. One possibility is that the renewable natural resource sector, thanks to its distinct characteristics, is relatively resilient to macro-economic cycles. On the other hand, the outcome could emerge from a correlation rather than causal relationships. For example, countries with a high share of both rural employment and GDP in agriculture, forestry and fisheries are frequently those with a warmer climate, a relatively lower urban density and a higher proportion of young populations – factors known to positively contribute to a reduced impact of COVID-19 (Goldberg and Reed 2020; Deaton, 2021).

Tourism- and services-dependent economies suffer the largest impacts of the crisis (IMF, 2021a). These losses are expected to be more persistent in the services sectors in non-advanced economies. The impact through tourism is likely to fade over time.

Decline in international tourism has had a big economic impact. International tourist arrivals (overnight visitors) fell by 72% in January–October 2020 (UNWTO, 2020a). Export revenue losses from international tourism reached US\$ 935 billion (more than 10 times the losses experienced during the Great Recession in 2007-2009). Tourism is the third largest export sector of the global economy, representing 7% of global trade in 2019 (UNWTO, 2020b). For some countries, it represents more than 20% of GDP and one in every 10 jobs.

The fall in international tourism has direct implications on biodiversity conservation. Globally, some 7% of tourism relates to wildlife, a segment growing by 3% annually (UNWTO, 2020b). The loss of income from nature-based tourism and the decreased presence of tourists and staff may turn local populations to alternatives that risk biodiversity conservation, including poaching, looting, consumption of bush meat and forest clearing. Moreover, this may create a negative feedback by reducing the appeal of the

area to tourism, thereby risking the post-pandemic recovery of tourism in those areas. For example, in many African destinations, wildlife is a driver for up to 80% of visits (UNWTO, 2020b).

2.2 Labour market impacts

Globally, 8.8% of working hours, equivalent to 255 million full-time jobs, were lost in 2020 in comparison with 2019 (ILO, 2021a).

Similar to the overall economic impacts of the pandemic, its labour market impact was most severe and persistent in the services sectors (OECD, 2020a; ILO, 2021a). According to ILO (2021a), **accommodation and food services** experienced the largest loss of working hours and employment (-33% and -20.3%, respectively).³ Despite their relative resiliency to the pandemic, as discussed above, primary sectors, such as agriculture, forestry and fishing, experienced considerable losses of working hours, at 6.9% and 3.9%, respectively.⁴ Information and communication sectors are the only sectors showing growth in employment and working hours in 2020, at 1.3% and 5%, respectively. This is different from previous recessions over the past 50 years, where the manufacturing and construction sectors were typically the most negatively impacted (IMF, 2021a).

By the end of 2020, the recovery of employment tended to be modest and uneven across economic sectors. Job losses continued in many sectors, including: agriculture, forestry and fishing; construction, retail; and manufacturing, but at a declining rate.

Decline in labour force participation rate is considerably larger in emerging market and developing economies (3%) than in advanced economies (0.4%) (IMF, 2021a). With a higher pre-pandemic labour force participation rate, advanced economies experienced a lower impact by the pandemic on unemployment and labour force participation, possibly attributed to active measures to support job retention.

3 Comparing the second quarter of 2020 to the same quarter in 2019.

4 Part of the losses of working hours in the primary sectors could be associated with longer-term trends, including declining total employment and steady productivity growth in the primary sectors.

Youth and lower-skilled workers have been affected the most (IMF, 2021a). Pre-pandemic unemployment rates were larger for youth and lower-skilled workers, showing the highest increase in unemployment in 2020. In addition, the decline in labour force participation by youth and low-skilled workers is considerably larger than in other groups.

Decline in labour force participation by women is larger in emerging market and developing economies (-2.5%) than in advanced economies (-0.2%) (IMF, 2021a).

2.3 The role of debt for economic recovery and sustainable development

Fiscal space to boost economic recovery is tight in emerging market and developing economies (IMF, 2021c). Many developing countries already experienced difficulties with external debt before the pandemic, which has further added to their fiscal distress. To moderate and respond to the situation, G20 Finance Ministers were swift to adopt the Debt Service Suspension Initiative (DSSI), suspending bilateral debt payments until July 2021 for 73 low-income countries (Simmons et al., 2021). Current discussions suggest that this policy may continue until the end of 2021, if not beyond.

Private holders of sovereign bonds are generally less willing to waive debt (Dibley et al., 2021). While debt service suspension can be a temporary solution for bilateral debt, many countries owe their debt to private holders who may not be as flexible as governments. This can bring severe consequences on countries fiscally distressed by debt.

For many emerging market and developing economies, international aid will be critical not only to their economic recovery but also to the achievement of the Sustainable Development Goals (IMF, 2020b). These countries will need to boost revenue capacity and seek sustainable financing, including development aid. Many low-income developing countries are at high risk of debt distress, and some will require upfront debt restructuring, debt relief and other aid, including official development assistance.

Debt relief to reach a sustainable economic recovery is also critical to small middle-income countries suffering debt distress. Many countries that fall in this category, including small island developing states, are unable to access concessional finance and have economies that are significantly reliant on nature. Section 5 discusses the issues related to debt distress and options for addressing it, along with biodiversity and climate goals.

3 Economic recovery packages and policy responses

3.1 Components of recovery packages

Global fiscal support reached US\$ 17 trillion by May 2021 (Table 1) (IMF, 2021c). Stimulus packages involve a broad range of measures, including two main categories; budgetary spending and liquidity support (Box 1). Health-sector spending is another common area; it involves budgetary spending in direct response to the pandemic, including monitoring, containment, mitigation and health care required to treat those suffering from COVID-19.

The scale and form of fiscal support has varied depending on the country's pre-crisis institutional setting, the impact of COVID-19 and access to credit. **The vast majority of the US\$ 17 trillion total global fiscal support – more than 80% – comes from advanced economies** (Table 1). **The United States represent 34% of the total**, Japan 14.5% and the European Union 8%. **The fiscal stimulus by China is 6.7% of total global, representing almost half of the total effort undertaken by emerging market economies.**

The most relevant category for increasing the role of nature in recovery packages involves non-health sector-related additional spending, amounting so far to about half of all stimulus. Setting aside liquidity measures and health-sector spending, half of fiscal support, or US\$ 8.55 trillion, involve non-health sector-related additional spending or forgone revenues (component A.1.2, Table 1). This category of spending involves new targeted spending that could, in principle, directed towards conservation activities, especially in the long-term.

Opportunities to re-direct other measures, such as short-term budgetary spending and liquidity measures, are more limited. Short-term budgetary measures involve policies, such as direct transfers to households, employment support programs and tax measures to support businesses, all aimed to help economy stay afloat but are not designed typically

to re-direct it. Liquidity support measures involve contingent liabilities, which can have potentially big fiscal impacts, but their potential for advancing NbR is limited because they focus on maintaining business-as-usual, including assets already in existence.

By December 2020, 13 % or US\$ 1.9 trillion of total spending on economic recovery packages was directed to long-term recovery measures, while the rest is focused on short-term rescue or undefined spending (O'Callaghan & Murdock, 2021). Long-term recovery measures are measures that aim to boost economic growth, including incentive measures, such as cash transfers, or incentives to tourism and leisure industry, and investment measures, such as worker retraining and job creation, education, healthcare and infrastructure investment (part of component A in Table 1). Short-term rescue measures are designed for emergency support to keep economy and society going, including temporary liquidity measures (component B in Table 1), life and livelihood measures, and tax and payment relief measures (component A.1 in Table 1).

Although the total global amount of economic recovery measures is massive, the share of spending that is destined to support targeted longer-term economic recovery, which likely involves the greatest potential for discretionary spending, including supporting NbR, is so far small.

Fiscal policy actions have been massive in advanced economies, but constrained by financing in many emerging market economies and, especially, low-income developing countries (IMF, 2020b). Figure 3 shows this by mapping countries' additional recovery spending relative to GDP, with dark green indicating countries, such as Australia, Canada and the United States, where this ratio is most pronounced so far.

BOX 1

Policy measures used in economic recovery packages

Policy measures for economic stimulus and recovery can be classified into two main groups: (A) budgetary measures; and (B) liquidity support (Figure 2; IMF, 2020c). Budgetary measures represent actual spending by the governments. Liquidity support measures are actions that support financial markets to ensure their proper functioning, which may have little or no upfront impact on spending and fiscal deficit. In the United States, a recent assessment evaluated ecological restoration as an economic sector, finding that it directly employs around 126,000 workers and supports an additional 95,000 jobs. The overall restoration sector thus supports approximately 221,000 jobs, including direct, indirect and induced effects (BenDor et al, 2015).

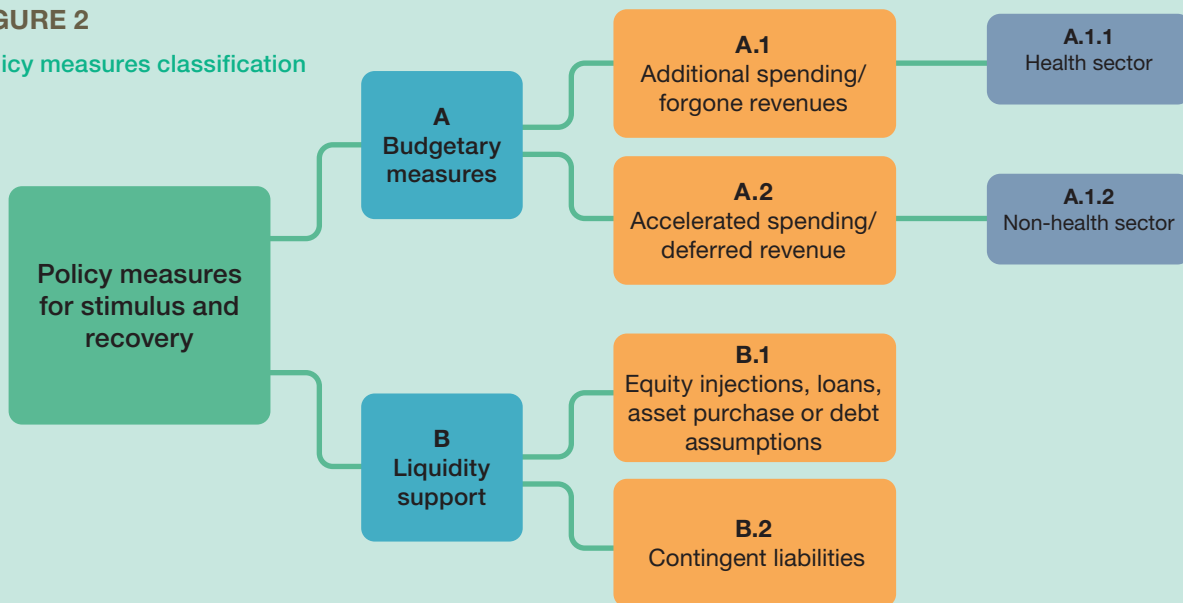
IMF computes countries fiscal support as additional spending/forgone revenues (A.1) + liquidity support (B). The calculated fiscal support does not include accelerated spending/deferred revenue (A.2), because it has no direct fiscal or debt implications.

In the context of nature, the most relevant component in the economic recovery packages is the component A budgetary measures. In particular, component A.1 – additional spending/ forgone revenues – could involve opportunities to support nature conservation. Measures in the component A.2 – accelerated spending/ deferral revenues – can also offer opportunities to implement nature-based recovery measures.

Data on COVID-19 policy measures are not meant for direct comparisons across countries as responses will vary depending on country-specific circumstances, including the impact of the pandemic and other shocks (IMF, 2021c). Rather, these data concern governments’ discretionary measures that supplement existing stabilising mechanisms that differ in breadth and scope across countries. For example, countries with robust social security may need fewer additional interventions than countries where social security net is more limited.

FIGURE 2

Policy measures classification



Source: Constructed based on IMF (2020d, Box 1.1, p. 22).

TABLE 1

Summary of fiscal measures in response to COVID-19 (US\$ billions)

POLICY MEASURES	Advanced economies		Emerging markets		Low-income countries		Global		
	US\$	%	US\$	%	US\$	%	US\$	%	% of Total
A – Budgetary measures	9 132	83	1 766	16	46	0	10 943	100	64
A.1 – Additional spending/forgone revenues	8 533	86	1 387	14	37	0	9 957	100	58
A.1.1 – Health sector	1 197	89	143	11	6	0	1 347	100	8
A.1.2 – Non-health sector	7 335	86	1 185	14	29	0	8 550	100	50
A.2 – Accelerated spending/deferred revenue	599	61	379	38	8		986	100	6
B – Liquidity support	5 382	88	716	12	7		6 104	100	36
B.1 – Equity injections, loans, asset purchase or debt assumptions	293	77	82	22	3	1	379	100	2
B.2 – Contingent liabilities	5 088	89	633	11	3	0	5 725	100	34
TOTAL	14 514	85	2 481	15	52	0	17 047	100	100

Note: The table uses data and classification of countries by IMF (2021d).

3.2 The relationship between economic recovery packages and economic losses due to COVID-19

Countries with larger pandemic-related additional spending measures are projected to experience smaller economic losses due to pandemic (IMF, 2021a). A key purpose of the economic stimulus is to help fill the gap in economic activity created by the pandemic. To examine how fully the economic recovery packages fill the economic gap created by COVID-19, we measured the size of the economic recovery package by country relative to the cumulative GDP loss forecast for 2020–2024.

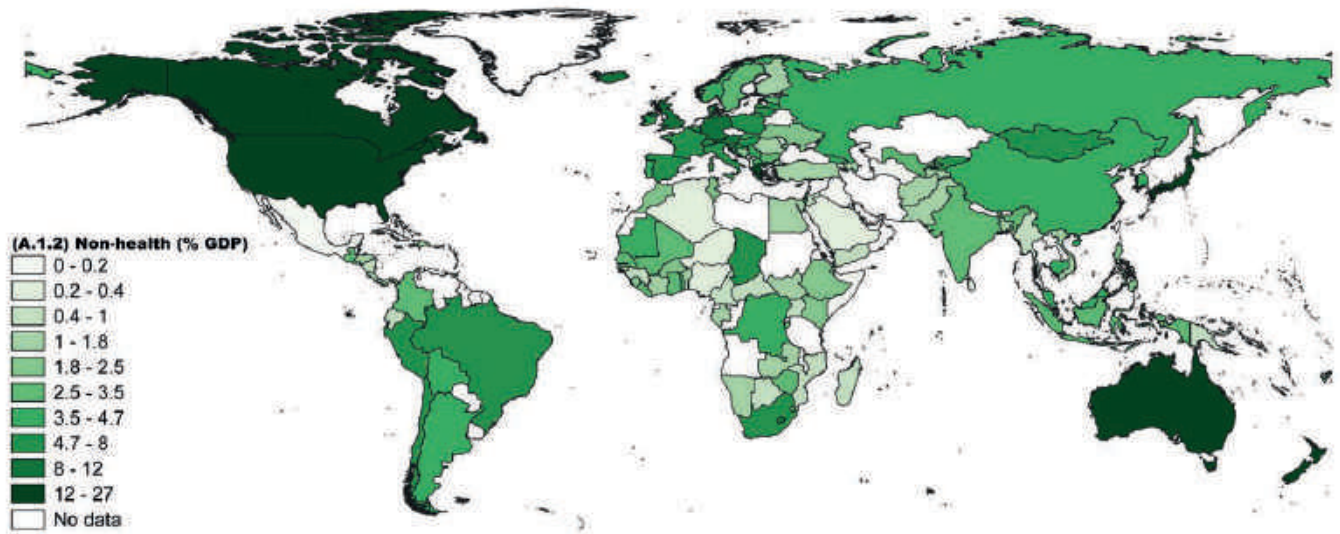
Figure 4 maps the results, with lighter red indicating countries where the size of the economic recovery package is smaller relative to the economic losses in that country. **In most countries, and especially in**

low-income developing countries, a considerable ‘stimulus gap’ remains between the size of economic stimulus and economic losses due to the pandemic. High and upper-middle income countries account for about 63% of total global GDP loss forecast for 2020–2024, but they are responsible for around 95% of the global total fiscal stimulus (Figure 5). This covers between 156% (high income) and 32.8% (upper-middle income) of their losses in economic output due to the pandemic.

