



The **Land Gap** Report

2025

Transforming global economic governance
to meet climate and biodiversity goals

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Abbreviations

AoA	Agreement on Agriculture
BECCS	bioenergy with carbon capture and storage
BEPS	Base Erosion and Profit Shifting
CAFI	Central African Forest Initiative
CAP	Common Agricultural Policy (European Union)
CBD	Convention on Biological Diversity
CDR	carbon dioxide removal
CF	Common Framework
CO₂	carbon dioxide
COP	Conference of the Parties
CoT	comparability of treatment
DAC	direct air capture
DSA	Debt Sustainability Analysis
DRGR	Debt Relief for a Green and Inclusive Recovery
DSSI	Debt Service Suspension Initiative
EAFRD	European Agricultural Fund for Rural Development
EEA	European Environment Agency
EMDE	Emerging Market and Developing Economies
EU	European Union
EUDR	European Union Deforestation Regulation
FAO	Food and Agriculture Organization of the United Nations
FATF	Financial Action Task Force
FCLP	Forest and Climate Leaders' Partnership
FDA	U.S. Food and Drug Administration
FLII	Forest Landscape Integrity Index
FODECC	Fonds de Développement des Filières Café et Cacao (Cameroon's Coffee and Cocoa Sectors Development Fund)
G7	Group of Seven (Canada, France, Germany, Italy, Japan, UK, USA)
G20	Group of Twenty
G24	Intergovernmental Group of Twenty-Four on International Monetary Affairs and Development
GATT	General Agreement on Tariffs and Trade
GDP	gross domestic product
GHG	greenhouse gas

ABBREVIATIONS

Gt CO₂	gigatonnes of carbon dioxide
ha	hectare
HIPC	Heavily Indebted Poor Countries
HLAB	High-Level Advisory Board on Effective Multilateralism
IMF	International Monetary Fund
IPs and LCs	Indigenous Peoples and Local Communities
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IUCN	International Union for Conservation of Nature
LT-LEDS	long-term low emission development strategies
LULUCF	land use, land use change and forestry
MDB	multilateral development bank
Mha	million hectares
MIC	middle-income country
MRN	Mineração Rio do Norte (Brazilian bauxite mining company)
NBSAP	National Biodiversity Strategy and Action Plan
NDC	Nationally Determined Contribution
NIEO	New International Economic Order
OECD	Organisation for Economic Co-operation and Development
PPG	Public and Publicly Guaranteed (debt)
RDP	Rural Development Programme
RED	Renewable Energy Directive
SDG	Sustainable Development Goal
S&P	Standard & Poor's (credit rating agency)
SDR	Special Drawing Right
UNCCD	United Nations Convention to Combat Desertification
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFCITC	United Nations Framework Convention on International Tax Cooperation
UNFF	United Nations Forum on Forests
UNODC	United Nations Office on Drugs and Crime
WTO	World Trade Organization

Foreword

Land in the economy is often seen only for its productive uses; however, land encompasses the basis for the constitution of territories, which is the cultural relationship between humans and life itself to sustain the reproduction of society and nature. The Land Gap Report 2025 takes this integral perspective, not only to evaluate the reality and potential of land for carbon mitigation purposes, but to advocate for a restorative, rights-based economic model.

The complexity of land use embodies the political relationships and power struggles present in each national context and in international relations. With 40 percent of the world's land under threat of desertification and highly degraded, with millions displaced due to the systemic consequences of extractive fossil fuel-based capitalism, with emissions from agriculture, forestry and land-use change accounting for 13 to 21 percent of total global emissions, land loss can be seen not only as a threat but as an opportunity to reconceptualize human relationships with the living systems of the planet.

This report is a welcome contribution to that perspective, since it looks at the structural political and economic constraints inhibiting this transformation. It addresses questions at the heart of global economic governance, sovereign debt, tax and trade policy reform, the impact of subsidies, and the role of commodity value chains vis-à-vis food sovereignty.

This is a welcome step forward, since the report recognizes the necessity for structural economic transformation and the need for international cooperation, going beyond the current more narrow paradigm of Nationally Determined Contributions (NDCs). It builds upon the first Land Gap Report (2022), which undertook the first global assessment of the aggregate area of land required to meet mitigation targets in countries' NDCs and Long-Term Strategies. The 2022 report uncovered how, rather than limiting fossil fuel use and production, mitigation targets were using land-based carbon removals as a quick fix for carbon offsetting. The total area of land required to meet those pledges entrenches a linear and simplistic paradigm of addressing climate change, with the risk of aggravating the ongoing threats to Indigenous Peoples' and Local Communities' land and following the same market approach that created the crises.

Many of the answers to the climate crisis are already present in the cultural response that Indigenous Peoples and Local Communities have used to manage their lands and territories. The Intergovernmental Panel on Climate Change reports already acknowledge that one of the most cost-effective measures to achieve 2030 climate targets, besides renewable energy, is stopping deforestation and restoring the land.

Whether this is going to be done through the same lens of exploitative capitalism, 'innovative market instruments', or on the contrary, through inclusive governance structures that strengthen culture, communities' rights and nature, depends on the political balance of power. This report contributes to that reflection by uncovering the discourse of the so-called 'finance gap' of international climate negotiations as a potential trap to promote private investment in nature and forests, rather than addressing the economic and political structures that materialize the political imbalance of power, denounced widely by the social and environmental justice movement.



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Executive Summary

KEY MESSAGES

Land gap

Governments' updated climate pledges rely heavily on land-based carbon removal, requiring **1 billion hectares (ha)** of land—an area larger than China—while delaying serious action on climate to later in the century. Over-reliance on future forest carbon removal from a handful of high-emitting countries instead of phasing out emissions from fossil fuels and ecosystem destruction undermines climate stability.

Forest gap

The scale of the 'forest gap'—the difference between global targets to halt and reverse deforestation and forest degradation, and the actual plans that countries are putting forward in their climate pledges—represents **20 million ha per year of ongoing forest loss and destruction**. This is based on **4 million ha** per year of deforestation by 2030—less than a 50 percent reduction on current rates; and **16 million ha** of degradation—less than a 10 percent decline in current rates. Stronger action is needed, or the world's growing 'forest gap' will jeopardize both climate and ecosystem stability.

Global economic governance reform

Today's economic structures—the institutions, rules, and financial mechanisms that shape our societies—limit countries' abilities to pursue deforestation-free development pathways. Facing short-term pressures to pay debts, attract international investment, and comply with international financial institutions, governments often rely on maintaining or even expanding extractive sectors that create emissions and drive forest destruction, sometimes even against the mandates of their own citizens. Transforming these systems is essential to achieving global climate and biodiversity goals.

Sovereign Debt

Contemporary approaches to resolving sovereign debt deepen countries' commodity dependence and weaken their ability to protect marginalized communities and vulnerable ecosystems from the expansion of agricultural and extractive sector pressures. Alternative approaches to sovereign debt crises could provide governments the fiscal breathing space to regulate commodity sectors and protect Indigenous Peoples and Local Communities as well as the ecosystems that support them. This means that all creditors—including bondholders, multilateral development banks and sovereign lenders—need to offer meaningful debt relief to low- and middle-income countries.

Tax

Reform of international financial transparency and tax cooperation rules has the potential to recover hundreds of billions of dollars in lost revenue, while also combating the secrecy and profitability of environmentally harmful activities. The democratization of tax policymaking at both national and international levels is crucial to provide revenue for forest and land rights, and to reshape the global economy towards restoration.

Trade

Current trade and investment rules reinforce the political and economic power of commodity traders in global value chains. Ignoring corporate influence has driven policy failures, unkept promises, and relentless forest loss. Economic development must be grounded in food sovereignty, the right to food, and the protection of resilient ecosystems. Agricultural trade rules should reinforce these foundations, not work against them.

Land and forests are central to achieving the goals of the climate and biodiversity agreements agreed to under the Rio Conventions. Natural ecosystems buffer societies from increasingly frequent climate-related disasters and regulate climate and water systems. Forest ecosystems in particular, store vast amounts of carbon and have the potential to remove more from the atmosphere, an increasingly vital contribution as the planet nears critical tipping points. They are also home to 200 million Indigenous Peoples and Local Communities, with another 1.7 billion people depending on forest resources for their livelihoods. Beyond their environmental and social value, land, forests and biodiversity underpin the global economy, providing the foundation for human wellbeing and shared prosperity.

Many countries have included land-based carbon removals in their climate mitigation pledges in the lead up to the 30th Conference of the Parties (COP30) in Belém, Brazil in November 2025. These new pledges provide an insight into the level of ambition in countries’ climate commitments, and how these commitments will impact land use in the future, including with regard to biodiversity, food security and land rights.