The gap between additional spending and economic losses is unequal between developed and developing economies. This difference is driven in part by existing debt burdens and higher interest rates on borrowing (O’Callaghan & Murdock, 2021). Lower middle- and low-income countries account for around 37% of total global GDP loss forecast for 2020–2024, but their fiscal stimulus is only 5.2% of the total global amount.

FIGURE 3

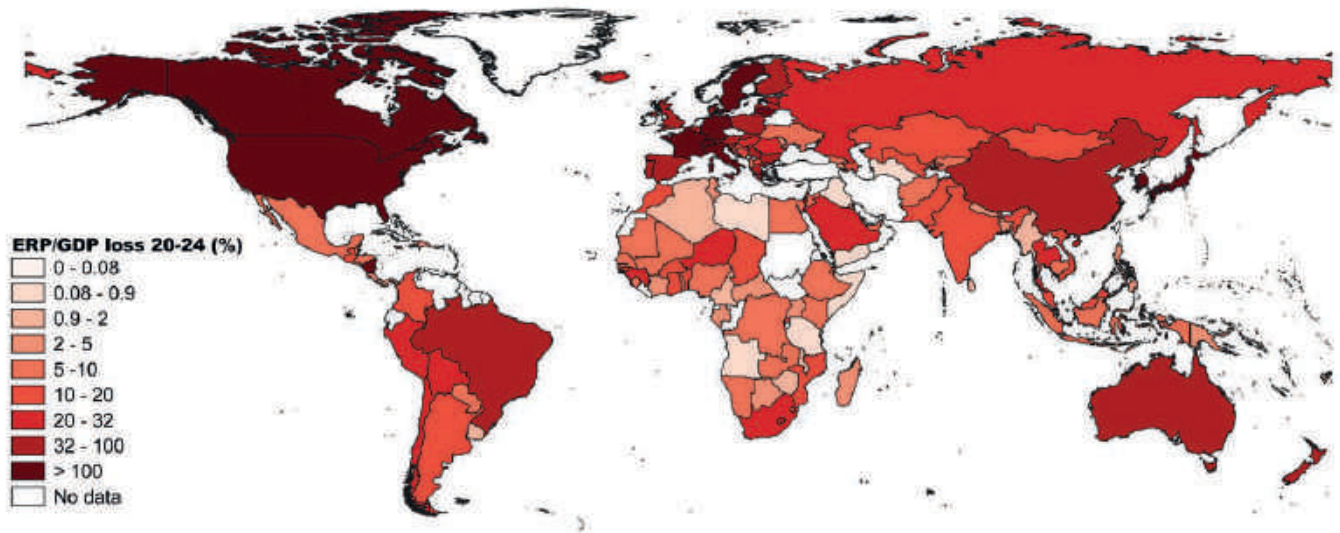
Additional recovery spending and forgone revenues in non-health sectors relative to GDP. Darker green shows countries where additional spending and foregone revenues are highest relative to GDP.



Sources: Map construction by the authors based on calculations using data from IMF (2021d).

FIGURE 4

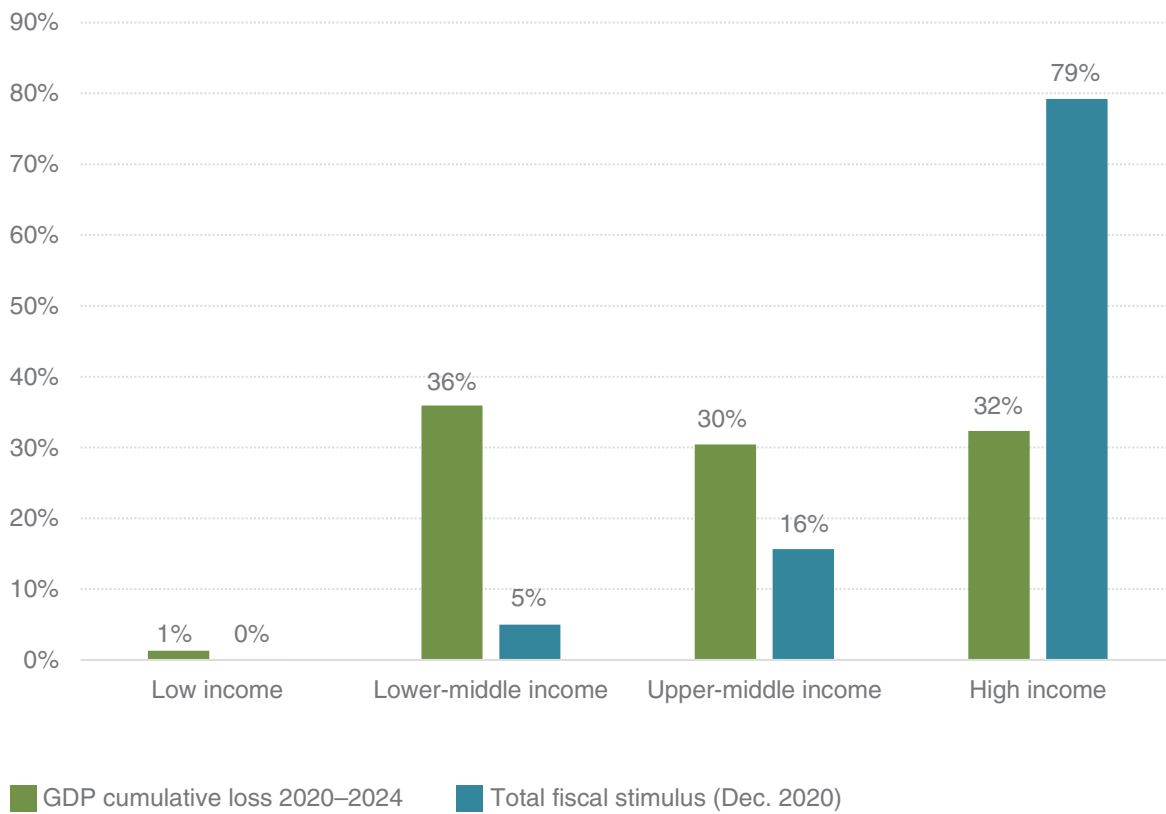
Economic recovery package relative to GDP loss 2020–2024 (%). Lighter red denotes countries where recovery spending is low relative to GDP loss 2020–2024. Values >100% indicate that countries spent more than the expected loss.



Sources: Map construction by the authors based on calculations using data from IMF (2019; 2021a; 2021d)

FIGURE 5

GDP cumulative loss forecast for 2020–2024 and fiscal stimulus by country income level, as share of the global total



Source: Based on calculations using data from IMF (2019; 2021a; 2021d).



4 Economic recovery packages and policy responses

The importance of COVID-19 economic recovery packages to creating a recovery that is both green and inclusive has been widely recognised as an objective by governments and international organisations (ILO, 2020; IMF, 2020e; OECD, 2020b; UNFCCC, 2021). This includes statements from the United Nations Secretary General, ministers from 30 countries and the heads of international organisations such as IMF and OECD.

Greening economic recovery means comprehensively assessing recovery plans to avoid investing in environmentally harmful activities and supporting environmentally beneficial activities, such as mitigating and avoiding climate change, and investing in NbS to address societal challenges, such as health, food security, climate change and disaster risk reduction. Biodiversity contributes services that are vital for human existence and good quality of life, including food and drinking water provision, protection from disasters, and health (IPBES, 2019).

Around 18% of long-term recovery spending, or US\$ 341 billion, announced by December 2020 was green or environmentally positive spending (Callaghan & Murdock, 2021). Green spending is defined as one that is likely to reduce greenhouse gas emissions, reduce air pollution and/or strengthen natural capital.⁵ Green or environmentally positive spending grew over 2020, though it remains low as a proportion of recovery spending (Figure 6).

The approvals of recent recovery and infrastructure spending bills by the Biden administration in the United States include large investments in clean energy and transport along with targeting climate-smart agriculture, resilience and environmental protection. The recent announcements also increase

the total share of spending on green recovery at the global level.

In 2020, high-income countries and China led in total green spending, while most countries lacked a green focus in their COVID-19 related spending (O’Callaghan & Murdock, 2021). **In addition to China, South Korea, Spain, Germany, the UK, France and Japan and are the countries with the largest green spending.** When considering green spending as a proportion of GDP, Spain, South Korea and the United Kingdom lead the ranking, also in part because these countries have spent significantly more on overall recovery in comparison to others.

For NbR to be effective, its benefits to nature should not be offset by non-green spending to support environmentally harmful activities. Fiscal measures can encourage both positive and negative effects on the environment and nature (see Box 2). From the US\$ 1.9 trillion spending towards long-term recovery announced by December 2020, 18% are likely to diminish greenhouse gas emissions, 16% are likely to bring positive impacts for air pollution and another 16% may act to increase air pollution. Only 3% are deemed positive for natural capital, while up to 17% may negatively impact natural capital, mainly through expanded road transportation and defence services (O’Callaghan & Murdock, 2021).

Green spending varies across countries in amounts and activities targeted (O’Callaghan & Murdock, 2021). In advanced economies, green spending in 24 countries, amounting to US\$ 317 billion by December 2020, was spread across a wide range of policy areas. In emerging markets and developing economies, green spending by 26 countries, amounting to US\$ 51 billion by December

5 This includes both liquidity support and additional spending/forgone revenues. Long-term recovery spending is defined as in Section 2: incentive measures; like targeted recovery cash transfers, incentives to tourism and leisure industry, or electric vehicles; and investment measures, such as worker retraining and job creation, education, healthcare, and infrastructure investment (O’Callaghan & Murdock, 2021)

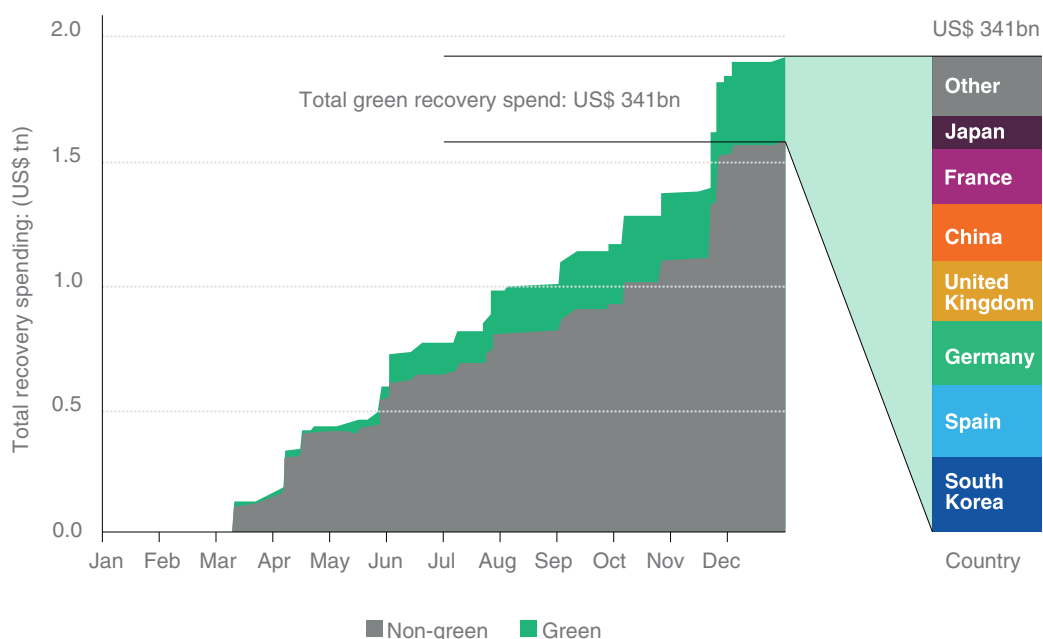
2020, was mostly focused towards natural capital projects (around 50%) and clean energy (around 30%).

Nature and biodiversity are mostly neglected in stimulus packages. Only 3%, or US\$ 56 billion, of total long-term recovery spending announced by December 2020 are directed to

natural capital measures (Figure 7) (O’Callaghan & Murdock, 2021). This includes measures related to public parks and green spaces investment, tree planting and biodiversity protection, ecological conservation initiatives, and waterway protection and enhancement. Almost half of the spending to support natural capital attributed to China.

FIGURE 6

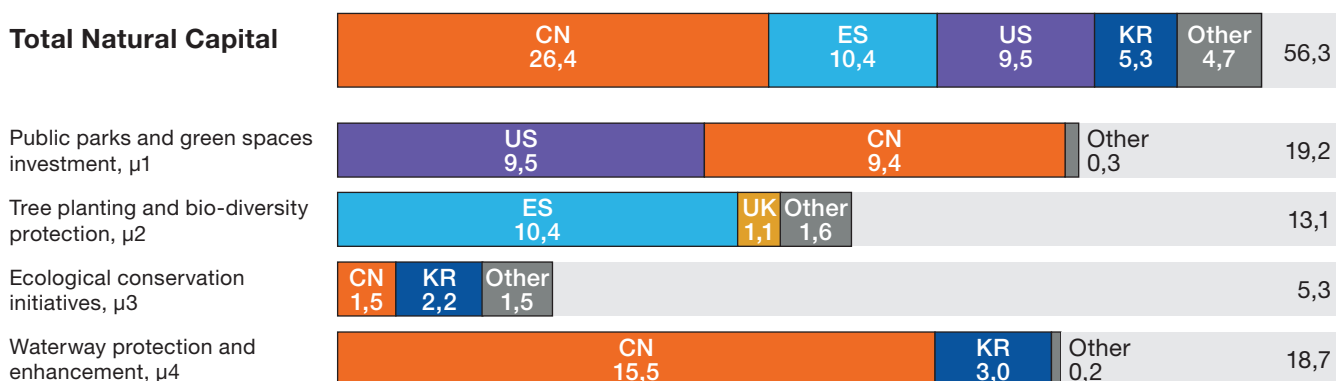
Recovery spending over the course of the pandemic and total green spending by country (US\$ billion)



Source: O’Callaghan & Murdock (2021).

FIGURE 7

Total natural capital spending by country and sub-category (US\$ billion)



CN: China, ES: Spain, KR: South Korea, UK: United Kingdom, US: United States

Source: O’Callaghan & Murdock, 2021.

BOX 2

Examples of the impact of economic recovery packages on nature

Economic recovery packages have resulted in a portfolio of measures that have positive, neutral or negative impacts on the environment and nature.

POSITIVE IMPACTS

Regulatory

Some countries are introducing regulatory measures that promote the conservation, sustainable use and restoration of biodiversity. For example, China and Vietnam introduced measures to regulate wildlife trade in order to reduce the associated human health risks (OECD, 2020c).

Job creation

Several countries have included active job creation programs based in nature in recovery packages, including the following examples:

- **India** is channelling INR 60 billion (US\$ 0.8 billion), part of the INR 20 trillion (US\$ 0.27 trillion) recovery package, into its Compensatory Afforestation Fund Management and Planning Authority to provide jobs for tribal communities in forest management, wildlife protection and other related activities (ETBFSI News, 2020).
- The **New Zealand** government has launched a NZD 1.3 billion (US\$ 0.9 billion) 'Jobs for Nature' programme as part of its NZD 50 billion (US\$ 33 billion) Response and Recovery Fund (New Zealand Ministry for the Environment, 2020). The programme expects to create up to 11,000 jobs in areas such as restoration of wetlands and conservation areas and protection of riparian zones (UNEP 2020).
- In April 2020, the Government of **Pakistan** decided to reintroduce its '10 Billion Tree Tsunami' programme, a PKR 7.5 billion (US\$ 46 million) five-year tree-planting launched in 2018, and create more than 63,600 jobs to support unemployed workers because of COVID-19 (UNEP, 2020; ReutersKhan, 2021).
- The Government of **Colombia** announced that they will initiate a 180 million trees plantation programme by 2022, aiming to generate 50,000 work-days (UNEP, 2020; DW, 2020). The package includes funds to promote agroforestry and agro-pastoralism, and farming techniques that can restore soils and ecosystems.
- **Ethiopia** aims to double its forest cover by 2030 by focusing on forest restoration as a way to create green jobs, improve the health of its citizens and spur recovery from COVID-19 (UNEP, 2020).
- In Europe, several countries include programmes for nature-based job creation. In the **United Kingdom**, the government announced a US\$ 51 million 'green recovery challenge fund', designed to help charities and local authorities to protect 2,000 jobs and create an additional 3,000 short- and long-term jobs in tree planting, habitat restoration and green space creation. Other examples include subsidies in **Sweden** for employment in conservation and forest management (Ministry of Enterprise and Innovation of Sweden, 2020) and the economic recovery package in **Finland** that supports projects involving green areas, water services and forest conservation (US\$ 6.4 million) and includes an additional 15.2 million to restore nature and develop nature tourism (Finnish Government, 2020).

BOX 2 continued

Transition to a greener economy

A few countries have oriented stimulus packages towards a transition to a greener economy, including the following:

- **Norway** introduced a Green Transition plan and accompanying measures to promote a circular economy, increase the budgetary capacity of local authorities to support green change, and boost offshore wind and low-emissions technology research.
- **Canada** announced the 'Healthy Environment and a Healthy Economy' plan in December 2020. It includes more than 60 new measures and US\$ 11.7 billion in investments, in addition to the Canada Infrastructure Bank's US\$ 4.7 billion for clean infrastructure announced the same year as part of its growth plan (Government of Canada, 2020). Partnering with provinces, territories, non-governmental organisations, Indigenous communities, municipalities, private landowners and others, Canada will: invest up to US\$ 3.16 billion to plant two billion trees; up to US\$ 631 million to restore and enhance wetlands, peatlands, grasslands and agricultural lands to boost carbon sequestration; and provide US\$ 98.4 million to establish a new Natural Climate Solutions for Agriculture Fund.
- About one-third of **France's** US\$ 120 billion recovery package is devoted to accelerating the greening of the economy (UNEP, 2020). Alongside investments in clean buildings, industry and transport are new resources for the 'agro-ecological transition' of agriculture.
- In **South Korea**, the Korean 'New Deal' committed US\$ 63 billion in green funding before 2025 (around half of the total Korean economic recovery package). The 'New Deal' focuses on a variety of initiatives to support a sustainable transition, including funding for renewables, support for electric and hydrogen vehicles, energy efficiency in buildings, and investments from the private sector into green and digital infrastructure projects.

NEGATIVE IMPACTS

Loosening environmental regulations is the clearest example of policy measures potentially harmful to nature (OECD, 2020c). Some governments have relaxed their land-use policies, pollution standards and project permission processes since the COVID-19 pandemic began. Although not all these regulatory changes are permanent, even temporary changes can set a precedent that can be difficult to overturn.

Examples of biodiversity-harmful policy measures are the decreased oversight of Amazon deforestation in Brazil, Canada's rollback of environmental protection regulations for oil and gas exploration, and China's approvals of new coal-mining (Vivid Economics, 2021).

Other examples include airline bailouts worldwide, including Norway, South Africa, South Korea, United Kingdom and the United States. These bailouts could have been conditional on environmental targets. For example, France approved a bailout for Air France with attached environmental conditions, including the reduction of emissions by 50% by 2030 and a minimum standard of 2% renewable fuel use by the same period.

5 Tackling the triple crisis on debt, nature and climate

As discussed previously, heavy economic losses have taken place and are expected to continue around the world due to the pandemic. IMF estimates that global public debt will reach 98% of GDP at the end of 2020, compared with the pre-pandemic projections of 84% (IMF, 2021c). Many developing countries face critical difficulties in servicing sovereign debt, including Ghana, Kenya, Myanmar, Nigeria, and Zambia, countries where debt service exceeds 20% of tax revenues. In such situations, adding new debt to support economic recovery is exceedingly difficult. Clearly, some form of debt assistance and restructuring is necessary to prevent further economic damage in developing countries.

Many countries burdened by debt and economic losses from the pandemic are highly dependent on nature, including having a relatively large share of rural population and labour force. The share of rural population indicates particularly high direct dependency on nature and natural resources, given the reliance of rural population on especially agriculture for subsistence and livelihoods. However, economies with lower share of rural population also depend on nature for income and food, but they typically feature a higher degree of variation and substitutability between the different potential sources of the goods consumed for food and other purposes.

Moreover, climate change is expected to hit economic activity in many of the countries weighed down by debt and economic losses from the pandemic, further limiting their ability to service debt and access new financing (Dibley et al., 2021). Such context lends itself to pursuing options for international financing to help address debt distress while also investing in conservation and restoration of nature in order to simultaneously help aid economic recovery, support livelihoods and address SDGs related to climate and biodiversity.

To shed light on these issues, this section assesses countries based on debt distress, economic impact of the pandemic, as well as social vulnerability and trends in deforestation and threats to biodiversity. The instruments to help enhance NbR through financial and debt instruments are covered in later the sections.

5.1 Who needs help?

We next consider several variables that help examine where different needs, including economic losses due to COVID-19, debt distress, dependency of economy on nature and necessity for nature conservation, emerge and may converge. The data considered are based on the following six criteria:

- 1 Debt distress:** the amount of debt service relative to government revenues (indicator of the fiscal pressure of debt and the fiscal space that countries have for fiscal support for economic recovery);
- 2 Economic loss due to COVID-19:** cumulative GDP loss forecast 2020–2024 relative to pre-pandemic projections (indicator of the severity of the impact of the pandemic on the economy);
- 3 Direct dependency on nature and natural resources for livelihoods:** share of rural employment of all employment (proportion of the population that closely depends on nature for income and subsistence);
- 4 Poverty:** percentage of the population subsisting at US\$ 1.90 or less per day.⁶ This is a measure of extreme poverty;
- 5 Threats to biodiversity:** Red List Index (extinction risk of species and proxy for pressures on, and degradation of, nature); and

⁶ World Bank Development Indicators.

6 Forest cover change: Forest cover change by country between 2000 and 2020 using data from FAO.

Figure 8 maps these data by focusing on low- and middle-income countries for their relevance to this context. Table A1 presents the data by country.

As the maps show, considerable variation exists in each variable across the globe, but there is also a degree of convergence between high debt distress, high GDP losses, direct dependency on nature, poverty, deforestation and threats to biodiversity. This is the case, for example, in the Atlantic coast of Africa, Central America, parts of South America and several countries in South-East Asia.

We continue by examining in more detail countries based on the relationships between debt distress, biodiversity loss, climate change and the economic impact of the pandemic. This analysis can inform which countries are particularly relevant for assistance to surmount the economic crisis, while addressing specific needs for, and benefits from, conservation of nature. We note that any priority setting involves subjective elements, especially regarding the variables considered and the weight given to them. In the end, incorporating multiple criteria can be most helpful.⁷ In the assessments below, we incorporate multiple criteria by jointly considering debt distress, biodiversity loss and potential for NbS for climate.

5.1.1 Debt distress, biodiversity loss and the impact of the pandemic

Figure 9 examines two dimensions – debt distress and threats to biodiversity – by plotting countries according to debt service relative to government revenues (horizontal axis) and the Red List Index (vertical axis). The countries are categorized into four quadrants using thresholds for debt service over government revenues (14%) and the Red List Index (0.90). The former is a conservative threshold used by IMF to identify countries potentially in debt distress, and the latter coincides with the median value of the Red List index in Africa (a key continent for the issue at hand).

Countries in the lower right quadrant have a low Red List Index (high extinction risks) and high debt service over government revenues. As Figure 9.d shows, these include several countries in East Africa, the Pacific coast of South America and South-East Asia. It is noteworthy that these countries also regularly rank high in other dimensions related to nature, including forest cover loss (Figure 8).

5.1.2 Nature-based Solutions for greenhouse gas emissions mitigation, debt distress and the impacts of the pandemic

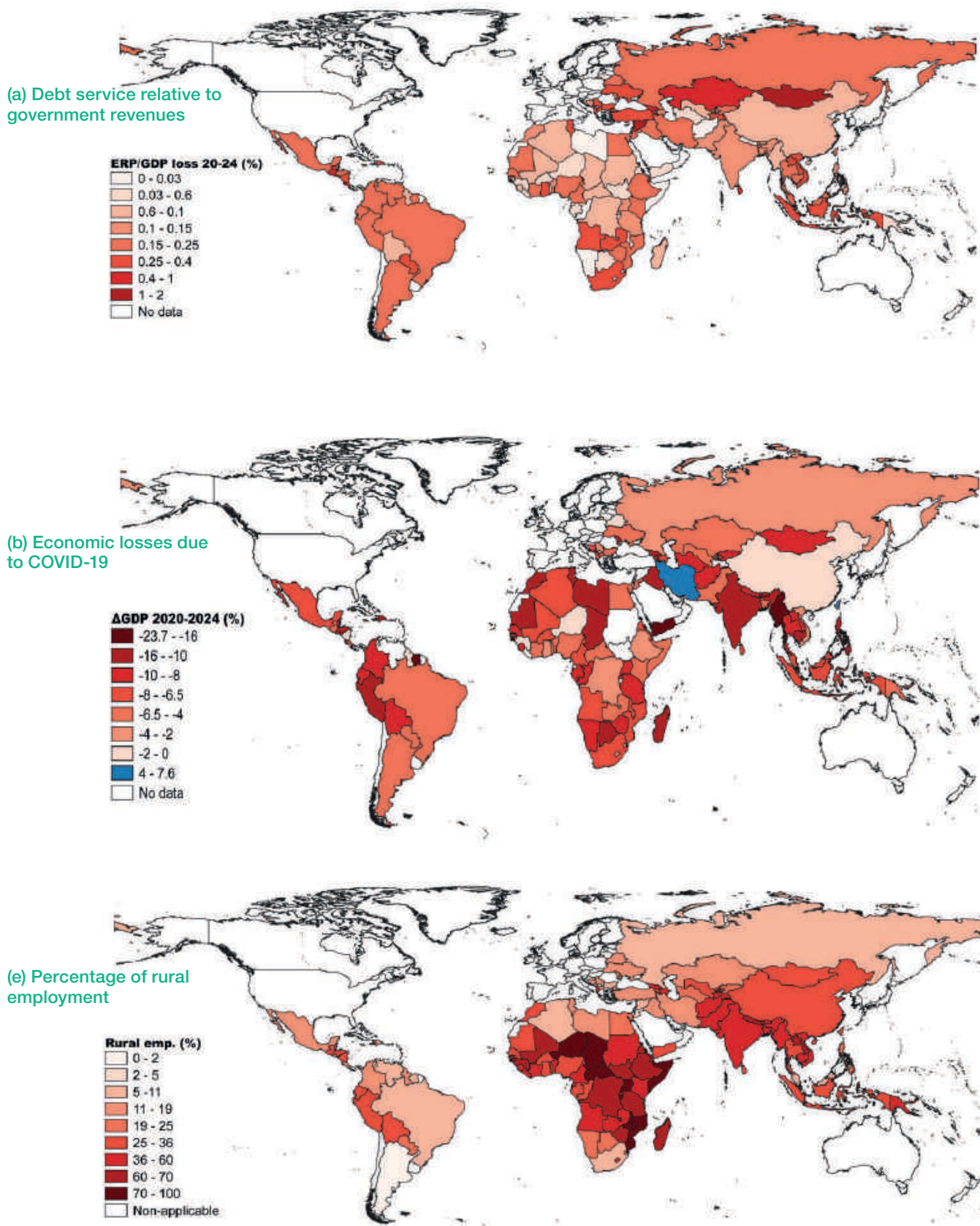
In 2015, 196 Parties signed the Paris Agreement to transform their development trajectories on a course towards sustainable development, aiming at limiting global warming to 1.5°–2 °C above pre-industrial levels (UNFCCC, 2015). Each Party is required to prepare, communicate and maintain successive Nationally Determined Contributions (NDCs) that it intends to achieve to reduce national emissions and adapt to the impacts of climate change.

There is an opportunity to increase the role of NbS in climate funds to help NbR and countries to reach their greenhouse gas mitigation commitments. Natural climate solutions can provide 37% of cost-effective CO₂ mitigation needed through 2030, an reach more than 66% chance of holding global warming to below 2°C (Griscom et al., 2017). In 39 tropical countries, cost-effective natural climate solutions could help cut in half recent historic national emissions (Griscom et al., 2020). In addition, NbS can decrease the risk and vulnerabilities to climate change, bringing additional co-benefits that help to tackle other societal challenges, like health, pollution control, food and water security, and disaster risk reduction.

⁷ For example, Strassburg et al. (2020) identify priority areas for restoration across all terrestrial biomes based on biodiversity loss, mitigation of climate change and costs of restoration.