This report finds that such pledges continue to rely on carbon removal into land to offset ongoing emissions from fossil fuels and the clearing and degradation of forests, undermining the full potential of land to support climate and biodiversity goals. Over-reliance on land-based climate mitigation risks displacing food production, weakening ecosystem resilience, and delaying the necessary phase-out of greenhouse gas (GHG) emissions.

At the same time, countries’ climate pledges are failing to advance concrete plans to end forest loss and degradation, putting attainment of global objectives on climate and biodiversity further out of reach.

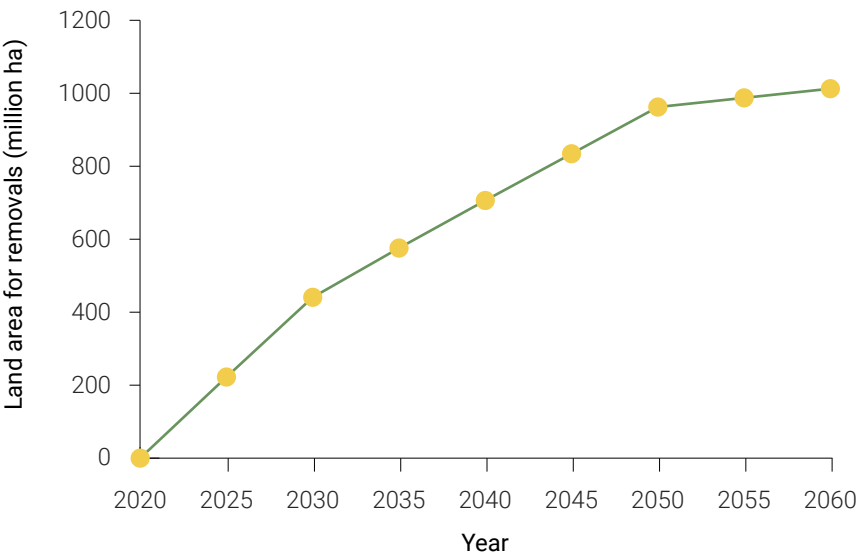
The Land Gap

The Land Gap Report 2025 provides an updated assessment of land area required for carbon removal in climate pledges submitted to the UNFCCC up to November 2025. Pledged land for carbon removal now exceeds 1 billion ha—far beyond what is feasible or sustainable. This represents an increase from *The Land Gap Report 2022* and the 2023 update which found that 990 million ha of land are required to meet climate pledges submitted by the end of 2023. Almost half of this area, 441 million ha, which is larger than the size of India, requires converting land to carbon removal activities. Land conversion at this scale would displace food production, threaten biodiversity, and disrupt livelihoods, leading to severe social and ecological trade-offs that far outweigh the potential climate benefits. Conversely, ecosystem restoration (for which 572 million ha is pledged) could achieve carbon removal in line with sustainable development goals.

This report reassessed all pledges to the UNFCCC, as defined by the short- term targets included in Nationally Determined Contributions (NDCs), and those outlined in Long-Term Low Emissions Development Strategies (LT-LEDS), which includes **95** new pledges since January 2024, demonstrating that countries are

Carbon dioxide removal in national climate pledges

Countries climate pledges rely on 1.01 billion ha of land for carbon removal, with the largest land area pledges from a handful of countries occurring later in the century



Source: Author’s own analysis

doubling down on reliance on the land sector for carbon removal to meet their pledged climate targets. A small number of large, high-emitting countries account for more than **70 percent** of total land included in the pledges, indicating a continuing lack of ambition in reducing emissions from fossil fuels in the near term, instead placing reliance on the land sector later in the century.

Land and forests under threat from extractivism

Land remains under threat from continued extractivism, a form of economic activity and organization that is based on unsustainable natural resource exploitation often for export, with benefits largely accumulating far from the sites of extraction. Over half of Earth's land surface has transgressed critical ecological thresholds, weakening ecosystem integrity, threatening rights and undermining food production. The land sector is in urgent need of transformation. Forests continue to be lost and degraded at an alarming rate, with 7.2 million ha of deforestation in 2024, releasing 4 gigatons of CO₂, further eroding the ability of forest ecosystems to contribute to climate stabilization goals. In 2023 and 2024, extreme fires reduced the carbon uptake of forests to one-quarter of its usual effect. Commodity-driven agricultural production and industrial logging are the largest drivers of forest loss and degradation, accounting for over half of global forest loss, even as hunger and food insecurity continue to plague development aspirations around the world.

Failed approaches and missed opportunities

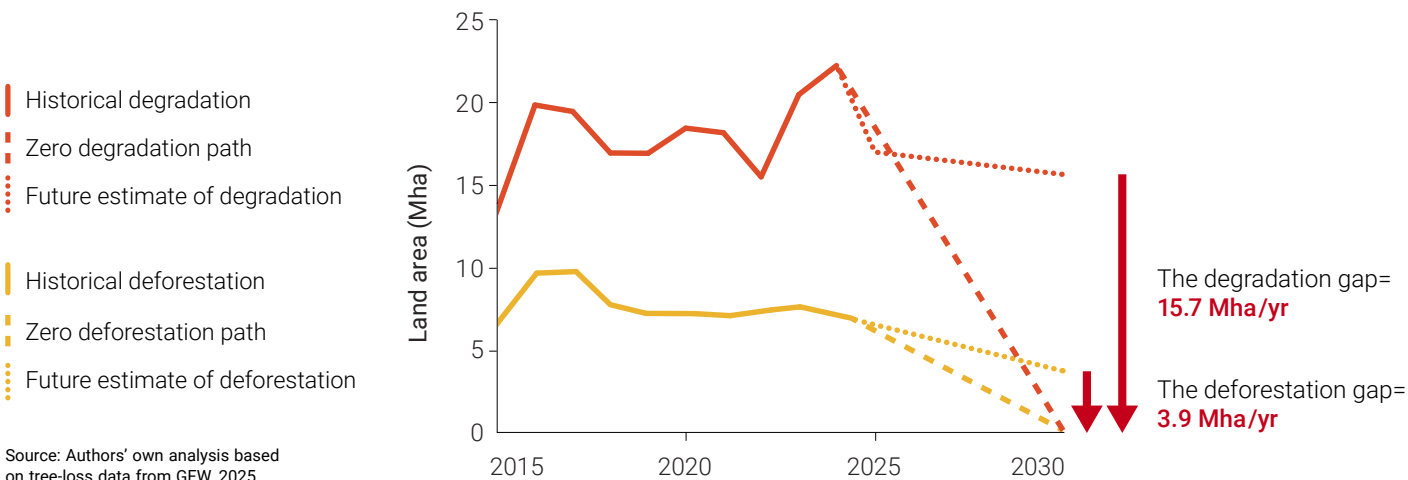
Over the past 15 years, many countries and many initiatives have pledged to protect forests and land, but these commitments and targets are often neither implemented nor achieved. Following an initial pledge for 'deforestation-free' supply chains by 2020, almost 40 governments and over 55 of the world's biggest companies signed the New York Declaration on Forests in 2014, committing to eliminating deforestation from the production of agricultural commodities, as well as to halving the rate of deforestation by 2020, and to ending natural forest loss globally by 2030. The Forest Declaration was relaunched in 2021 ahead of COP26 in Glasgow, with 145 governments reaffirming the goal to end the forest loss and degradation of natural forests by 2030. In 2023, the outcome of the Global Stocktake decision at COP28 formally incorporated the Forest Declaration's pledge—to halt and reverse deforestation and forest degradation by 2030—as part of the UN-FCCC text itself, expanding the commitment to halt forest loss by 2030 to all parties of the Paris Agreement. Countries reinforced this goal in 2025 in a decision made at the UN Forum on Forests.

The Forest Gap

Yet forest loss and degradation continue apace. While some substantive progress has been made since the first pledges to halt forest loss, this report shows that there remains a substantial gap

The forest gap national climate pledges

By 2030, current climate pledges would still allow nearly 20 million ha of forests to be lost or degraded each year—a slight decline from the 26 million ha lost annually over the past decade.



between current climate pledges and halting clearing and degradation of natural forest by 2030. While policy commitments from major traders of all forest-risk commodities and sourcing regions have played an important role in sending market signals that drive reform in producer countries, the last decade has shown that voluntary action is insufficient on its own to change behavior and catalyse the scale of transformation needed by 2030.

This report assesses, for the first time, the scale of the ‘forest gap’—the difference between commitments made over the past 15 years, culminating in the first Global Stocktake outcome to halt and reverse deforestation and forest degradation by 2030, and the actual plans that countries are putting forward in their NDCs and longer-term strategies. Current pledges result in a ‘forest gap’ of almost 4 million ha of ongoing deforestation by 2030—less than a 50 percent reduction on current rates; and almost 16 million ha of degradation—less than a 10 percent decline in current rates. Even with current COP30 pledges, this results in a remaining ‘forest gap’ of **around 20 million ha** projected to be lost or degraded each year by 2030, underscoring the inadequacy of planned policies and targets. Stronger action is needed or the world’s growing ‘forest gap’ will jeopardize both climate and ecosystem stability.