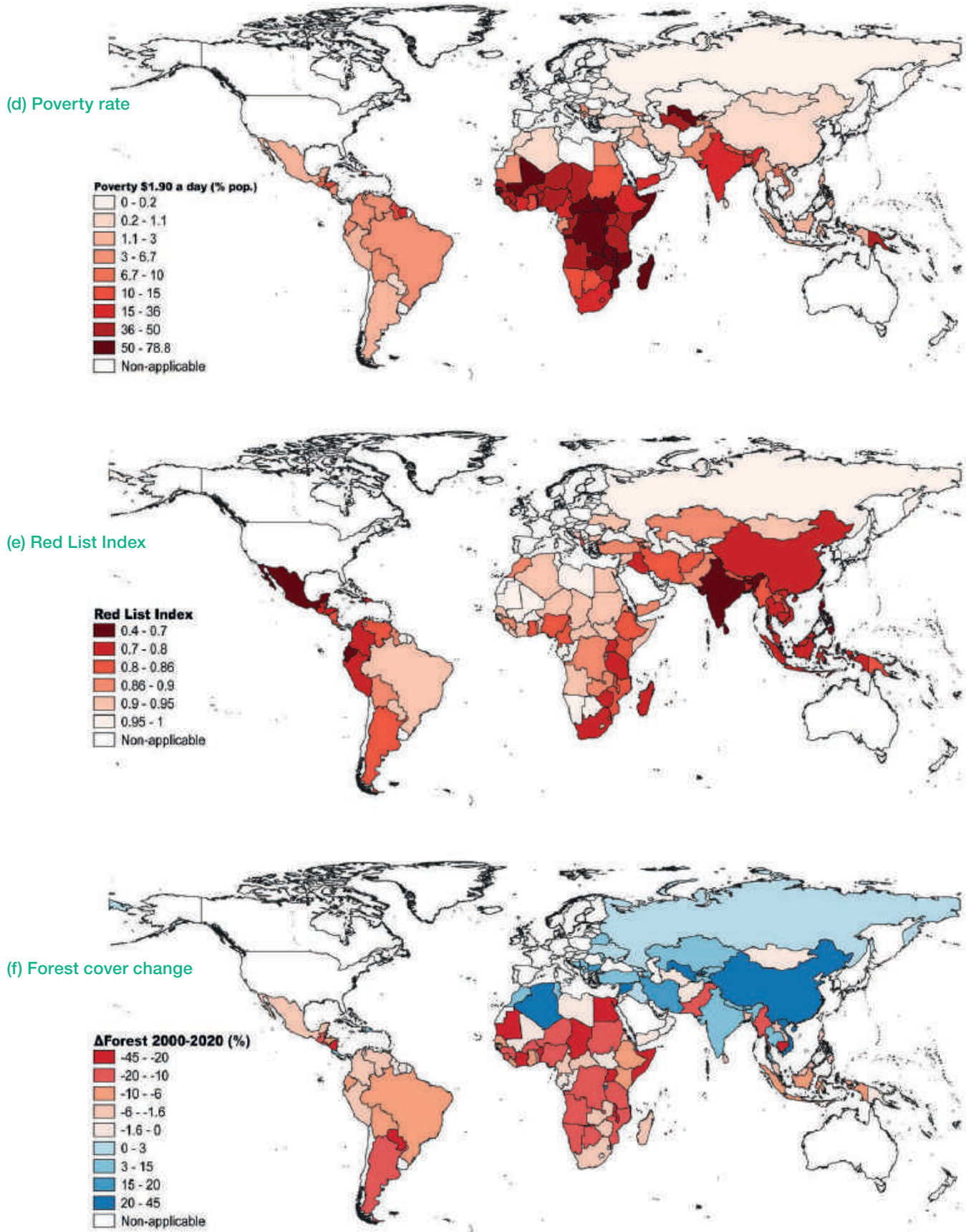
FIGURE 8

Maps of variables to examine where different needs, including economic losses due to COVID-19, debt distress, dependency of economy on nature and necessity for nature conservation, emerge and may converge in low- and middle-income countries



Source: Map construction by the authors based on calculations using data from BirdLife (2019); FAO (2020); ILO (2021b); IMF (2019; 2020f; 2021a); IUCN (2019) World Bank (n.d.a); and World Bank Group (2021). Data for each indicator is for the latest year available per country.

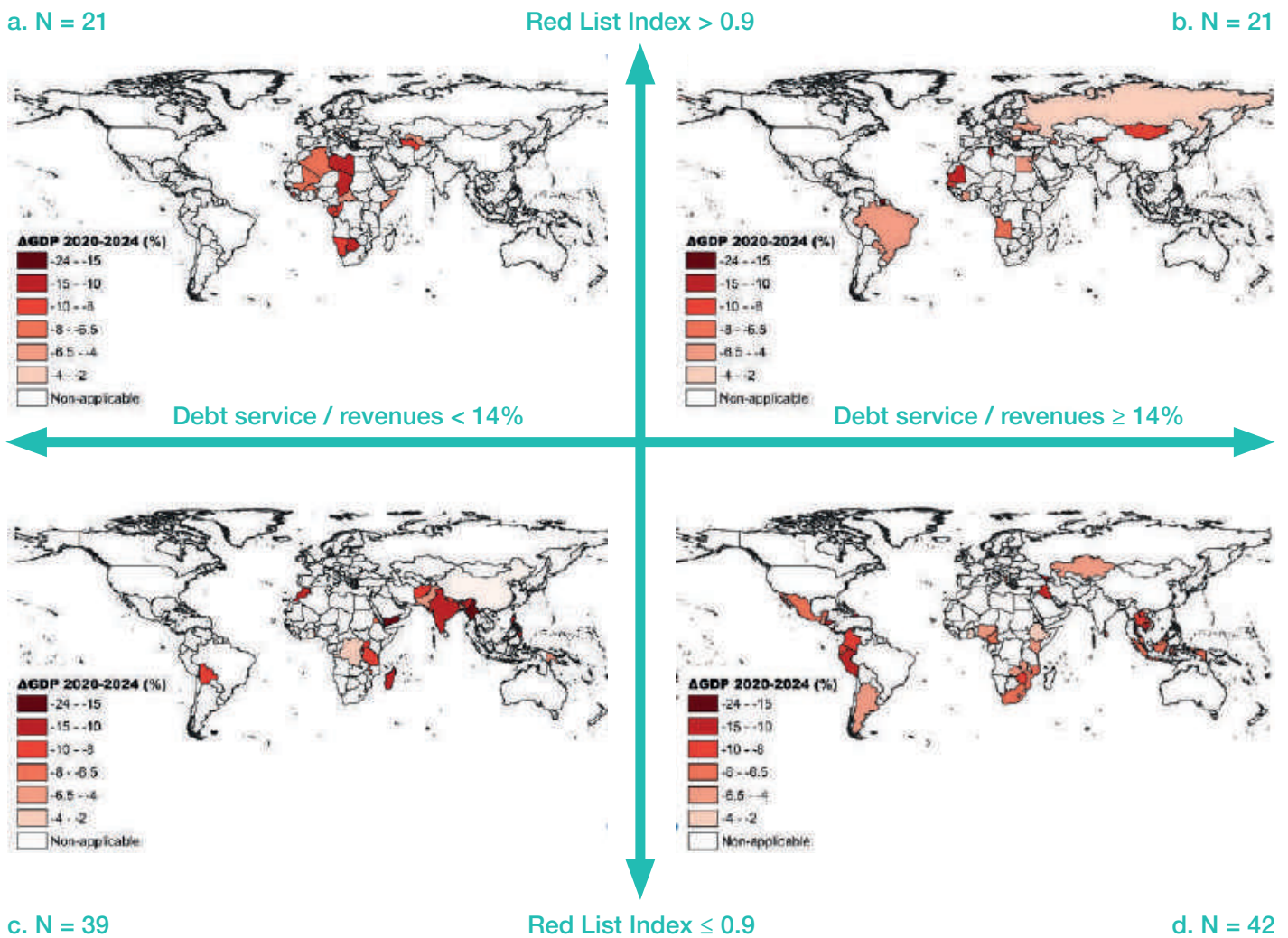
FIGURE 8 continued



Source: Map construction by the authors based on calculations using data from BirdLife (2019); FAO (2020); ILO (2021b); IMF (2019; 2020f; 2021a); IUCN (2019) World Bank (n.d.a); and World Bank Group (2021). Data for each indicator is for the latest year available per country.

FIGURE 9

GDP cumulative loss 2020–2024 by level of debt service over revenues and Red List Index (RLI) for low- and middle-income countries. Countries are classified into four categories based on debt service over revenues $\geq 14\%$ (the minimum threshold considered by IMF and WB Debt Sustainability Framework for Low Income Countries) and Red List index ≤ 0.9 . The number of countries in each quadrant is listed as N.



Source: Map construction by the authors based on calculations using data from BirdLife (2019); IMF (2019; 2020f; 2021a); IUCN (2019); and World Bank Group (2021)

Figure 10 categorises low- and middle-income countries in the tropics into four quadrants using thresholds for debt service over government revenues (14%) and the potential for NbS to mitigate emissions (30%). The assessment considered 79 countries in the tropics due to the geographic scope available at this stage (Griscom et al., 2020).

Countries in the upper right quadrant (**b**) have a high mitigation potential from NbS and high debt service over government revenues (Figure 10b). The colours refer to economic losses forecast for 2020–2024

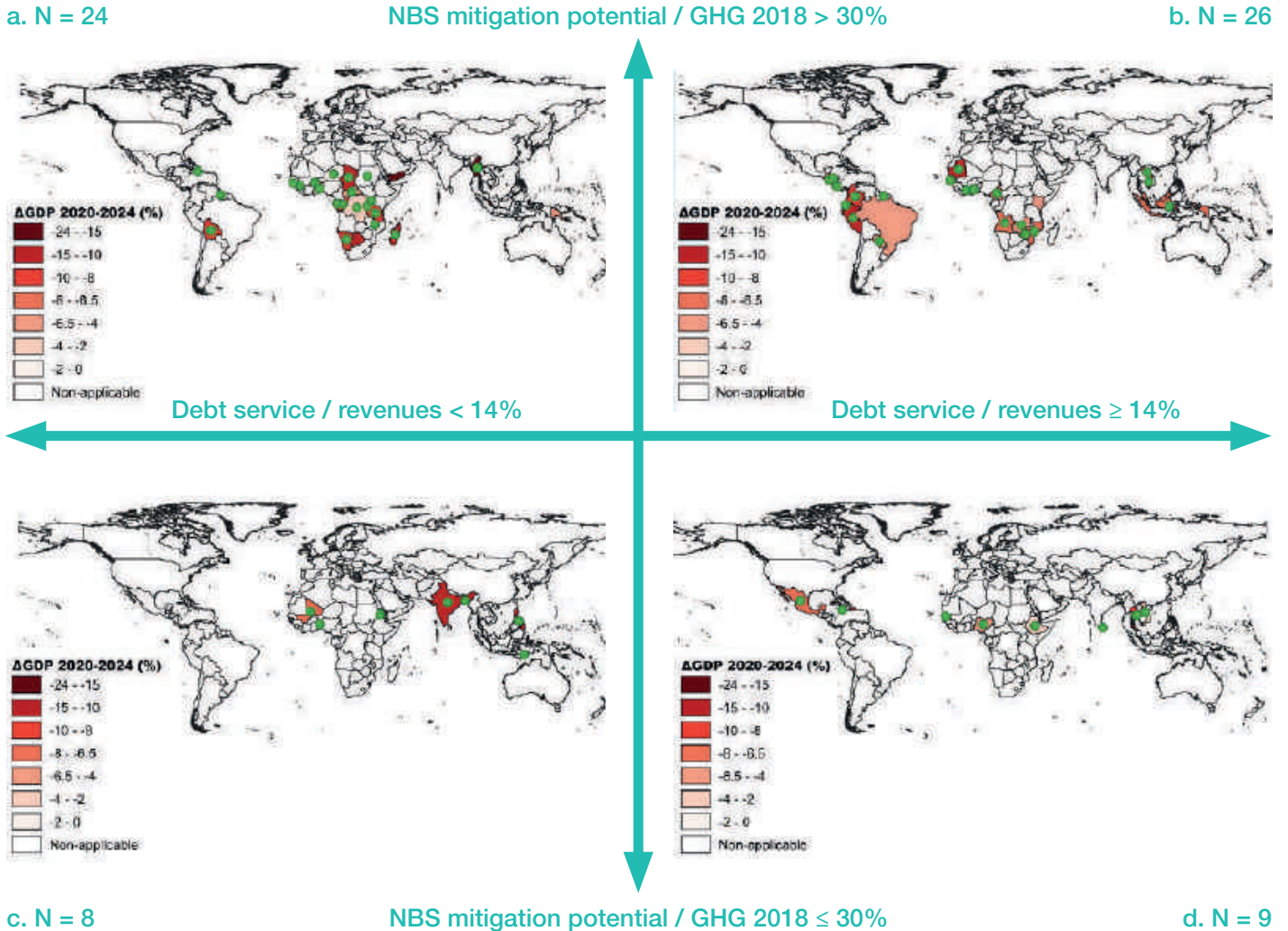
due to the pandemic, showing that these countries are also expected to suffer deep economic losses because of the pandemic.

Countries marked with a green dot in Figure 10 indicate that the use of NbS is mentioned in the adaptation component of their NDCs (Seddon et al., 2020).⁸ Countries that do not include NbS in their adaptation component might need additional assistance to help them to develop strategies for mitigation that includes nature-based solutions.

⁸ NbS could also be mentioned in the mitigation component, but this dimension is not considered here due to lack of data.

FIGURE 10

GDP cumulative loss 2020–2024 by level of debt service over revenues and NbS greenhouse gas mitigation potential over 2018 emissions for low- and middle-income countries in the tropics. Countries are classified into four categories based on debt service over revenues $\geq 14\%$ (the minimum threshold considered by IMF and WB Debt Sustainability Framework for Low Income Countries) and nature-based mitigation potential $\geq 30\%$. Green dots indicate countries that mention nature-based solutions in the adaptation component of their national determined contributions submitted to the United Nations Framework Convention on Climate Change. Number of countries in each quadrant is listed as N.



• Countries that mention NbS in the adaptation component of their national determined contributions submitted to the United Nations Framework Convention on Climate Change.

Source: Map construction by the authors based on calculations using data from CAIT (2017); Griscom et al. (2017); IMF (2019; 2020f; 2021a); and World Bank Group (2021).

Jointly analysing data that underlies Figure 9d and Figure 10b, we identify countries that are simultaneously: (i) under severe debt distress; (ii) experience high pressures on biodiversity; and (iii) have high potential to mitigate emissions using NbS. The list includes 19 countries:

South and Central America: Belize, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, Peru;

Sub-Saharan and West Africa: Cameroon, Ghana, Kenya, Mozambique, Zambia, Zimbabwe, and

South East Asia: Cambodia, Indonesia, Lao P.D.R., Malaysia.

TABLE 2

Long-term external debt by creditor and continent in low- and middle-income countries (US\$ billion)

CONTINENT	Public and publicly guaranteed debt (PPG)						Private non-guaranteed debt (PNG)		Total		
	Bilateral		Multilateral		Private		US\$	%	US\$	%	% of Total
	US\$	%	US\$	%	US\$	%					
Africa	151.13	34.5%	174.80	25.3%	220.28	11.2%	154.75	22.1%	700.96	100%	12.1%
Americas	44.33	2.8%	172.92	11.1%	701.76	45.1%	637.68	41.0%	1 556.70	100%	26.8%
Asia	215.88	7.5%	309.13	10.8%	805.58	28.1%	1 538.81	53.6%	2 869.40	100%	49.5%
Europe	24.84	3.8%	32.62	5.0%	240.14	36.8%	355.69	54.4%	653.29	100%	11.3%
Oceania	2.04	10.2%	2.62	13.1%	1.35	6.8%	13.98	69.9%	19.99	100%	0.3%
Total	438.23	7.6%	692.10	11.9%	1969.10	33.9%	2700.92	46.6%	5800.35	100%	100%

Source: Based on calculations by the authors using data from the World Bank (2021).

5.2 Potential instruments to enhance nature-based recovery in debt distressed countries

As illustrated in the preceding section, many countries suffering the largest economic losses because of the pandemic are also countries under high debt distress and in need of additional conservation of nature. Developing countries, in particular, will need substantial assistance, including possible debt relief, to mitigate increasing pressures that exploit natural capital to pay short-term debt, placing nature conservation ambitions aside (Simmons et al., 2021).

Some of the key instruments, including financial instruments, debt alleviation and climate fund, that could advance NbR are discussed in the following pages. A number of these instruments have been developed in the context of climate policy, but there are also instruments that consider nature conservation as the main objective. Additionally, some other relevant instruments exist that are not examined in this paper, such as official development aid, aid-for-trade programmes, and blended finance to support ecosystem and biodiversity protection and conservation.

Given that a range of debt-relief instruments is potentially available, is there a preferred applicable approach? The ideal mix of instruments will ultimately depend on the individual characteristics

of the creditor and debtor countries. As such, this paper does not present general recommendations for which policy option or mix to aim for. Rather, it provides an overview of some of the key options available to help inform policy discussions.

5.2.1 Green and nature-performance bonds

The long-term external debt held by low- and middle-income countries includes bilateral, multilateral and private debt that is publicly guaranteed, as well as private non-guaranteed debt. In 2019, total long-term external debt in these countries reached US\$ 5.8 trillion, of which 80.5% are owed to private creditors, including 34% private publicly guaranteed and 46.8% private non-guaranteed debt (Table 2). The rest is bilateral debt (7.6%) and debt with multilateral creditors (11.9%). As Table 2 shows, Asia is the continent with the largest share of long-term external debt (49.5%). Africa is the only continent for which bilateral and multilateral debt is larger than private debt.

Global attention is turning to the need to develop financial instruments designed specifically to address issues related to nature and sustainability (Gorst et al., 2021). Several international organisations, including the United Nations Economic Commission on Africa and the World Bank, are calling and advancing approaches to sovereign debt instruments that integrate nature and climate priorities.

BOX 3

World Bank green bonds – more than 10 years on

In 2008, the World Bank launched its first green bond to help connect investors seeking to invest in projects that benefit our climate. Since then, the World Bank has issued over US\$ 13 billion equivalent in green bonds through 158 transactions in 21 currencies.

As of June 2019, East Asia and Pacific is the region receiving the largest share of total committed funds (34%), followed by Latin America and the Caribbean (25%) and South Asia (21%). Africa received only 1% of the total committed funds.

About 66% of all green bond commitments funded projects for renewable energy, energy efficiency and clean transport. Other sectors receiving funding from the World Bank green bonds are: agriculture, land use, forest and ecological resources (17%); water and waste water (8%); and resilient infrastructure and built environment (8%). Of the committed funds, 75% focused primarily on greenhouse gas mitigation, while 25% focused mainly on climate change adaptation.

Source: IFC (2016); World Bank (2019a, 2019b & n.d.b).

NbS can and have been funded through green bonds, considering both mitigation and adaptation. For example, green bonds funded projects helping to restore or reforest some 760,000 hectares of forest in China, Mexico and Tunisia. The projects help avoid emissions and sequester 17 million tonnes of CO₂ annually through reforestation and other forest management activities in Mexico, and benefited 6.6 million people through flood protection in China.

In December 2018, the World Bank Group announced a new set of climate targets and commitments for 2021–2025, doubling its current five-year investments to around US\$ 200 billion in support of countries to take ambitious climate action. It is expected to help countries to deliver and exceed their greenhouse gas mitigation targets submitted in the national plans under the Paris Agreement.

The new wave of green financial instruments includes green, social and sustainability bonds, and nature and climate performance bonds. **Green bonds are fixed income assets used to fund projects that have positive environmental or sustainability impacts.** The first green bonds were launched by the European Investment Bank in 2007, structured to fund renewable energy and energy efficiency projects (IFC, 2016). [Box 3](#) describes 10 years of experience of the World Bank green bonds.

Nature performance bonds (also referred as sustainability-linked bonds) are types of green or sustainability bonds, but they link debt payments to pre-defined nature and climate indicators (ICMA, 2020; Gorst et al., 2021; Rodríguez & Thiaw,

2021). These instruments allow countries to reduce debt payments and use the savings on pressing priorities, as long as they also achieve measurable and monitored environmental outcomes pre-defined through key performance indicators and sustainability performance targets, for example, biodiversity targets, land degradation neutrality targets, or NDCs. Different from green bonds that are exclusively applied to finance or re-finance a combination of both green and social projects, nature performance bonds are intended to be used for general purposes (ICMA, 2018 & 2020). In 2020 the International Capital Markets Association published the Sustainability-linked bond principles, a voluntary framework to help institutions to design these standardised bonds (ICMA, 2020).

BOX 4

Seychelles, a recent example of debt-for-nature swap

After years of borrowing, in 2008 the Seychelles defaulted on payments for its US\$ 406 million national debt, mostly owed to the Belgium, France, Italy and the UK, and had to be bailed out by the IMF. At the same time, plastic pollution, climate change and overfishing threaten to deliver a catastrophic blow to the nation's marine ecosystem, which sustains more than two-thirds of the local economy. After a mass bleaching event in 1998, in some areas, the Seychelles' has already lost up to 90% of its coral reefs. The nation is also extremely vulnerable to flooding and coastal erosion.

In 2015, The Nature Conservancy negotiated a deal that "converts a portion of the nation's foreign debt into a US\$ 22-million investment in

expanded marine conservation. With the support of private founders, The Seychelles Conservation and Climate Adaptation Trust (SeyCCAT)* was created. SeyCATT is an independent private trust formed in 2016 that disburses blue grants funded by the debt conversion, and other recent financing opportunities in Seychelles, to support ocean conservation and implementation of the Plan.

Since the start of the activities, the Seychelles increase the protection of national waters from 0.04% to 30%. Fishing, oil exploration and other marine development has been banned or severely restricted in the marine protected areas.

* For further information, please visit: <https://seyccat.org>

Source: TNC (n.d.); Kennedy (2018); Gerretsen (2020).

5.2.2 Debt-for-nature swaps and state-contingent debt instruments

Many countries need foreign aid and debt forgiveness beyond temporary debt suspension initiatives that mostly postpone country obligations for the near future (O'Callaghan & Murdock, 2021). The high level of debt distress in developing countries can have direct implications on poverty, health and the trajectory of sustainable development.

Debt-for-nature swaps that involve a reduction in the country's debt in return for added measures to conserve nature have been in use since the 1980s (Rodríguez & Thiaw, 2021). Debtor countries in this context are typically heavily indebted, have exhausted other more favourable debt relief instruments and can convince creditors that they can allocate a part of the budget for debt repayment to finance domestic projects, which yield significant environmental benefits (OECD, n.d.a.). **Box 4** describes a recent case in Seychelles signed in 2015.

Debt-for-nature swaps concerned more than US\$ 2.6 billion of debt in 1985-2015, with US\$ 2 billion occurring prior to 2000 (Steele and Patel, 2020). This generated an estimated US\$ 0.9–1.2 billion for conservation (Sommer et al., 2020; Steele & Patel, 2020). One of the main criticisms to debt-for-nature swaps is that they have only resulted in relatively small amounts of debt relief, limiting their impact on the reduction of developing countries' debt burden.

The main advantage of debt-for-nature swap is that the debtor-country reduces its debt obligations—including payments in foreign currencies—and frees up resources for environmental spending (UNDP, 2021). However, if the arrangement imposes strict conditionality on how to implement the spending, it can also create negative effects in the recipient countries. **For debt-for-nature swaps to help countries towards a positive long-term transition, their implementation calls for consideration for climate change mitigation and adaptation, nature conservation, and sustainable and inclusive development.**

State contingent debt instruments emerged as an alternative for improving the outcomes of debt restructurings (Cohen et al., 2020). State contingent debt instruments link debt payments to indicators that measure the state of key economic variables, such as GDP or commodity prices, as well as one-time events such as nature-related disasters. Payments are high in good states of the world, and vice versa. This allows countries to ensure fiscal space if they are faced with a negative shock. For example, Grenada and Barbados re-structured debt to include a clause that allows for deferral of payments in case of nature related disasters.

Undisclosed climate risks in sovereign debt instruments can lead to significant revaluation of debt in the presence of a climate shock (Dibley et al., 2021). Countries can have disincentives in the short run to disclose their exposure to climate risks because doing so can raise the cost of capital. However, if the money borrowed is spent on greening economy it can help to alleviate the long-term impacts of climate change, granting cheaper access to credit in the future.

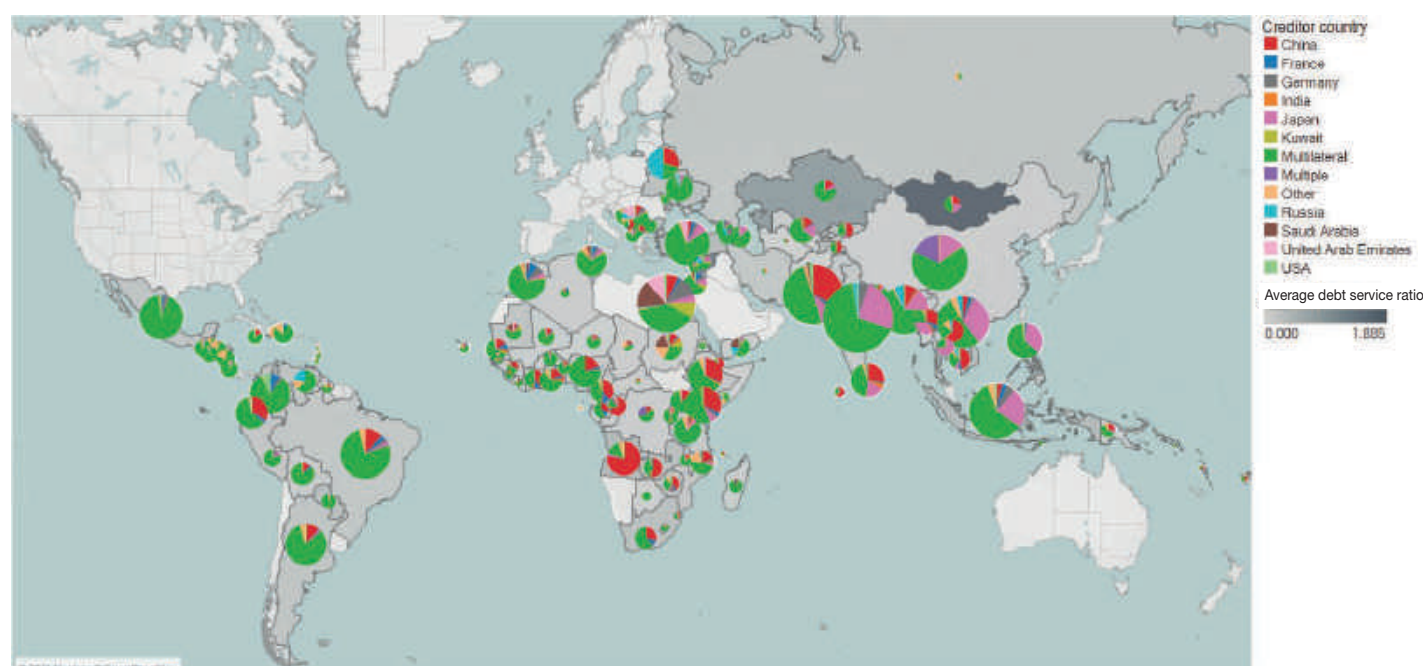
Long-term external debt to public creditors (multilateral and bilateral), the debt category most potential for this class of finance instruments, reached about US\$ 1.1 trillion in 2019 in low- and middle-income countries (Table 2). A total of US\$ 692 billion (61%) of this was multilateral debt; the remaining debt (US\$ 438 billion) is bilateral.

The assessment of the sources of debt by country shows that multilateral debt remains a central source of financing across most low- and middle-income countries (Figure 11). It accounts for the majority of public financing in almost all countries besides a few countries in Africa.

Of the individual creditors of bilateral debt, China (34%) and Japan (24.4%) are the main countries. While Japan’s bilateral lending is concentrated in Asia, China is one of the key lenders in Africa, Asia and South America alike, and is particularly prominent across East, Southern and West Africa, including Angola, Congo, Zambia, Kenya, Zimbabwe, Ethiopia, Cameroon, South Africa and Nigeria (Figure 11).

FIGURE 11

Bilateral and multilateral foreign debt by country, including bilateral debt, by the 10 largest creditor countries (indicated in the pie charts using multiple colours), multilateral debt (listed in the pie charts in green) and the ratio of debt service to government revenues (indicated by the grey shading of countries). Data shown represent low- and middle-income countries; countries with missing data are uncoloured.



Source: Map construction by the authors based on calculations using data from the World Bank (2021).

5.2.3 Nature-based Solutions in climate funds

NbS for climate have achieved prominence in policy developments so we highlight them as an example of the potential role for nature-based solutions more generally. Some 60%, or 104 countries, who submitted national determined contributions included some aspects of NbS in the adaptation component (Figure 12 (a); (Seddon et al., 2020; UNEP, 2021). A total 77 countries included NbS in both adaptation and mitigation components, while an additional 27 countries include NbS in the mitigation plans only. This is especially frequent among low-income and lower middle-income countries (Figure 10 (b)).

NbS represent 13% (US\$ 12 billion) of main global climate funds (UNEP, 2021). Climate funds and international organisation loans have a strong role that can be used to promote economic recovery and nature conservation. Depending on the funding agency, NbS represent between 9% (Global Climate Fund, US\$ 337 million in average per year between 2015 and 2020)

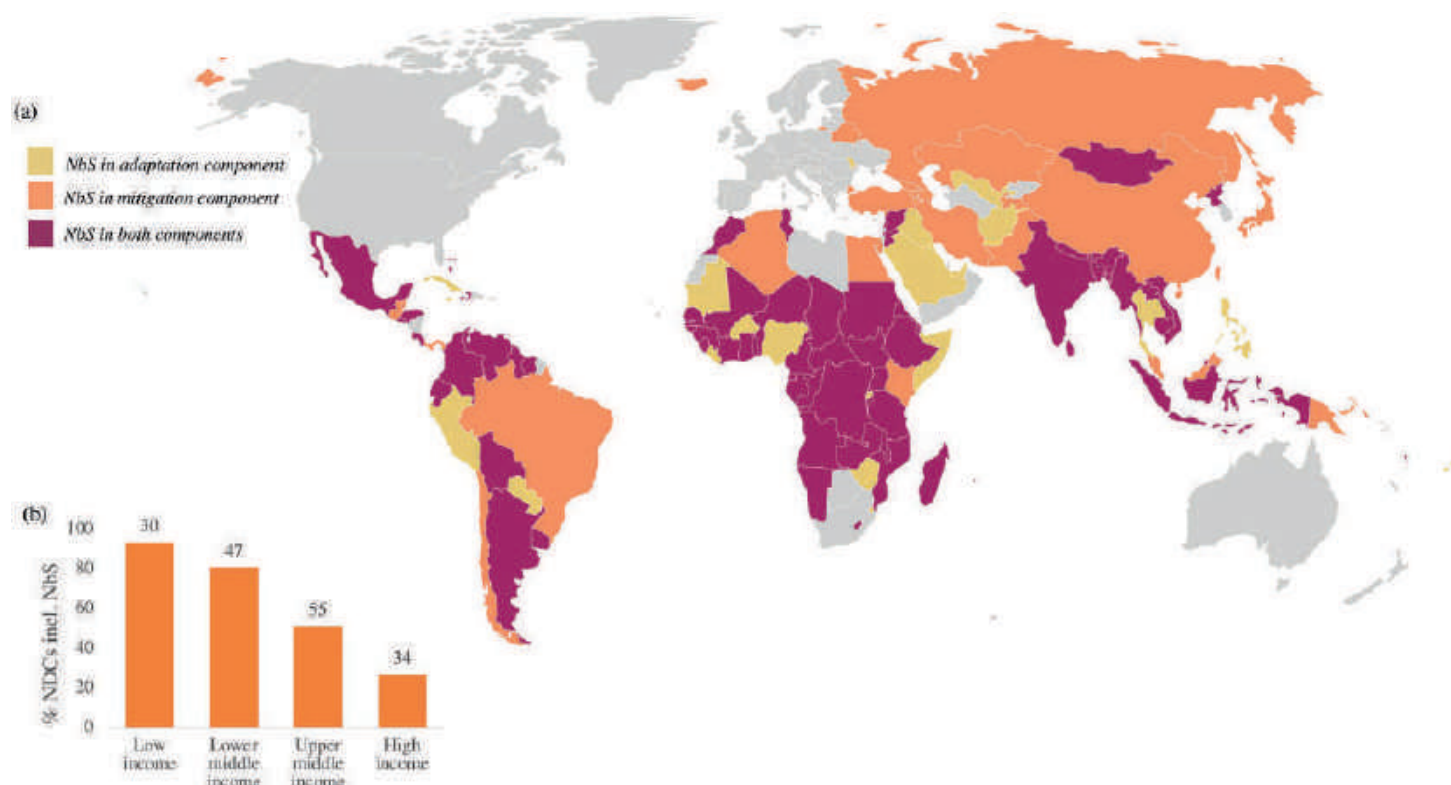
and 68% (Adaptation Fund, US\$ 45 million in average per year between 2010 and 2020) of the total funding available (UNEP, 2021). The Global Environmental Facility is the largest contributor, providing a total US\$ 287 million in average per year between 1991 and 2020 (13% of total funding for NbS in climate funds).