Global economic governance reform to protect forests

Conventional explanations for the failure to halt deforestation and forest degradation tend to focus on lack of: political will, financial resources, commitment from private sector actors and state capacity to implement decisions. This understanding has continued to shape policy interventions focused on supply chains, governance and finance in the land and forest sector for decades. However, such gaps and deficiencies provide only partial explanations. **What is rarely discussed is how the current structure of global economic governance—the political economic ‘rules of the game’—constrain a country’s policy and fiscal autonomy to take necessary actions aligned with deforestation goals.** Those rules push many countries, especially in the Global South, into reliance on extractive industries as a means of sustaining financial stability. Yet these industries, such as mining, forestry, fossil fuels and industrial agriculture, are also the main drivers of ecological destruction. Global economic governance structures form, at least in part, conditions for the persistent ‘land gap’ and the ‘forest gap’ revealed in this report: countries face enduring structural constraints that limit their ability to transition away from fossil fuels and extractive industries, resulting in a dependence on land-based removals to meet climate targets (the ‘land gap’). Meanwhile, these same political and economic pressures restrict tropical forest coun-

tries’ capacity to halt and reverse forest loss and degradation, while countries in the Global North take advantage of inequitable accounting rules to hide their own emissions (‘forest gap’).

Transforming these systems is essential to achieving global climate and biodiversity goals. This requires structural reforms in debt, fiscal and tax policy, trade, capital flows, and credit rating practices. Forest policymaking must move beyond market-based and voluntary instruments and instead confront the structural economic barriers that entrench extractive growth, advancing a reparative, rights-based global economy that serves the many rather than the few.

Conclusion

While the scale of this challenge remains immense, new opportunities to address this entrenched system have begun to emerge. Developing countries, in particular, have begun to be far more forceful in asserting the need for reform of the global financial system to deliver the scale of the transformation required to address the climate and biodiversity crises, while also building climate-resilient economies that meet the needs of their populations.

This report shows that a handful of high-emitting countries’ continue to depend on unrealistic levels of land-based carbon removal, which cannot be achieved without major impacts on livelihoods, land rights, food production, and ecosystems. Moreover, all countries are failing to take seriously global targets to halt and reverse forest loss and degradation by 2030. Most new climate pledges also overlook obligations on the rights of Indigenous Peoples’ and Local Communities’ to lands, territories and resources, representing a missed opportunity to make progress on strengthening tenure reform. Instead, countries must reduce their reliance on land-based removals by accelerating emission reductions across all sectors and prioritizing ecosystem-based restoration over plantations or forest expansion.

To deliver on this ambition, a reckoning is needed on the fundamental importance of nature for maintaining climate stability. This requires shifting focus to how nature, land and forests are treated in our global economic governance. Put simply, without meaningful transformation of this global economic system, the Sustainable Development Goals and the attainment of all Rio Convention goals will remain out of reach. Transformational change that moves towards a restorative, rights-based economic model is both necessary and possible. The rules of our economy are not laws of nature: they were made by people, and people can change them. Together, we can design a new economic model that protects the environment, strengthens communities and creates a fairer, more sustainable future for all.

CHAPTER 1

The Land Gap



Forestry Tasmania's firebombing of multiple areas of native forests in Southern Tasmania, April 2024. Firebombing is a deliberate logging industry practice to incinerate the remains of forests after logging, releasing carbon dioxide, harming wildlife and causing air pollution.

KEY MESSAGES

- **Continued reliance on land-based carbon removal in updated climate pledges**
As of November 2025, governments' climate pledges propose using approximately 1.01 billion ha of land for carbon removal—representing a slight increase from 990 million ha assessed in pledges submitted by December 2023—if fully implemented.
- **Tree planting carries trade-offs**
Reforestation, plantations and energy crops account for almost 50 percent of land pledged for carbon removal. These activities may compete with other socio-ecological goals, including Indigenous Peoples' and Local Communities' rights, food security, biodiversity and ecosystem resilience.
- **Restoration offers low-conflict carbon benefits**
Restoration accounts for nearly half of all pledged land. Regenerating degraded ecosystems can enhance carbon storage while supporting biodiversity, ecosystem integrity, and the livelihoods that depend on them.
- **Land-based mitigation masks limited climate ambition**
A few large emitters account for over 70% of pledged land removals, much of it deferred to mid-century net-zero goals. Delaying immediate decarbonization in favour of future land-based carbon removal places the burden onto future generations and undermines the likelihood of achieving a climate-resilient future.
- **Most new climate pledges overlook rights obligations**
Even with explicit recognition in the Global Stocktake, NDCs have yet to translate human rights and Indigenous rights into concrete, actionable commitments.
- **Conditional pledges can advance equitable climate action**
Conditional pledges from developing countries highlight an opportunity to channel climate finance toward activities that deliver both climate and wider ecological and social benefits.

This chapter examines how countries' climate pledges depend heavily on land-based carbon dioxide removal (CDR). Consistent with past assessments (see Dooley et al, 2022 and 2024), this report shows that countries are continuing to over-rely on the land sector to meet their climate pledges. The analysis shows that around 1.01 billion ha of land are designated for CDR activities, including large-scale forest plantations, reforestation, and the restoration of degraded forests, wetlands, and rangelands—an increase from past assessments. Almost half of this area—441 million ha—would require conversion from other land uses to forests or energy crops, an area equivalent to roughly one-third of the world's cropland area. Such projections reflect unrealistic expectations about the capacity of land to deliver climate mitigation at the scale envisioned. The magnitude of land-based removals implied in these pledges raises concerns about the credibility of net-zero targets that rely heavily on CDR, compared with those focused on rapid emission reductions and limited removals.

1.1 Assessing land area in national climate mitigation targets

The Land Gap considers the scale of land required in the climate pledges of Parties to the United Nations Framework Convention on Climate Change (UNFCCC), by assessing country commitments to land-based CDR through reforestation or land restoration, as well as the total land area needed to achieve these removals relative to other needs and priorities for land use, including food production and biodiversity conservation. The *Land Gap Report 2022* showed that existing available land is already scarce due to these competing needs, and that further reliance on the land sector for carbon removal risks exacerbating existing crises of food security, water provision, biodiversity loss and the rights of Indigenous Peoples and Local Communities (IPs and LCs).

In 2025, as part of the UNFCCC's pledge and review process, countries were required to submit updated Nationally Determined Contributions (NDCs) with more ambitious climate targets. These new pledges provide an insight into national climate ambitions and how these commitments will impact the broader spectrum of land use needs in the future. This report reassessed all pledges to the UNFCCC, as defined by the short-term targets included in NDCs, and those outlined in Long-Term Low Emis-

sions Development Strategies (LT-LEDS), to derive the scale of land required to meet current pledges.

1.1.1 Methods

To assess the reliance on land in national climate pledges, we identified both land-based CDR (including reforestation, afforestation and restoration activities) and technological CDR (bioenergy with carbon capture and storage (BECCS) and direct air capture (DAC)) by reviewing the climate pledges of all countries. The review focused on mitigation pledges and so does not include countries' National Adaptation Plans or land restoration commitments made outside of climate pledges. As in previous reports, bioenergy use outside of BECCS has not been included in the assessment, as this is generally considered within the energy sector in country climate pledges, while the Land Gap has assessed land-based mitigation commitments only.

All submissions to the UNFCCC up to November 2025 have been reviewed, covering 198 Parties. The European Union (EU) and its 27 Member States were assessed using the EU's combined NDC submission. Three countries have not yet submitted an NDC; therefore 168 submissions have been assessed in this report, covering 194 countries plus the EU.¹ Countries were assessed primarily based on their long-term targets, with NDCs assessed for countries without a long-term pledge.²

Since the last published assessment, which included all country submissions to the end of 2023 (Dooley et al., 2024—hereafter LGR2023), **95** new submissions have been made to the UNFCCC, including **79** NDCs and **16** LT-LEDS. Of these, **47** include updated pledges for CDR in the land sector. For **38** countries, these new submissions either replaced or extended the area of the previous analysis of land pledges in LGR2023.

Each pledge was categorized by the description of land management approaches, according to land activities as categorised by the Intergovernmental Panel on Climate Change (IPCC) (see [Table 1.1](#)). These land management approaches also encompass ecosystem condition, from least disturbed to more disturbed (see [Table 1.1](#)). Primary forests have minimal disturbance. 'Old secondary forests' represent regeneration of degraded natural forests; while 'Young secondary forests' refers to reforestation or afforestation. Agricultural landscapes were classified into two broad categories—'Agroforestry', for pledges that referred to regeneration or integrating trees into agricultural landscapes, and 'Silvopasture', for pledges that referred to restoring degraded

¹ Whilst the United States has withdrawn from the Paris Agreement, this withdrawal does not come into effect until January 2026, hence, its climate pledges are included in this assessment.

² Where countries included a long-term pledge, this took precedence in the overall assessment under the assumption that a long-term pledge incorporates activities within a short-term pledge. Where countries had separate 2030 and 2035 pledges, but no long-term pledge, it was assessed whether these two pledges were cumulative, or whether the new (2035) pledge should be considered an update of the 2030 pledge.

rangelands. Mangroves tend to be named directly in pledges. BECCs were classified as energy crops.

Of these categories of activities, the carbon removal achieved through reforestation and afforestation (including forest expansion and plantations) as well as BECCs are likely to require a land-use change,³ while other activities, such as regeneration of forest and agricultural lands, or degraded rangelands and wetlands, remove carbon via the restoration of ecosystems within existing land uses. The distinction between activities that are likely to require land-use change and those that restore ecosystems while maintaining existing land uses is critical to evaluating the ecological and sociological benefits and risks of CDR commitments.

Countries' climate pledges are expressed in a range of different metrics. To identify the scale of land reliance on CDR, we divided commitments into 3 types: direct land area; indirect land area; and emissions (ie: tonnes CO₂ removed).

For less than half (45 percent) of the total land area in pledges, countries directly stated the area intended for climate mitiga-

tion activities—**direct pledges**. More than half of the total land area (52 percent) is pledged as tonnes CO₂ removed—**emissions-based pledges**. In these cases a conversion was made from emissions to land area, based on IPCC removal factors and the forest biome in which the activity would take place—Boreal, Temperate, Subtropical or Tropical—using the Food and Agriculture Organization's (FAO) country-level classifications (FAO-FRA 2025), (see [Table 1.1](#) for global average removal factors). For the remaining land area found in pledges, activities were expressed in different ways, such as proportion of existing forest area or total country area, or a quantity of trees to be planted, which we called **indirect pledges**. For these, forest and country area data from the World Bank was used to calculate total pledge area, while calculations of the number of trees per hectare made use of Crowther et al. (2015), which gives tree density values for different forest biomes. Potential uncertainty in quantifications of indirect pledges arises from assumptions made in interpreting country statements. For emissions-based pledges uncertainty in IPCC removal factors was accounted for by applying a formula using the standard deviation. For full discussion of methodology including uncertainty treatment see Dooley et al., (2024).

3 FAO defines land-use change as the conversion of one land use, such as agriculture, to another, such as plantations. Or the permanent transformation of forest to agriculture or urban areas, which is specifically defined as deforestation. This report also includes the conversion of land uses, such as agricultural crops for food to energy crops for BECCs, as a change of land use.

Table 1.1 **IPCC land use activity categories and removal factors**

Global average removal factors for above-ground carbon are shown. Biome averages are used for assessing land area in climate pledges.

LESS DISTURBED MORE DISTURBED	Land management approach	IPCC activity type	Removal Factor (Mg CO ₂ per ha per year)
	Protection	Primary forest (not included as CDR)	1.55
	Restoration (restoring degraded forests, agricultural lands and wetlands)	Old secondary forest	3.39
		Mangroves	15.40
		Silvopasture	2.62
		Agroforestry	1.49
	Reforestation and afforestation (land-use change for forest expansion or tree-planting)	Young secondary forest	8.50
		Plantation	14.40
	BECCS (land-use change for energy crops)	Energy crops	17.94
	DACS	No land area assumed	

Source: Authors' own compilation based on removal factors drawn from IPCC, 2019; Harris et al., 2021; and Li et al., 2020

1.2 Land Gap threatens climate and development goals

The assessment of all country pledges up to November 2025 found a total land area of **1 013 (889-1 136) million ha**. Of this figure, 441 **(415-466) million ha** would require a land-use change to implement (based on pledges for reforestation and afforestation, plantations and energy crops for BECCS). Another **572 (475-670) million ha** of activities are pledged for the restoration of degraded forests, agricultural lands and other ecosystems. These figures assume full implementation of country pledges. The range included in these figures represents the uncertainty around IPCC removal factors, as explained above. **Figure 1.1** shows the global distribution of these pledges.

LGR2023 showed that the total land required to meet biological carbon removal in national climate pledges equalled 990 (892-1 087) million ha, if those pledges are met in full. Of this total, 435 (395-475) million ha require the use of reforestation and afforestation, and a further 555 (466-644) million ha require the restoration of degraded forests, agricultural lands and other ecosystems.

Although the increase in pledged land area is small, the results show that countries continue to rely on land-based carbon removal at unrealistic levels. New commitments since January 2024 add only modestly to the global total of land area for car-

bon removal. Major submissions, such as those from Indonesia and Ethiopia, appear to restate existing long-term pledges rather than expand them, while Australia's new 2050 target maintains similar land-based carbon removal levels as its previous plan. Overall, recent pledges reinforce the same strategy of dependence on land for carbon removal.

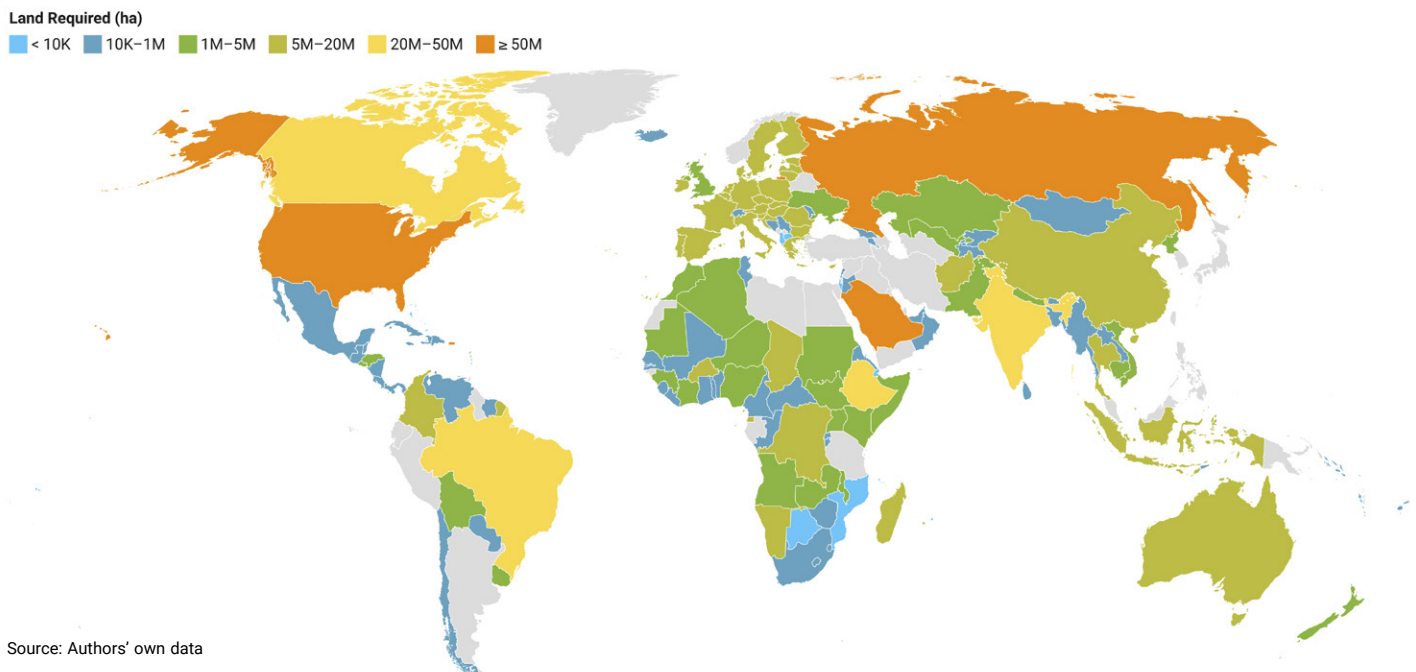
1.2.1 Impacts of different land-based removal commitments

When comparing earlier and updated pledges, there is little change in the types of land-based CDR to which countries have committed. **Figure 1.2** shows how commitments across land-use activities have evolved between the LGR2023 and 2025 assessments, distinguishing between land-use change and restoration activities and indicating the share of conditional pledges (see also **Figure 1.7**).