NbS for climate change adaptation need to be implemented carefully to help to create synergies between reduced climate impacts and broader ecological, social and climate change mitigation outcomes (Chausson et al., 2020). A review of 293 cases show that interventions in natural or semi-natural ecosystems effectively improved adverse climate impacts. For NbS to create synergies with societal challenges, they need to be carefully implemented with trade-offs and synergies in mind (IUCN, 2020; Seddon et al., 2021). For example, where trade-offs between the mitigation of adverse climate impacts and biodiversity conservation and other societal challenges may occur (for example, where afforestation may reduce soil erosion, but alter habitat for certain species and lower water availability).

FIGURE 12

NbS in adaptation components of nationally determined contributions in developing countries.

(a) Global distribution of nations that include NbS (ecosystem-based adaptation and/or conservation) in the adaptation and/or mitigation component of the first iteration of their Nationally Determined Contribution (NDC). (b) The percentage of NDCs from nations in each of the four World Bank income groups that include NbS in adaptation components (numbers above bars show how many nations fall within that income group).



Source: Reproduced from Seddon et al. (2020, p. 6).

6 Discussion

The economic impacts of the pandemic have been severe, with implications expected to continue over the next several years for almost all countries worldwide. Economic losses due to the pandemic vary considerably across the globe, with countries in Africa and South America, along with India and South-East Asia, expected to suffer the sharpest gap in economic output in 2020–2024 relative to pre-pandemic projections.

Global fiscal support to stimulate and recover economy reached US\$ 17 trillion by May 2021. However, most of it is focused on short-term rescue measures. For example, only 13% (US\$ 1.9 trillion) from total spending announced by December 2020 is directed towards long-term recovery measures most suitable to include investments on nature. Although this is a considerable amount, and has become larger after the recent policy developments, especially in the US and Canada, it is significantly smaller than the total fiscal stimulus implemented or announced.

Large inequalities exist between economic losses and fiscal measures to support economic recovery. More than 80% of the global economic stimulus comes from advanced economies, although they themselves suffered around 32% of total global economic loss.

Nature and biodiversity have been mostly neglected in stimulus packages. Only 3% of total long-term recovery spending by December 2020 (US\$ 56 billion) is currently directed to natural capital measures. A considerable increase in investment directly in nature is needed for nature-based recovery to be effective and to make a difference in the transition towards sustainability.

Nature is essential for human existence and good quality of life (IPBES, 2019). One key aspect of nature-based recovery is the avoidance of economic investments that produce harmful effects on nature. Prior to the pandemic, governments spent approximately US\$ 500 billion per year in support

that is potentially harmful to biodiversity (OECD, 2019). For example, government support to fossil-fuels reached US\$ 178 billion in 2019 in OECD and selected partner economies, a 5% annual increase in reference to the previous year, ending a five-year downward trend (OECD, 2021 n.d.b.). Of the total fossil-fuel economic support, 70% are directed to consumers, reaching between US\$ 125 and 131 billion annually in 2017–2019. During the pandemic, many countries announced unconditional support and tax deferrals to fossil-fuels production and/or consumption, including France, Mexico, Russia and South Africa. Such efforts to support business-as-usual may be attractive in the short-term, but are counter-productive in the longer-term effort to reach sustainability.

Another aspect of business-as-usual involves agricultural subsidies. They can be highly harmful to the environment if they encourage intensification of production, which entails higher levels of fertiliser and pesticide use. Agricultural sectors received US\$ 619 billion in net transfers per year on average in 2017–2019 in OECD, European Union and 13 selected emerging market and developing economies (OECD, 2020d). The average rate of agricultural producer support in OECD countries remains more than double the emerging market and developing economies. In 2017, farmers in OECD countries received US\$ 228 billion in support, of which US\$ 116 billion (51%) were considered potentially most environmentally harmful compared to other types of support (OECD, 2020e). In addition, fisheries support can be harmful for biodiversity if it creates incentives to overexploit the resource stock. In 2017, US\$ 700 million have been directed to support individuals or companies in fisheries in 27 OECD countries who report to the OECD's Fisheries Support Estimate database (OECD, 2020e). Around 40% of these transfers were directed to lowering the cost of inputs, which has been identified among the most likely to incentive for overfishing.

Economic recovery can support NbS for societal challenges, including food and water security, climate change and disaster risk reduction. NbS linked to food and water security, pollution control, and control of vector-borne diseases can also directly benefit the health of people. However, nature-based recovery may also involve trade-offs, especially in the short term, by limiting immediate economic benefits from current economic production and consumption practices to move toward sustainable development in the future (IPBES, 2019; Cohen-Shacham et al., 2019).

One specific window to support nature-based recovery involves the urgent need for addressing the debt distress experienced by many developing countries, while also considering the necessity to protect biodiversity and support international climate commitments. We identified 19 countries in Central and South America, Sub-Saharan and West Africa, and South East Asia that are under major debt distress, with intense threats to biodiversity and high potential of NbS for climate mitigation. These countries could include priority targets for debt restructuring and international assistance that include linkages to nature conservation and nature-based climate mitigation.

Further underlining the need for international funding to support biodiversity conservation is the fact that the impacts of economic activity on biodiversity are embedded in international trade. For example, about half of the threats to biodiversity exemplified in the final consumption by United States and China, the two countries with the largest biodiversity footprint in the world, is produced abroad, in places like Cameroon, Madagascar, Mexico and in South-East Asia (estimates by IUCN and University of Sydney, based on Lenzen et al., 2012). As such, developed countries should consider mitigating the impacts of their consumption on biodiversity by assisting developing countries to conserve biodiversity threatened by those impacts associated with international trade.

This report discusses several existing policy instruments that can be used to support nature-based recovery in vulnerable countries. These include financial instruments, debt restructuring and financial aid. Increasing the role of NbS in NDCs could be a positive first step to start implementing nature-based recovery. The funding of these activities may come from climate funds, green and nature performance bonds, or other international financing and development aid. Different policy options are available to suit the needs of different situations; what is critically needed is political will and commitment to support nature-based recovery domestically and, especially, internationally.

References

- BirdLife International, Handbook of the Birds of the World (BirdLife) (2019). *Bird species distribution maps of the world. Version 2019.1*. Accessed through UN SDG Indicators Database. <https://unstats.un.org/sdgs/indicators/database/>
- CAIT (2017). *Climate Data Explorer*. Washington, DC: World Resources Institute. <http://cait.wri.org/>
- Chausson, A. et al. (2020). 'Mapping the effectiveness of nature-based solutions for climate change adaptation'. *Global Change Biology* 26: 6134–6155. <https://doi.org/10.1111/gcb.15310>
- Cohen-Shacham, E. et al. (2019). 'Core principles for successfully implementing and upscaling Nature-based Solutions'. *Environmental Science and Policy* 98: 20–29. <https://doi.org/10.1016/j.envsci.2019.04.014>
- Cohen, C., Ali Abbas, S.M., Anthony, M., Best, T., Breuer, P., Miao, H., Myrvoda, A. and Togo, E. (2020). 'The Role of State-Contingent Debt Instruments in Sovereign Debt Restructurings'. *IMF Staff Discuss Note* 2020(006). <https://doi.org/10.5089/9781513556482.006>
- Deaton, A. (2021). 'COVID-19 and Global Income Inequality'. *National Bureau of Economic Research (NBER) Working Paper Series* 28392. Cambridge, MA (USA): NBER. <https://www.nber.org/papers/w28392>
- Deutsche Welle (DW) (2020). 'Colombia: reforestación contra la deforestación de bosques'. *DW Ciencia y Ecología* [website]. <https://www.dw.com/es/colombia-reforestaci%C3%B3n-contra-la-deforestaci%C3%B3n-de-bosques/a-55688938>
- Dibley, A., Wetzler, T. and Hepburn, C. (2021). 'National COVID debts: climate change imperils countries' ability to repay'. *Nature* 592: 184–187. <https://doi.org/10.1038/d41586-021-00871-w>
- ETBFSI News (2020). 'Key Highlights of the Finance Minister's whole economic package'. *ETBFSI* [website]. <https://bfsi.economicstimes.indiatimes.com/news/policy/key-highlights-of-the-finance-ministers-whole-economic-package/75797903>. Accessed 1 March 2021.
- Finnish Government (2020). *Government reaches agreement on fourth supplementary budget proposal for 2020*. Press release, 2 June 2020, Government Communications Department, Ministry of Finance. <https://valtioneuvosto.fi/en/-/10616/hallitus-paattivuoden-2020-neljannesta-lisatalousarvioesityksesta>. Accessed 1 March 2021.
- Food and Agriculture Organisation of the United Nations (FAO) (2020) *Global Forest Resources Assessment 2020*. FAO, Rome, Italy. Accessed through UN SDG Indicators Database <https://unstats.un.org/sdgs/indicators/database/>
- Gerretsen, I (2020). 'The deal that saved Seychelles' troubled waters'. *BBC Future* [website], 3 August 2020. <https://www.bbc.com/future/article/20200803-the-deal-that-saved-seychelles-troubled-waters>. Accessed 5 March 2021.
- Goldberg, P.K. and Reed, T. (2020). 'The effects of the coronavirus pandemic in emerging market and developing economies. An optimistic preliminary account'. *Brookings Papers on Economic Activity* [website article]. <https://www.brookings.edu/bpea-articles/the-effects-of-the-coronavirus-pandemic-in-emerging-market-and-developing-economies/>
- Gorst, A., Zadek, S. and de Montpellier, L. (2021). *Greening Sovereign Debt: Building a Nature and Climate Sovereign Bond Facility*. <https://www.f4b-initiative.net/publications-1/greening-sovereign-debt%3A-a-new-paper%3A-building-a-nature-and-climate-sovereign-bond-facility>
- Government of Canada (2020). *A Healthy Environment and a Healthy Economy*. Government of Canada [website]. <https://www.canada.ca/en/environment-climate-change/news/2020/12/a-healthy-environment-and-a-healthy-economy.html>. Accessed 1 March 2021.

- Griscom, B.W. et al (2017). 'Natural climate solutions'. *PNAS* 114: 11645–11650. <https://doi.org/10.1073/PNAS.1710465114>
- Griscom, B.W. et al (2020). 'National mitigation potential from natural climate solutions in the tropics'. *Philosophical Transactions of the Royal Society B* 375: 20190126. <https://doi.org/10.1098/rstb.2019.0126>
- International Capital Market Association (ICMA) (2018). Sustainability Bond Guidelines 2018. ICMA [website]. <https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/sustainability-bond-guidelines-sbg/>
- _____ (2020). 'Sustainability-Linked Bond Principles'. ICMA [website]. <https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/sustainability-linked-bond-principles-slbp/>
- International Finance Corporation (IFC) (2016). 'Mobilizing private climate finance – Green bonds and beyond'. *EMCompass*, Note 25, December 2016. IFC, The World Bank Group. https://openknowledge.worldbank.org/handle/10986/30351dcomm/documents/briefingnote/wcms_740877.pdf
- International Labour Organization (ILO) (2020). 'COVID-19 and the world of work: Jump-starting a green recovery with more and better jobs, healthy and resilient societies'. *ILO Policy Brief*, July 2020. Geneva, Switzerland: ILO. https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_751217.pdf
- _____ (2021a). 'COVID-19 and the world of work. Second edition. Updated estimates and analysis'. *ILO Monitor*, 7 April 2020. Geneva, Switzerland: ILO. <https://www.ilo.org/wcmsp5/groups/public/---dgreports/--->
- _____ (2021b). *ILOSTAT database*. Data retrieved on January 29, 2021 through World Bank World Development Indicators Database. <https://databank.worldbank.org/source/world-development-indicators/preview/>
- International Monetary Fund (IMF) (2019). *World Economic Outlook, October 2019: Global Manufacturing Downturn, Rising Trade Barriers*. Washington, D.C.: IMF. <https://doi.org/10.5089/9781513508214.081>
- _____ (2020a). *World Economic Outlook: A Long and Difficult Ascent*. October 2020. Washington, D.C.: IMF. <https://www.imf.org/en/Publications/WEO/Issues/2020/09/30/world-economic-outlook-october-2020> (available in Arabic, Chinese, French, Japanese, Russian and Spanish).
- _____ (2020b). 'Fiscal Monitor: Policies for the Recovery'. *Fiscal Monitor Reports*, October 2020. Washington, D.C.: IMF. <https://www.imf.org/en/Publications/FM/Issues/2020/09/30/october-2020-fiscal-monitor> (available in Arabic, Chinese, French, Japanese, Russian and Spanish).
- _____ (2020c). 'Policy Responses to COVID19'. *Policy Tracker* (by country) [website]. <https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19>. Accessed 17 February 2021.
- _____ (2020d). 'Fiscal Monitor - April 2020'. *Fiscal Monitor Reports*. Washington, D.C. <https://www.imf.org/en/Publications/FM/Issues/2020/04/06/fiscal-monitor-april-2020> (available in Arabic, Chinese, French, Japanese, Russian and Spanish).
- _____ (2020e). 'Greening the Recovery'. Fiscal Affairs. Special Series on Fiscal Policies to Respond to COVID-19. Washington, D.C.: IMF.
- _____ (2020f). *World Revenue Longitudinal Data* [website] <https://data.imf.org/?sk=77413F1D-1525-450A-A23A-47AEED40FE78>, Latest Update Date: 08/27/2020.
- _____ (2021a). *World Economic Outlook: Managing Divergent Recoveries*. April 2021. Washington, D.C.: IMF. <https://www.imf.org/en/Publications/WEO/Issues/2021/03/23/world-economic-outlook-april-2021>
- _____ (2021b). 'Policy Support and Vaccines Expected to Lift Activity'. *World Economic Outlook Update*, January 2021. Washington, D.C.: IMF. <https://www.imf.org/en/Publications/WEO/Issues/2021/01/26/2021-world-economic-outlook-update> (available in Arabic, Chinese, French, Japanese, Russian and Spanish).
- _____ (2021c). 'Fiscal Monitor Update, January 2021. Government Support Is Vital as Countries Race to Vaccinate'. *Fiscal Monitor Reports*. Washington, DC: IMF. <https://www.imf.org/en/Publications/FM/Issues/2021/01/20/fiscal-monitor-update->

january-2021 (available in [Arabic](#), [Chinese](#), [French](#), [Japanese](#) and [Spanish](#)).