The overall increase in pledged land area comes mainly from forest-related commitments, including both forest expansion and restoration. New pledges for reforestation and afforestation—reflecting the expansion of young secondary forest area relative to the previous assessment—have been made by several countries, with Angola, Burkina Faso, and Madagascar as major contributors. Additional pledges for the restoration of degraded forests (old secondary in **Figure 1.2**) are found in the pledges of Angola, Australia, Burkina Faso, Indonesia, and Madagascar. Other activity

Figure 1.1 Land area required to deliver country climate pledges submitted to the UNFCCC

Grey denotes countries that have not included land-based CDR in their climate pledges.



types have remained largely unchanged, except for a small decline in the area pledged for BECCS.

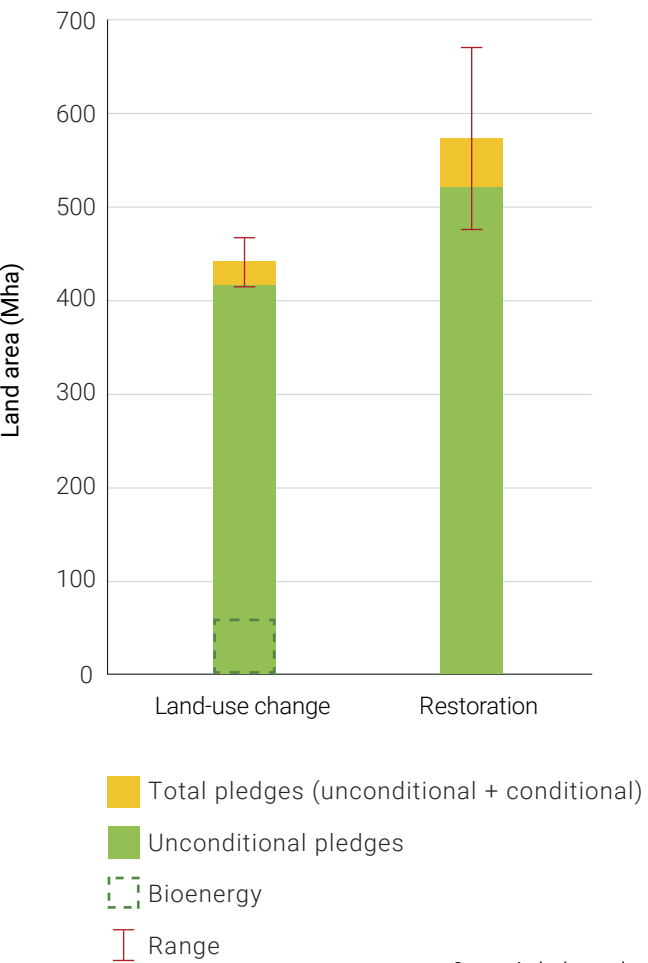
However, not all land based mitigation actions are created equal. Some actions pose greater risks to biodiversity, food production and human rights. Three of the seven activity types— young secondary forests, plantations, and BECCS—require land-use change through forest expansion, establishment of new plantations, or cultivation of energy crops, all of which can compete with other ecological and social priorities (Braun et al., 2025). Such changes risk driving biodiversity loss, undermining food security, and threatening the rights and livelihoods of IPs and LCs (Dooley and Kartha, 2018). The other four activities— restoration of degraded forests, mangroves, agroforestry, and silvopasture—focus on regenerating ecosystems. Prioritizing these restoration approaches over land conversion can better align climate, biodiversity, and food security goals (Di Sacco, 2021; Fleischman et al., 2022) With more than half of pledged land devoted to restoration, these actions could support the 2030 Global Biodiversity Framework—provided they also uphold human rights and Indigenous peoples’ rights to land, territories and resources.

Pledges for technological CDR through BECCS have declined slightly, from 61 million ha in LGR 2023 to 58 million ha in the updated assessment. This reduction is mainly due to Australia no longer specifying BECCS in its 2050 target, after previously pledging 43 million tonnes of carbon removals via BECCS—estimated to require about 2.6 million ha of land. One new quantifiable BECCS commitment has been added, from Serbia, covering 10,800 ha. The remaining countries with quantifiable BECCS pledges are Canada, Switzerland, the United Kingdom, and the United States.

Reliance on BECCS, often presented as a key negative emissions technology, risks undermining the ambition of climate pledges. Large-scale deployment could transgress planetary and social boundaries through impacts on biodiversity, food security, and land-use competition (Deprez et al., 2024). Life-cycle assessments show that net carbon removal is highly uncertain once indirect land-use change and supply-chain emissions are considered, while assumed high biomass yields and conversion efficiencies may not be achievable in practice (Fajardy & Mac Dowell, 2018; Harper et al., 2018). Heavy dependence on BECCS therefore risks delaying near-term emissions reductions and overstating the sustainable potential for CDR.

Quantifying the demand for land from bioenergy remains highly uncertain, depending on feedstock type, conversion processes, and plant efficiencies. None of the national pledges specify these parameters. Within this uncertainty, land requirements may be either over- or underestimated, while the availability of

Figure 1.2 Land area by activity type in climate pledges



Source: Author's own data

waste feedstocks to reduce direct land-use pressures remains very limited. See Dooley et al., (2024) for details on estimation of land area for BECCS pledges.

1.3 Missed opportunities for equity, ambition and rights

These results highlight the risks of net-zero targets that rely too heavily on land-based CDR, where expected future removals may delay urgent emission reductions. Excessive dependence on land for mitigation can also displace other land uses and users, undermining the rights of IPc and LCs. Prioritizing restoration over new land conversion offers more equitable outcomes for people, biodiversity, and food security. Examining conditional pledges reveals how such benefits could be realised, while underscoring the need for greater transparency in countries’ land and climate commitments.

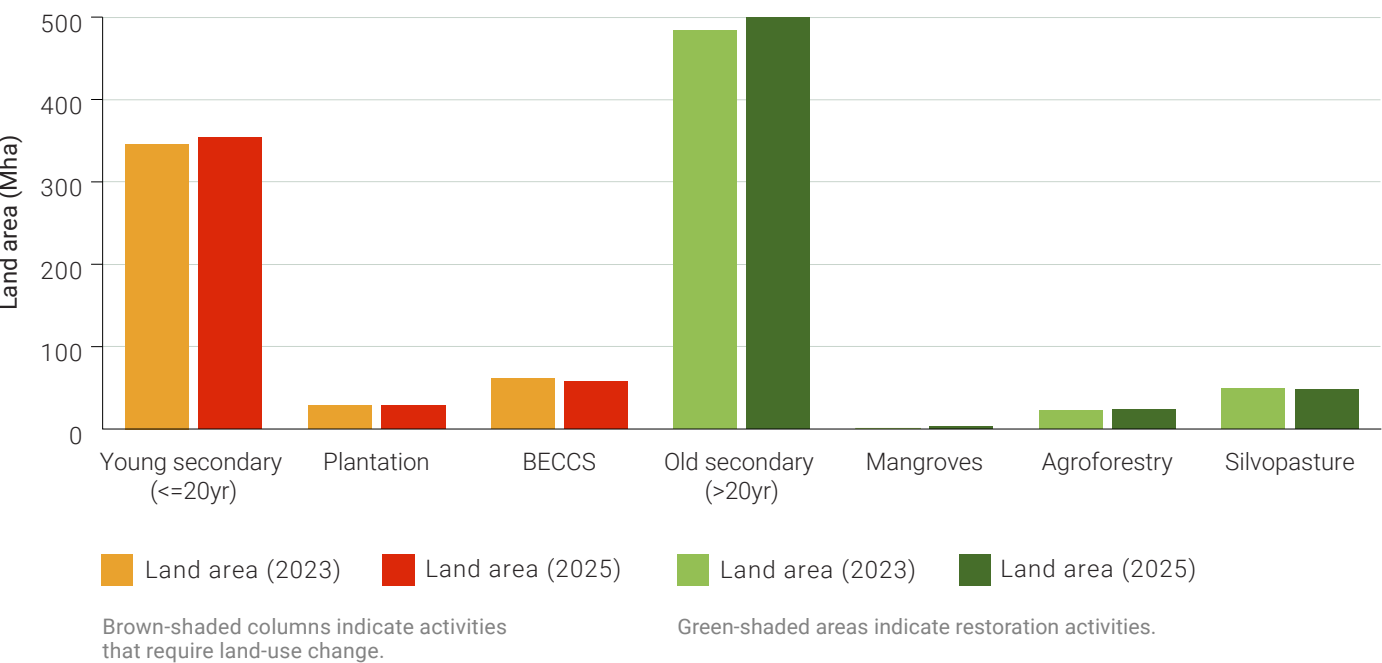
The next section explores these implications of the Land Gap—focusing on mitigation delay, equity and ambition in conditional pledges, and the missed opportunity to strengthen mitigation through the recognition of rights.

1.3.1 Land pledges reveal mitigation delay

A number of high-emitting industrialized countries are responsible for an outsized share of the total land area required to meet pledges for CDR. Together, Canada, Russia, Saudi Arabia and the United States account for over 70 percent of the global total area required for land-based carbon removals in pledges. The pledges of Saudi Arabia and the United States also require large areas of land-use change (See [Figure 1.4](#)), although the pledge of the United States is not expected to be implemented.

These largest land area pledges also occur later in the century and are highly influenced by a few countries (see [Figure 1.5](#)). The reliance on land area later in the century is for both restoration and land conversion (see [Figure 1.6](#)). To avoid double-counting of data, the Land Gap assessment made use of either short-term or long-term pledges from each country. Of the pledges assessed, 92 relate to short-term NDC commitments (i.e. 2030 or 2035), while 32 are part of the country’s 2050, or net-zero targets (found in LT-LEDS). While significantly more countries are assessed using short-term pledges, the land area required for 2050 pledges is far greater. This reflects minimal change from the previous LGR2023 assessment where results continue to be dominated by the large reliance on CDR by a number of wealthy high-emitting countries out to 2050 and 2060 (see [Table 1.2](#)).

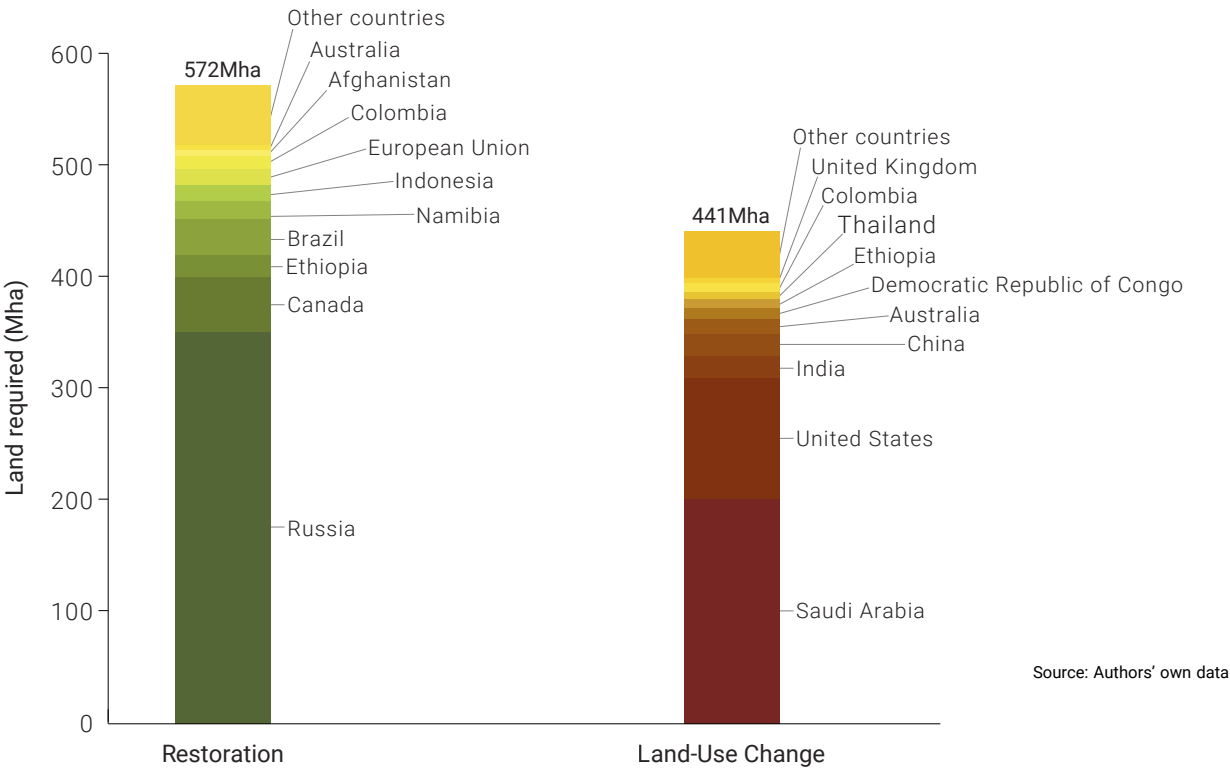
Figure 1.3 Land Gap change in new climate pledges by activity type



Source: Authors’ own data

Figure 1.4 **Land required—largest 10 CDR pledges by area**

Brown-shaded columns indicate activities that require land-use change.
Green-shaded areas indicate restoration activities.



Source: Authors' own data

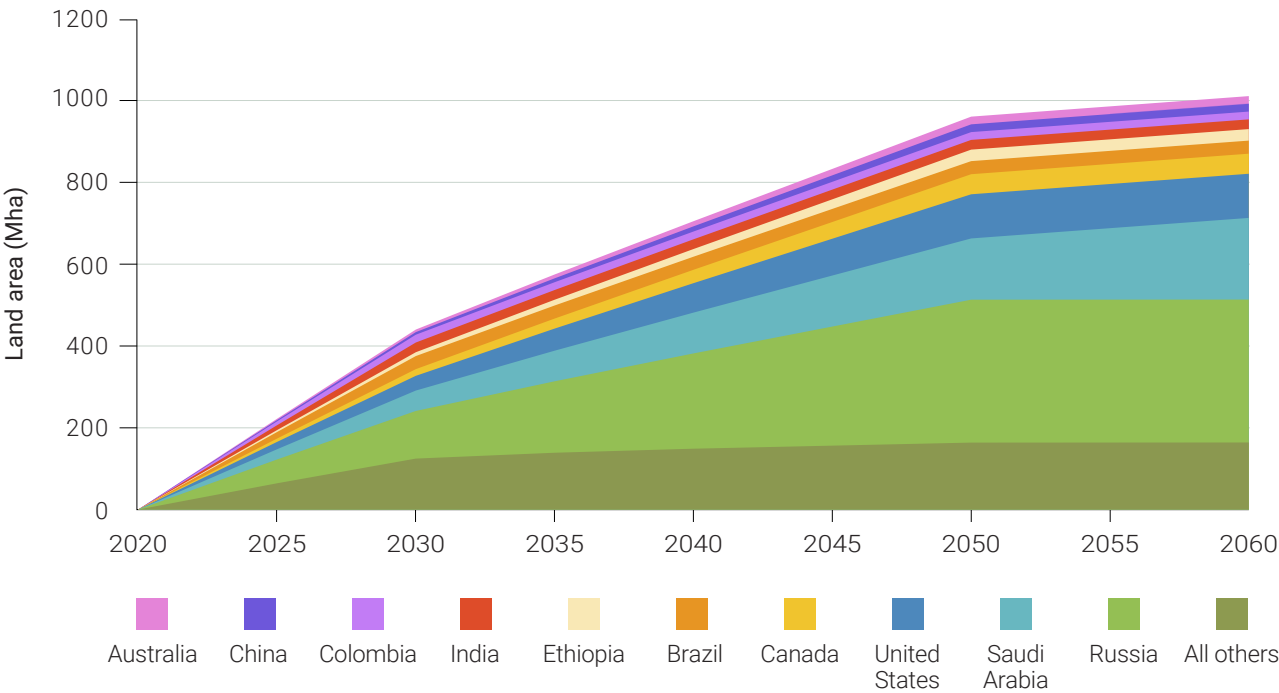
Table 1.2 **Countries with the largest pledges by land area and date of target**

Country	Land required in pledges (Mha)	Year of pledge
 Russia	350	2060
 Saudi Arabia	200	2060
 United States	108	2050
 Canada	49	2050
 Brazil	32	2030

Source: Authors' own data

Figure 1.5 **Distribution of CDR pledges in time and by country**

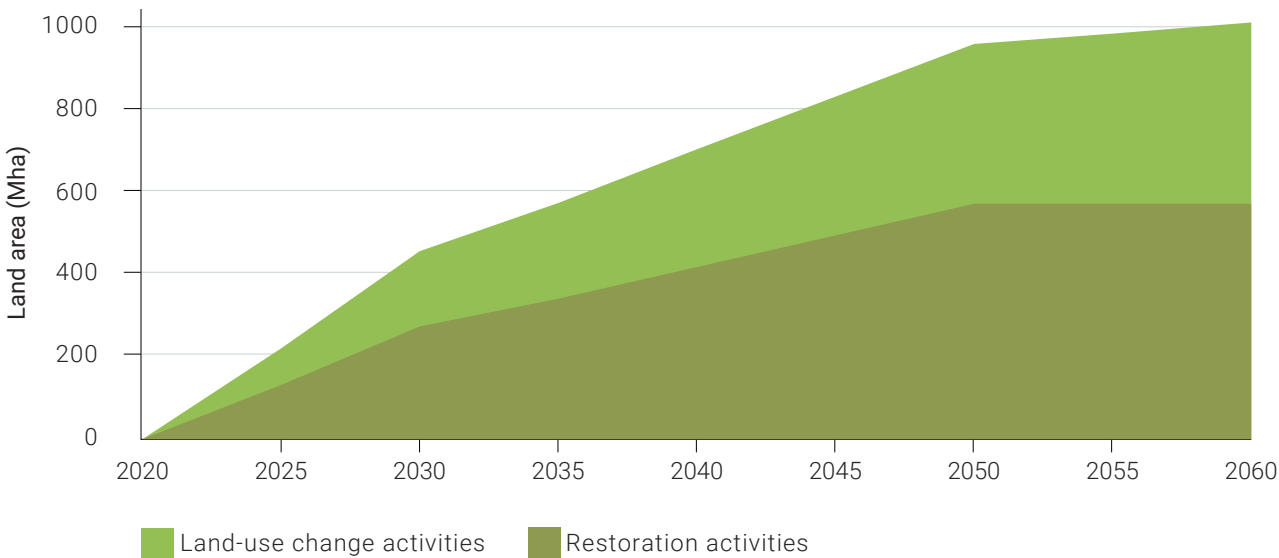
The ten countries with pledges requiring the largest land areas are shown individually. The remaining countries are grouped under 'All others'.