____ (2021d). 'Fiscal Monitor Database of Country Fiscal Measures in Response to the COVID-19 Pandemic'. *Database of Fiscal Policy Responses to COVID-19* [website]. <https://www.imf.org/en/Topics/imf-and-covid19/Fiscal-Policies-Database-in-Response-to-COVID-19>. Accessed 8 June 2021.

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (2019). *Global Assessment Report on Biodiversity and Ecosystem Services*. <https://ipbes.net/global-assessment>

International Union for Conservation of Nature (IUCN) (2019). *The IUCN Red List of Threatened Species version 3*. <https://www.iucnredlist.org>. Accessed through UN SDG Indicators Database <https://unstats.un.org/sdgs/indicators/database/>

____ (2020). 'IUCN Global Standard for NbS'. *Nature-based Solutions* [website]. <https://www.iucn.org/theme/nature-based-solutions/resources/iucn-global-standard-nbs>. Accessed 30 March 2021.

Kennedy, M. (2018). 'Seychelles finds a novel way to swap its debt for marine protections'. *NPR* [website] <https://www.npr.org/sections/thetwo-way/2018/02/23/588273709/seychelles-finds-a-novel-way-to-swap-its-debt-for-marine-protections>

Kahn, R.S. (2021). 'As a 'green stimulus' Pakistan sets virus-idled to work planting trees. *Reuters* [website article], 28 April 2020. <https://www.reuters.com/article/us-health-coronavirus-pakistan-trees-fea/as-a-green-stimulus-pakistan-sets-virus-idled-to-work-planting-trees-idUSKCN22A369>. Accessed 1 March 2021.

Lenzen, M., Moran, D., Kanemoto, K., Foran, B., Lobefaro, L. and Geschke, A. (2012). 'International trade drives biodiversity threats in developing nations'. *Nature* 486: 109–112. <https://doi.org/10.1038/nature11145>

Ministry of Enterprise and Innovation of Sweden (2020). 'Green jobs important measure to tackle unemployment during COVID-19 crisis'. *Ministry of Enterprise and Innovation of Sweden* [website] <https://www.government.se/articles/2020/04/green-jobs-important-measure-to-tackle-unemployment-during-covid-19-crisis/>

New Zealand Ministry for the Environment (2020). Jobs for Nature – Mahi mō te Taiao. <https://www.doc.govt.nz/jobs-for-nature>. Accessed 1 March 2021.

O'Callaghan, B.J. and Murdock, E. (2021). *Are we building back better? Evidence from 2020 and Pathways for Inclusive Green Recovery Spending*. UN Environment Programme. <https://wedocs.unep.org/bitstream/handle/20.500.11822/35281/AWBBB.pdf>

Organisation for Economic Co-operation and Development (OECD) (2019). *Biodiversity: Finance and the Economic and Business Case for Action*. Report prepared for the G7 Environment Ministers' Meeting, 5-6 May 2019. Paris, France: OECD. <https://www.oecd.org/env/resources/biodiversity/biodiversity-finance-and-the-economic-and-business-case-for-action.htm>

____ (2020a). *OECD Economic Outlook*, Volume 2020 Issue 2. Paris, France: OECD Publishing. <https://doi.org/10.1787/39a88ab1-en>

____ (2020b). 'Biodiversity and the economic response to COVID-19: Ensuring a green and resilient recovery'. *OECD Policy Responses to Coronavirus (COVID-19)* [website]. <https://www.oecd.org/coronavirus/policy-responses/biodiversity-and-the-economic-response-to-covid-19-ensuring-a-green-and-resilient-recovery-d98b5a09>

____ (2020c). 'Making the Green Recovery work for jobs, income and growth'. *OECD Policy Responses to Coronavirus (COVID-19)* [website]. <https://www.oecd.org/coronavirus/policy-responses/making-the-green-recovery-work-for-jobs-income-and-growth-a505f3e7/>

____ (2020d). *Agricultural Policy Monitoring and Evaluation 2020*. Paris, France: OECD Publishing. <https://doi.org/10.1787/928181a8-en>

____ (2020e). *A Comprehensive Overview of Global Biodiversity Finance*. Paris, France: OECD Publishing. <https://www.oecd.org/environment/resources/biodiversity/report-a-comprehensive-overview-of-global-biodiversity-finance.pdf>

____ (n.d.a). 'Debt-for-environment swaps'. *OECD* [website]. <https://www.oecd.org/env/outreach/debt-for-environment-swaps.htm>. Accessed 26 February 2021.

- ____ (n.d.b). 'OECD Work on Support for Fossil Fuels'. *OECD* [website]. <http://www.oecd.org/fossil-fuels/>. Accessed 5 April 2021.
- Rodríguez, C.M.R. and Thiaw, I. (2021). 'How rescheduling debt could unlock a sustainable recovery'. *World Economic Forum* [website article], 25 March 2021. <https://www.weforum.org/agenda/2021/03/rescheduling-debt-climate-sustainable-recovery/>
- Seddon, N. et al. (2020). 'Global recognition of the importance of nature-based solutions to the impacts of climate change'. *Global Sustainability* 3: e15. <https://doi.org/10.1017/sus.2020.8>
- Seddon, N., Smith, A., Smith, P., Key, I., Chausson, A., Girardin, C., House, J., Srivastava, S., Turner, B. (2021). 'Getting the message right on nature-based solutions to climate change'. *Global Change Biology* 27(8): 1518–1546. <https://doi.org/10.1111/gcb.15513>
- Simmons, B.A., Ray, R., Yang, H., Gallagher, K.P. (2021). 'China can help solve the debt and environmental crises'. *Science* 371(6528): 468–470. <https://doi.org/10.1126/science.abf4049>
- Sommer, J.M., Restivo, M. and Shandra, J.M. (2020). 'The United States, Bilateral Debt-for-Nature Swaps, and Forest Loss: A Cross-National Analysis'. *Journal of Development Studies* 56(4): 748–764. <https://doi.org/10.1080/00220388.2018.1563683>
- Steele, P, Patel, S (2020). *Tackling the Triple Crisis Using Debt Swaps to Address Debt, Climate and Nature Loss Post-COVID-19*. London, UK: IIED. <https://pubs.iied.org/16674iied>
- Strassburg, B.B.N. et al. (2020). 'Global priority areas for ecosystem restoration'. *Nature* 586: 724–729. <https://doi.org/10.1038/s41586-020-2784-9>
- The Nature Conservancy (TNC) (n.d.). 'Seychelles'. *TNC* [website]. <https://www.nature.org/en-us/about-us/where-we-work/africa/stories-in-africa/seychelles-conservation-commitment-comes-to-life>. Accessed 5 March 2021.
- United Nations Development Programme (UNDP) (2021). 'Debt for nature swaps'. *UNDP* [website]. <https://www.sdfinance.undp.org/content/sdfinance/en/home/solutions/debt-for-nature-swaps.html#mst-3>. Accessed 26 February 2021.
- UN Environment Programme (UNEP) (2020). 'Amid COVID-19, these 10 countries are aiming to kickstart their economies by repairing nature'. *UNEP* [website story], 7 October 2020. <https://www.unep.org/news-stories/story/amid-covid-19-these-10-countries-are-aiming-kickstart-their-economies>. Accessed 1 March 2021.
- ____ (2021). *Adaptation Gap Report 2020*. Nairobi, Kenya: UNEP. <https://www.unep.org/adaptation-gap-report-2020>
- United Nations Framework Convention on Climate Change (UNFCCC) (2021). *Platform for REDESIGN 2020*. <https://platform2020redesign.org/countries>. Accessed 18 February 2021.
- ____ (n.d.) 'Nationally Determined Contributions (NDCs)'. *UNFCCC* [website]. <https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs>. Accessed 7 April 2021.
- UNWTO (2020a). 'Impact assessment of the COVID-19 outbreak on international tourism'. *UNWTO* [website article]. <https://www.unwto.org/impact-assessment-of-the-covid-19-outbreak-on-international-tourism>. Accessed 19 February 2021.
- ____ (2020b). 'Tourism and COVID-19 – unprecedented economic impacts'. *UNWTO* [website], Secretary-General's Policy Brief on Tourism and COVID-19, 24 August 2020. <https://www.unwto.org/tourism-and-covid-19-unprecedented-economic-impacts>
- Vivid Economics (2021). *Greenness of Stimulus Index*. Available at: https://www.vivideconomics.com/wp-content/uploads/2020/10/201028-GSI-report_October-release.pdf
- World Bank (2019a). '10 Years of Green Bonds: Creating the Blueprint for Sustainability Across Capital Markets'. *World Bank* [website]. <https://www.worldbank.org/en/news/immersive-story/2019/03/18/10-years-of-green-bonds-creating-the-blueprint-for-sustainability-across-capital-markets>. Accessed 8 April 2021.
- ____ (2019b). *Green Bond Impact Report 2019*. Washington, D.C.: World Bank (IBRD). <https://the-docs.worldbank.org/en/doc/790081576615720375-0340022019/original/IBRDGreenBondImpactReport-FY2019.pdf>

_____ (2021). *Global Economic Prospects, January 2021*. The World Bank. <https://www.worldbank.org/en/publication/global-economic-prospects>

_____ (n.d.a). Development Research Group. Data are based on primary household survey data obtained from government statistical agencies and World Bank country departments. Data for high-income economies are from the Luxembourg Income Study database. For more information and methodology, please see PovcalNet (<http://iresearch.worldbank.org/PovcalNet/index.htm>). Data accessed through World Bank World Development Indicators Database. <https://databank.worldbank.org/source/world-development-indicators/preview/>

_____ (n.d.b). 'Green Bonds'. World Bank [website article]. <https://treasury.worldbank.org/en/about/unit/treasury/ibrd/ibrd-green-bonds>. Accessed 8 April 2021.

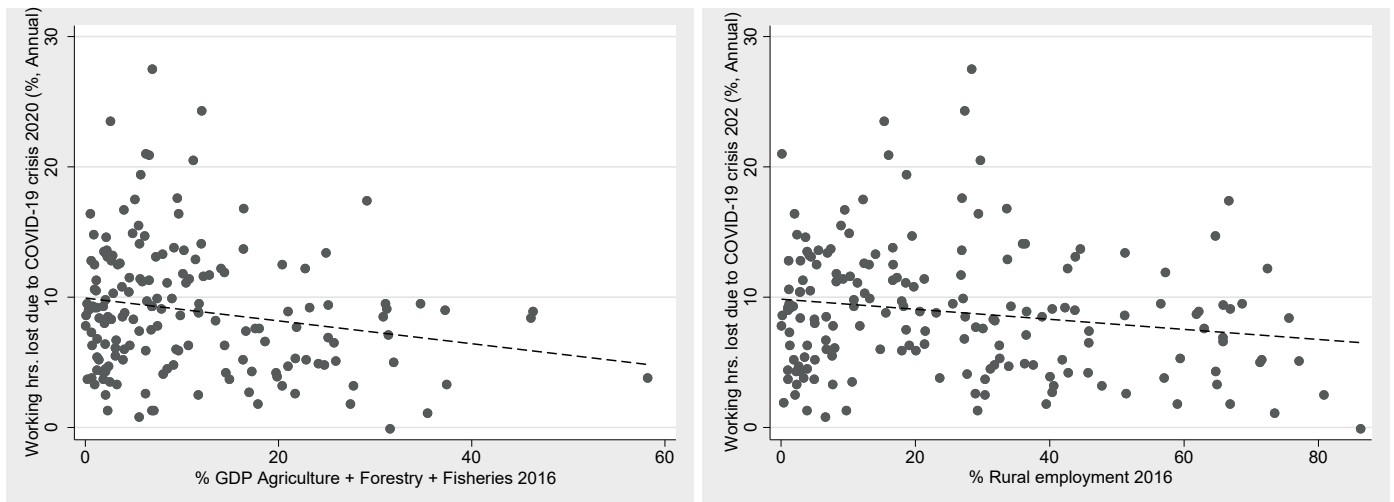
World Bank and Organisation for Economic Co-operation and Development (OECD) (n.d.). *World Bank national accounts data, and OECD National Accounts data files*. Data accessed through World Bank World Development Indicators Database. <https://databank.worldbank.org/source/world-development-indicators/preview/>

World Bank Group (2021). *International Debt Statistics 2021*. Washington, D.C.: World Bank. <https://data.worldbank.org/products/ids>

Appendices

FIGURE A1

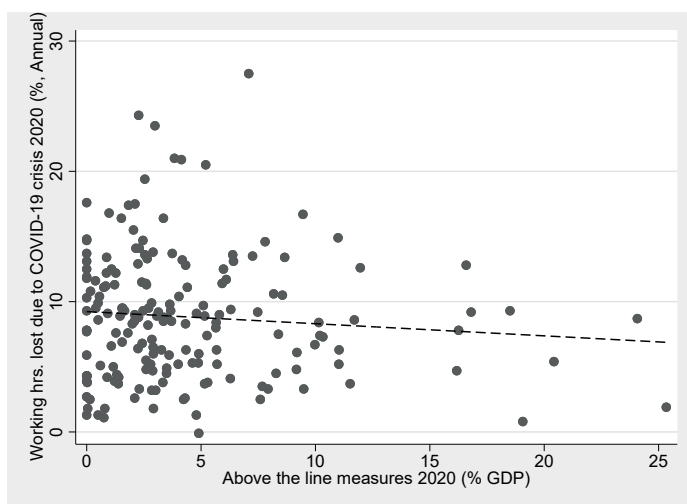
Percentage of agriculture, forestry and fisheries in GDP;
rural employment and working hours lost



Source: Figure constructed by the authors based on calculations using data from ILO (2021b); World Bank (n.d.a), and World Bank and OECD (n.d).

FIGURE A2

Working hours lost and additional spending / forgone
revenue



Source: Figure constructed by the authors based on calculations using data from ILO (2021a) and IMF (2021d).