Source: Authors' own data

Figure 1.6 **Distribution of CDR pledges over time**

Light green-shaded area shows pledges based on activities that restore existing land uses, while dark green-shaded area shows pledges based on activities that are more likely to require land-use change.



Source: Authors' own data

In order to give the world the best chance of limiting late century warming to 1.5°C, mitigation efforts should occur as soon as possible. Emission reductions made before 2030 are the critical determinant of our ability to limit average global temperature increase to 1.5°C or 2°C (IPCC, 2022). Based on current assessments of country NDCs and LT-LEDS, best estimates of future global temperature rise are **1.9°C** (1.8°C–2.0°C) above pre-industrial levels—if countries meet their emissions targets on time and in full and there is no backsliding on current policy commitments within these NDCs (Climate Resource, 2025). But the results presented in this chapter suggest that countries are relying heavily on land-based carbon removals, making achievement of economy-wide targets more difficult.

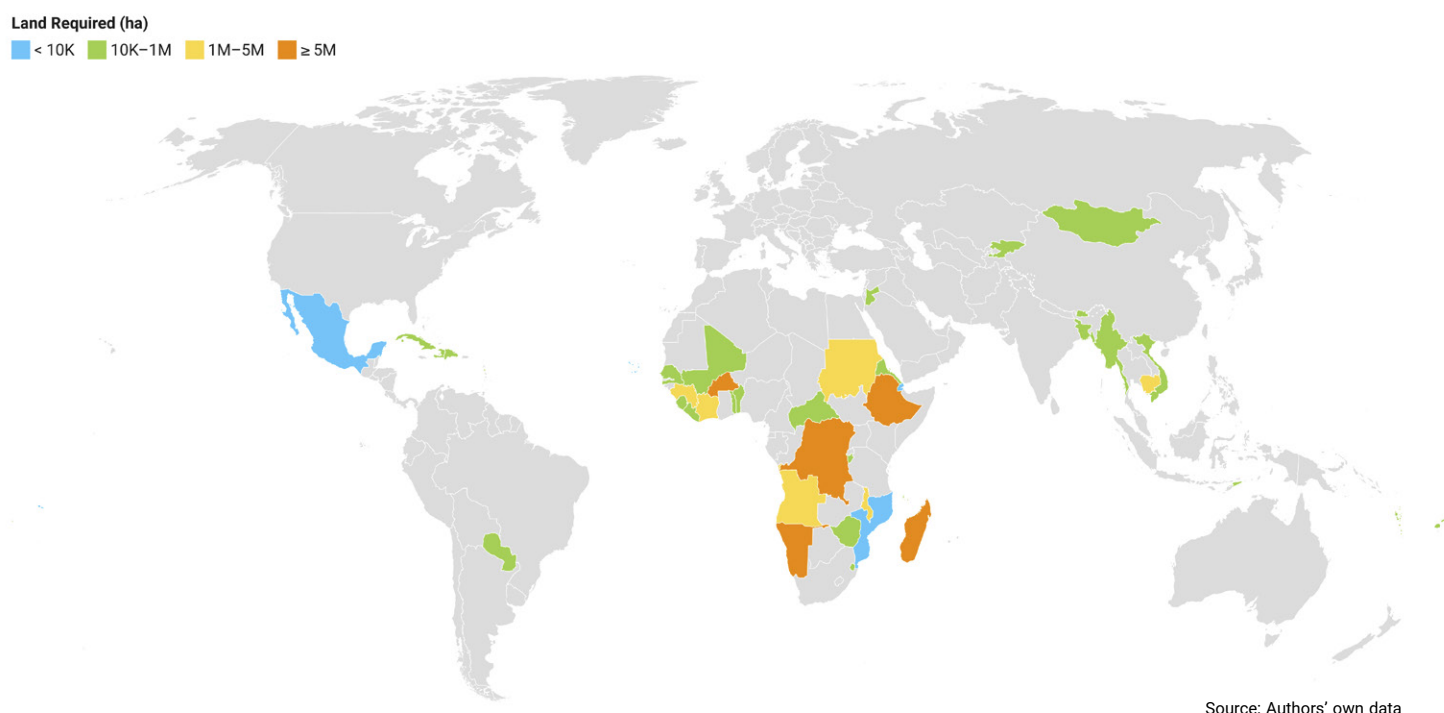
Recent studies by land accounting experts (Roman-Cuesta et al., 2025), including the FAO (Tubiello et al., 2025), have also found that many countries are already overestimating current removal rates in the land sector. Relying on future carbon removals as an “escape hatch” for delayed emission cuts is a high-risk strategy, particularly if anticipated removals fail to materialize. Such dependence on carbon dioxide removal can also deter or postpone necessary decarbonization efforts (McLaren & Markusson, 2020). Countries should instead pursue more ambitious emission reductions across all sectors, including land-based mitigation, in an integrated, equitable, and rights-based manner.

1.3.2 Conditional pledges as a pathway to equity and ambition

Achieving equitable and ambitious outcomes from land-based mitigation hinges on acknowledging the conditional nature of many developing countries’ pledges and the systemic barriers that limit their implementation. The Paris Agreement allows developing country Parties to include targets that depend on financial resources, technology transfer, and capacity-building support (UNFCCC, 2015). Such “conditional pledges” (Pauw et al., 2020) distinguish between actions achievable with national means and those requiring international cooperation and support. Conditional pledges provide a concrete example of how ambition is constrained not by a lack of commitment, but by the structural financial conditions shaping countries’ capacity to act.

Pledges that are explicitly conditional on climate finance account for more than 75 million ha of the total land area found in countries’ climate pledges for this assessment. Unconditional pledges from those countries that also have conditional pledges amount to 15 million ha. While this number is small compared with the total land area (which is dominated by high-emitting industrialized countries), conditional pledges are almost exclusively from tropical countries in the Global South. **Figure 1.7** shows that conditional pledges are concentrated in sub-Saharan Africa, as well as parts of Latin America and Southeast Asia.

Figure 1.7 **Distribution of conditional pledges for land-based CDR activities**



These pledges highlight more than project-level dependencies—they expose the structural inequities in international financial and economic governance that limit fiscal space for many developing countries (Althouse and Svartzman, 2024). High debt burdens, lost revenue from cross-border tax abuse and illicit financial flows, as well as unequal terms of trade constrain the ability of these countries to mobilize domestic resources for social and environmental priorities, as outlined in Chapters 3-7. Without reforms to these underlying systems—alongside predictable, accessible, and non-debt-creating climate finance—countries with high mitigation and restoration potential will remain unable to implement their commitments at scale. Addressing these conditions is therefore key to unlocking ambition and aligning land-based mitigation with equity and sustainable development, themes explored further in later chapters.

Importantly, of the 75 million ha covered by conditional pledges, 51 million ha (68 percent) are pledges for restoration activities, while the remaining 24 million ha (32 percent) are for reforestation. This highlights the opportunity to direct limited climate finance toward activities that deliver both climate and broader ecological and social benefits. [Table 1.3](#) lists the countries with the largest conditional pledges in terms of land area, and the proportion of these pledges that would require land-use change.

Within their LT-LEDS, some countries indicate different pledges based on scenarios that may also lead to a higher or lower

estimate of land use required to meet targets. This report's assessment if all countries' *lowest* scenarios are followed (both in LT-LEDS and unconditional pledges) indicates a total of **834** (731-938) million ha, including **505** (407-603) million ha for restoration activities and **330** (324-335) million ha for land-use change activities.