TABLE A1

Country-level data on debt service relative to government revenues (low- and middle-income countries), GDP loss in 2020–2024, percentage rural employment, Red List Index and forest cover change 2000–2020

CONTINENT	Country	Debt service/ general government revenues (%)	GDP loss 2020–2024 (%)	Rural employment (% of total)	Poverty (% population earning under US\$ 1.90/day)	Red List Index	Forest cover change 2000–2020 (%)
AFRICA	Angola	38.16	-7.73	50.91	49.90	0.93	-14.29
	Burundi	1.71	3.99	86.25	72.80	0.89	44.19
	Benin	11.95	-6.25	39.08	49.60	0.91	-24.18
	Burkina Faso	4.58	-6.88	27.08	43.80	0.99	-13.86
	Botswana	3.44	-10.02	20.37	14.50	0.97	-13.43
	Central African Republic	7.35	-5.82	70.30	65.90	0.94	-2.62
	Côte d'Ivoire	19.28	-5.64	41.01	29.80	0.90	-44.32
	Cameroon	17.05	-7.97	44.17	26.00	0.84	-5.82
	Democratic Republic of the Congo	7.20	-2.94	64.81	77.20	0.89	-12.33
	Republic of Congo	2.71	-9.71	33.74	39.60	0.97	-1.12
	Comoros	4.74	-7.08	34.99	19.10	0.75	-21.02
	Cape Verde	10.09	-16.54	11.84	3.40	0.90	15.11
	Djibouti	64.14	-7.63	25.47	17.00	0.81	3.57
	Algeria	9.05	-6.60	9.88	0.40	0.91	23.43
	Egypt	15.27	-5.19	21.66	3.80	0.92	-24.03
	Eritrea	3.33	-7.60	63.76	–	0.90	-5.65
	Ethiopia	15.81	-3.12	67.29	30.80	0.85	-7.88
	Gabon	3.89	-8.47	30.59	3.40	0.96	-0.71
	Ghana	28.03	-3.65	31.05	12.70	0.85	-9.75
	Guinea	5.89	-1.05	61.32	36.10	0.90	-10.68
	Gambia	18.48	-4.03	27.71	10.30	0.97	-32.09
	Guinea-Bissau	6.36	-9.14	61.06	68.40	0.91	-7.86
	Equatorial Guinea	3.33	7.61	39.15	–	0.82	-6.39
	Kenya	17.34	-4.44	55.08	37.10	0.80	-8.84
	Liberia	4.04	–	42.78	44.40	0.91	-7.36

Note: For Debt service/general government revenues (%), Rural employment (% of total), Poverty (% of population earning under USD 1.9 a day, and Red List Index the value in the table is for the latest year available.

Sources: BirdLife (2019); FAO (2020); ILO (2021b); IMF (2019; 2020f; 2021a); IUCN (2019) World Bank (n.d.a); and World Bank Group (2021).

TABLE A1 continued

	Libya	1.18	-12.38	16.96	–	0.97	0.00
	Lesotho	6.05	-3.56	44.91	27.20	0.95	0.00
	Morocco	12.87	-10.71	34.15	0.90	0.89	4.28
	Madagascar	6.59	-10.06	64.68	78.80	0.76	-4.61
	Mali	7.92	-6.57	63.00	50.30	0.98	0.00
	Mozambique	15.99	-7.47	70.59	63.70	0.82	-10.79
	Mauritania	23.33	-11.30	31.52	6.00	0.98	-25.81
	Mauritius	9.68	-16.71	6.20	0.20	0.42	-7.54
	Malawi	5.45	-6.51	76.64	69.20	0.81	-27.26
	Namibia	2.96	-8.88	22.59	13.80	0.97	-17.62
	Niger	5.34	-1.09	72.86	45.40	0.94	-18.70
	Nigeria	15.83	-4.62	35.53	39.10	0.86	-13.12
	Rwanda	11.17	-9.90	63.35	56.50	0.88	-3.83
	Sudan	6.80	0.66	38.95	12.20	0.93	-15.88
	Senegal	18.80	-8.04	30.83	38.50	0.94	-8.87
	Sierra Leone	9.14	-8.72	55.36	43.00	0.93	-13.47
	Somalia	2.96	-5.19	80.49	68.60	0.91	-20.43
	South Sudan	4.32		60.84	76.40	0.93	0.00
	São Tomé and Príncipe	4.63	-10.21	19.61	35.60	0.80	-11.07
	Swaziland	3.84	-2.52	12.50	29.20	0.81	5.13
	Seychelles	2.19	-17.41	24.39	0.50	0.69	0.00
	Chad	7.35	-10.07	75.39	38.10	0.92	-32.11
	Togo	9.81	-6.44	33.10	51.10	0.86	-4.67
	Tunisia	26.86	-12.20	14.28	0.20	0.97	5.22
	Tanzania	13.04	-8.79	65.67	49.40	0.70	-14.77
	Uganda	11.55	-9.82	72.45	41.30	0.76	-26.08
	South Africa	27.17	-6.86	5.16	18.70	0.78	-4.09
	Zambia	28.34	-6.29	50.11	58.70	0.87	-4.76
	Zimbabwe	22.75	-9.06	66.02	39.50	0.79	-5.02
AMERICAS	Argentina	19.75	-6.16	0.10	1.50	0.85	-14.40
	Antigua and Barbuda	20.18	-16.79	8.28	–	0.89	-14.07
	Bahamas	20.18	-11.24	2.26	–	0.70	0.00
	Belize	19.48	-12.46	17.01	13.90	0.85	-12.49
	Bolivia	8.57	-9.51	31.06	3.20	0.87	-7.75
	Brazil	16.38	-5.05	9.26	4.60	0.90	-9.88
	Barbados	20.18	-12.23	2.70	–	0.90	0.00



TABLE A1 continued

	Canada	–	-2.79	1.49	0.20	0.96	-0.25
	Chile	5.76	-6.52	9.22	0.30	0.77	15.13
	Colombia	24.39	-9.11	16.71	4.90	0.75	-5.73
	Costa Rica	41.12	-7.22	12.40	1.00	0.83	6.22
	Cuba	–	–	–	–	–	–
	Dominica	11.13	-15.70	2.84	–	0.68	0.00
	Dominican Republic	25.75	-11.02	9.33	0.60	0.73	8.70
	Ecuador	24.20	-8.49	28.83	3.60	0.67	-8.98
	Grenada	16.88	-16.85	2.84	–	0.68	0.00
	Greenland	–	–	–	–	–	–
	Guatemala	47.55	-4.05	31.74	8.80	0.73	-16.19
	Guyana	9.57	-1.14	15.89	11.80	0.88	-0.80
	Honduras	16.28	-10.97	30.67	14.80	0.77	-6.18
	Haiti	1.12	-5.70	29.22	24.50	0.72	-8.76
	Jamaica	25.61	-8.30	16.23	1.70	0.67	14.57
	Saint Kitts and Nevis	33.09	-18.99	17.82	–	0.74	0.00
	Saint Lucia	10.58	-16.60	11.35	4.60	0.84	-1.14
	Mexico	20.28	-6.82	12.81	1.70	0.68	-3.93
	Nicaragua	33.75	-0.14	30.33	3.40	0.85	-36.89
	Panama	29.20	-18.76	14.21	1.20	0.75	-5.14
	Peru	16.28	-10.33	27.79	2.20	0.73	-3.94
	Puerto Rico	–	–	–	–	–	–
	Paraguay	30.29	-5.02	20.08	0.90	0.95	-29.96
	El Salvador	64.37	-8.72	16.71	1.30	0.83	-13.36
	Suriname	18.41	-17.22	8.02	21.10	0.98	-0.94
	Trinidad and Tobago	18.41	-8.03	3.11	3.20	0.81	-3.57
	Uruguay	21.30	-6.93	8.36	0.10	0.86	48.36
	United States	–	-0.94	1.37	1.00	0.83	2.06
	Saint Vincent and the Grenadines	16.82	-6.20	10.32	–	0.77	0.00
	Venezuela	21.30	–	7.54	6.70	0.83	-5.94
ASIA	Afghanistan	1.22	-8.65	43.13	–	0.84	0.00
	United Arab Emirates	134.30	-7.73	1.46	0.00	0.86	2.54
	Armenia	59.93	-14.41	25.78	1.10	0.85	-1.25
	Azerbaijan	14.75	-6.81	36.26	0.00	0.91	14.64

TABLE A1 continued

Bangladesh	11.54	-4.99	39.39	14.30	0.76	-1.92
Bahrain	18.41	-6.13	0.97	–	0.76	89.19
Brunei	13.17	-5.42	1.06	–	0.86	-4.28
Bhutan	10.90	-14.09	56.12	1.50	0.80	4.57
China	6.16	-1.64	26.07	0.50	0.75	24.28
Cyprus	18.41	-6.52	2.17	0.00	0.98	0.54
Georgia	52.47	-11.02	38.90	3.80	0.87	2.24
Hong Kong	19.09	-5.48	0.17	–	0.83	–
Indonesia	35.75	-7.03	29.63	2.90	0.75	-9.03
India	11.59	-11.26	43.33	22.50	0.68	6.76
Iran	18.41	4.09	17.69	0.50	0.84	15.29
Iraq	18.41	-13.79	18.82	1.70	0.80	0.86
Israel	18.41	-2.85	0.96	0.20	0.72	-8.50
Jordan	20.16	-4.66	2.58	0.10	0.97	0.00
Japan	–	-1.69	3.49	0.70	0.78	0.24
Kazakhstan	87.55	-6.46	15.77	0.00	0.87	9.43
Kyrgyzstan	20.99	-8.98	20.43	0.60	0.98	11.39
Cambodia	21.93	-11.85	36.38	–	0.79	-25.16
South Korea	0.03	-2.76	5.00	0.20	0.70	-2.92
Kuwait	11.88	-11.91	1.86	–	0.84	28.87
Laos	28.98	-9.20	62.37	10.00	0.83	-4.76
Lebanon	142.63	–	11.69	0.00	0.92	3.73
Sri Lanka	62.20	-7.60	25.50	0.90	0.58	-2.46
Macao	19.21	-13.37	0.40	–	0.86	–
Maldives	31.19	-23.65	8.61	0.00	0.85	0.00
Myanmar	6.70	-17.27	48.17	1.40	0.80	-18.14
Mongolia	188.52	-9.24	26.66	0.50	0.95	-0.64
Malaysia	19.21	-7.40	10.63	0.00	0.77	-2.93
Nepal	3.33	-9.84	65.08	15.00	0.83	3.14
Oman	134.30	-6.65	4.14	–	0.89	-16.67
Pakistan	12.65	-4.34	37.42	4.40	0.86	-17.41
Philippines	12.54	-14.44	24.29	2.70	0.68	-1.65
North Korea	–	–	–	–	–	–
Palestine	–	–	–	0.80	–	–
Qatar	134.30	-5.17	1.21	–	0.82	–
Saudi Arabia	134.30	-4.55	2.52	–	0.91	0.00
Singapore	32.73	-2.85	0.06	–	0.86	-8.48
Syria	134.30	–	10.66	0.90	0.94	20.83
Thailand	17.39	-8.40	32.14	0.10	0.79	4.61



TABLE A1 continued

	Tajikistan	33.46	0.39	45.76	4.10	0.99	3.37
	Turkmenistan	3.49	-8.17	21.69	49.80	0.98	0.00
	Timor-Leste	0.35	-13.89	40.54	22.00	0.86	-2.95
	Turkey	34.66	1.52	18.43	0.40	0.88	10.28
	Taiwan	19.09	4.09	31.82		0.61	
	Uzbekistan	7.17	-5.58	26.65	61.60	0.97	24.59
	Vietnam	25.01	-2.72	38.70	1.80	0.73	24.26
	Yemen	5.57	-17.94	28.31	18.30	0.86	0.00
EUROPE	Albania	26.10	-6.61	37.29	1.30	0.84	2.55
	Andorra	-		-		-	-
	Austria	-	-5.00	3.69	0.60	0.89	1.59
	Belgium	-	-4.27	0.99	0.10	0.99	3.30
	Bulgaria	29.68	-4.38	6.58	0.90	0.94	15.35
	Bosnia and Herzegovina	11.76	-6.95	15.73	0.10	0.90	3.61
	Belarus	24.32	-0.16	11.31	0.00	0.97	5.98
	Switzerland	-	-2.09	3.03	0.00	0.97	6.10
	Czech Republic	4.10	-5.28	2.80	0.00	0.97	1.51
	Germany	-	-3.07	1.25	0.00	0.98	0.57
	Denmark	-	-3.44	2.19	0.20	0.97	9.94
	Spain	-	-7.08	4.20	0.90	0.85	8.65
	Estonia	4.10	-4.07	3.29	0.20	0.99	8.91
	Finland	-	-2.99	3.71	0.10	0.99	-0.16
	France	-	-4.41	2.50	0.00	0.88	12.85
	United Kingdom	-	-6.33	1.07	0.30	0.79	7.99
	Greece	-	-6.10	12.27	0.10	0.85	8.38
	Croatia	10.38	-7.30	6.24	0.40	0.90	2.87
	Hungary	5.64	-4.39	4.85	0.20	0.88	6.86
	Ireland	-	1.45	4.77	0.20	0.92	24.06
	Iceland	-	-5.86	4.03	0.00	0.86	72.14
	Italy	-	-4.87	3.76	1.40	0.90	14.30
	Liechtenstein	-	-	-	-	-	-
	Lithuania	5.64	-2.03	7.18	0.90	0.99	8.96
	Luxembourg	-	-2.12	1.05	0.30	0.99	2.31
	Latvia	4.10	-3.90	6.97	0.30	0.99	5.24
	Monaco	-	-	-	-	-	-
Moldova	16.62	-10.07	24.46	0.00	0.97	12.22	
Macedonia	35.60	-6.71	15.72	3.40	0.97	4.59	
Malta	-	-8.34	1.00	0.10	0.88	31.43	

TABLE A1 continued

	Montenegro	75.20	-11.69	8.02	2.50	0.81	32.11
	Netherlands	-	-2.84	2.10	0.10	0.94	2.78
	Norway	-	0.61	2.11	0.30	0.94	0.55
	Poland	7.31	-3.21	9.62	0.20	0.97	4.68
	Portugal	-	-4.92	6.04	0.30	0.87	0.94
	Romania	7.31	-3.47	22.31	2.40	0.93	8.84
	Russia	18.67	-2.50	5.88	0.00	0.95	0.75
	San Marino	-	-5.50	1.65	-	0.99	0.00
	Serbia	27.23	-3.78	15.93	5.40	0.96	10.68
	Slovakia	4.10	-4.79	2.29	0.20	0.96	1.29
	Slovenia	10.38	-5.57	5.48	0.00	0.93	0.39
	Sweden	-	-2.72	1.73	0.70	0.99	-0.65
	Ukraine	28.31	-6.13	14.42	0.00	0.93	1.89
OCEANIA	Australia	23.40	-3.31	2.62	0.50	0.82	1.66
	Cook Islands	-	-	-	-	-	-
	Fiji	3.98	-16.04	17.98	0.50	0.67	13.27
	Micronesia	5.19	-4.07	25.28	15.40	0.87	-
	Guam	-	-	-	-	-	-
	Kiribati	5.30	-2.42	24.44	12.90	0.77	0.00
	Marshall Islands	5.19	-6.73	25.28		0.84	0.00
	New Caledonia	-	-	-	-	-	-
	Nauru	5.30	-0.98	24.44	0.90	0.77	-
	New Zealand	23.40	-4.07	5.91	-	0.63	0.43
	Palau	17.06	-13.02	43.39	-	0.74	4.62
	Papua New Guinea	3.51	-5.45	57.32	38.00	0.84	-1.16
	Solomon Islands	5.64	-6.21	37.91	24.70	0.77	-0.58
	Tonga	4.76	-7.30	19.85	1.00	0.73	0.00
	Tuvalu	5.19	-5.19	25.28	3.30	0.84	0.00
	Vanuatu	5.55	-10.37	57.64	13.20	0.66	0.00
	Samoa	11.88	-14.36	30.85	1.10	0.77	-5.63