1.3.3 Weak commitments to rights and tenure—a missed opportunity

An important outcome of the first Global Stocktake in 2023 was recognition of the importance of human rights obligations and the rights of Indigenous Peoples when considering climate action (UNFCCC, 2023a). The *2025 NDC Synthesis Report* revealed an increase in the number of countries that acknowledge the vital role of Indigenous Peoples and Local Communities in their NDCs. However, the extent to which countries make clear commitments related to strengthening tenure and natural resource management rights for IPs and LCs, alongside Afro-descendent Peoples (ADP), in new NDCs, and the extent to which commitments are supported by clearly defined and measurable targets or actions is not reported.

As noted in *The Land Gap Report 2022*, the land that is being pledged for CDR is neither unclaimed nor unused. Indigenous Peoples manage or have tenure rights over at least 3.8 billion ha, representing over a quarter of the world's land surface (Garnett, 2018). Globally, only 1.9 billion ha (18 percent) of land area is

Table 1.3 **Countries with the largest conditional pledges by land area**

Country	Conditional pledge (Mha)	Total pledge (Mha)	Conditional proportion pledge	Proportion requiring restoration	Target time frame of pledge
Ethiopia	22.6	28.2	80%	64%	LT-LEDS
Namibia	14.2	15.8	90%	99%	NDC
Democratic Republic of Congo	10.0	11.0	90%	18%	NDC
Burkina Faso	5.9	5.9	100%	61%	LT-LEDS
Madagascar	5.9	5.9	100%	72%	NDC
Côte d'Ivoire	3.6	4.0	89%	94%	NDC
Angola	2.5	4.6	54%	50%	NDC
Guinea	2.1	2.1	98%	97%	NDC
Sudan	1.4	1.7	85%	50%	NDC
Malawi	1.4	1.9	72%	58%	NDC

Source: Authors' own compilation

formally recognized as either owned by or designated for IPs and LCs. The Path to Scale initiative, an informal network of donors, financial mechanisms, and their intermediaries aiming to scale-up funding and other enabling factors, has set a goal of formal recognition of Indigenous Peoples' tenure rights across at least 400 million additional hectares of tropical forest by 2030, raising the total area of forests owned by or designated for local peoples in low and middle income countries from the current 30 percent to over 50 percent (RRI and RFN, 2024). In the COP26 Forest Tenure Pledge, launched in 2021 to advance land tenure rights for IPs and LCs in tropical forest countries, a group of 22 donors committed USD 1.7 billion over five years (2021-2025) to provide financial and technical support (Forest Tenure Funders Group, 2024). Quantitative area-based targets to increase the amount of land under Indigenous tenure are expected to be announced at COP30.

Recognition of Indigenous Peoples' rights over their lands, territories and resources is one of the most cost-effective and sustainable strategies to deliver carbon mitigation. IPs and LCs manage at least 17 percent, or 293 061 million tons of the total carbon stored in the forestlands of the 64 countries studied—equivalent to 33 times the global energy emissions of during the study year (RRI, et al., 2018). However, competing uses of land already constitutes a significant threat to IPs' and LCs' territories. Significant increases in demand for land, as envisioned to meet climate mitigation pledges in the Land Gap, will invariably cause conflicts with the people already living in and using this land.

Mitigation pathways that depend on unproven or unsustainable levels of land carbon removals represent a backslide rather than progress toward net zero.

Within new NDCs submitted since January 2024, 41 countries make broad references to human rights obligations. These references are most often couched in general terms—such as commitments to uphold “human rights obligations” or “fundamental rights to life”—without articulating how these principles connect to binding duties under existing international legal frameworks. Less than half of these countries go further to include references to specific international commitments on human rights and the rights of IPs' and LCs', such as the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), the Indigenous and Tribal Peoples Convention (ILO 169), and, more recently, the International Court of Justice's 2025 advisory opinion on states' obligations in respect of climate change. Such explicit linkages signal an emerging recognition that climate action must be grounded in international legal norms governing the protection of Indigenous and local community rights, but they remain the exception rather than the rule. A further 20 countries reference Indigenous and traditional knowledge, primarily in the context of adaptation planning.

When considering the extent to which countries make clear reference to strengthen or expand IPs' and LCs' tenure and natural resource management rights, only 10 countries make clear commitments. These commitments need to be evaluated on the basis of strong national legal frameworks for human rights and recognition of community tenure rights, which is beyond the scope of this report. For example, only 8 countries explicitly refer to the principle of Free, Prior and Informed Consent (FPIC), which is critical to respect Indigenous Peoples' autonomy and decision-making authority.

Despite these encouraging examples, very few NDCs set out clear, measurable targets or concrete actions to implement and monitor human rights obligations or the rights of Indigenous Peoples. In most cases, references to rights, tenure, and Indigenous knowledge systems remain aspirational, underscoring the need for future NDC cycles to move beyond acknowledgment towards enforceable commitments that embed human rights, Indigenous governance, and community-based resource management within the design, implementation, and evaluation of climate action.

More analysis is required in this space, but this limited study indicates that NDCs are not adequately considering the rights of IPs and LCs, missing an opportunity for cost-effective and sustainable climate mitigation action. Moreover, the lack of clearly stated commitment to existing human rights obligations to which many countries are signatories—and particularly the very few countries that reference FPIC—suggest a poor understanding of the risks of increased competition for land associated with the current Land Gap.

1.4 Conclusion

Countries continue to have an over-reliance on land-based CDR for their climate commitments

This updated assessment shows that, despite new pledges, countries' dependence on land-based carbon removals remains as large as—or larger than—at the time of the first Land Gap Report. The overall trajectory since LGR2023 indicates that the gap is widening: rather than signalling higher ambition, increased reliance on future CDR can mask delayed or insufficient action to cease emissions from fossil fuels and land clearing. Mitigation pathways that depend on unproven or unsustainable levels of land carbon removals represent a backslide rather than progress toward net zero.

The findings suggest that the land area pledged for carbon removal—now exceeding 1 billion ha—continues to far outstrip what is feasible or sustainable. This raises serious concerns about the realism of many countries' targets and the likelihood that CDR will materialise at the scale and pace projected. Over-estimating the role of land-based removals in national plans may lead to an underestimation of future global temperature rise, if fossil fuel and industrial emissions reductions are deferred.

Implementation of pledges that would entail large-scale land-use change also risks undermining food security, biodiversity, and human rights. To avoid these trade-offs, countries should prioritise the restoration of degraded ecosystems and the protection of remaining forests, rather than expanding land-based CDR as an offset for continued emissions. Land sector targets must be based on transparent, feasible plans grounded in ecological limits and rights-based approaches.

The following chapter examines how pledges to halt deforestation and degradation could begin to close this gap—if implemented effectively and equitably.

CHAPTER 2

The Forest Gap



Clearcut forest
in northwest
Ontario, Canada

KEY MESSAGES

- **Limited ambition despite high potential**
Commitments to halt and reverse deforestation and forest degradation remain limited in national climate commitments, despite their capacity to deliver rapid emissions reductions and restore ecosystem integrity.
- **The growing 'forest gap'**
A significant gap exists between current deforestation and degradation rates, the reductions required to achieve the 2030 global goal of halting and reversing forest loss and degradation, and existing national pledges. As of November 2025, the combined 'forest gap' was almost 20 million ha.
- **Forest loss undermines climate and biodiversity goals**
Approximately one-quarter of global forest cover has been lost. Protecting and restoring forests remains among the most cost-effective and immediately available mitigation options, yet annual rates of forest loss continue to rise, undermining progress on both climate and biodiversity targets.
- **Forest degradation: the hidden crisis**
Forest degradation occurs at rates even higher than deforestation, although estimates vary depending on the types of impact assessed. Strengthened commitment and capacity to monitor, report and address degradation is essential to quantify emissions and safeguard ecosystem integrity.
- **Accountability and equity in forest protection**
Improved accounting to track different states of ecosystem condition and monitor a range of forest degradation characteristics is critical to guide fair and effective action. A global accountability framework is needed to ensure transparent, consistent and equitable standards for defining, monitoring and reporting forest protection.

RIVER JORDAN FOR NRDC

Introduction

Protecting and restoring forests are critical for slowing global warming and contributing to achieving the 1.5 °C temperature goal of the Paris Agreement. This goal can only be achieved by halting emissions from both fossil fuels and from the loss and degradation of forests, which means protecting the carbon stocks in standing forests (Pan et al., 2024). The contribution of protecting and restoring forest carbon stocks to climate mitigation has often been overlooked or underestimated. However, these actions present the most effective land-based strategies for maintaining and increasing a stable and resilient biosphere carbon reservoir. Protection and restoration of existing forests provide near-term, low-cost and feasible mitigation strategies, while also achieving climate adaptation and development benefits (Roe et al., 2021). Protecting forests has synergistic roles, supporting inter-related goals for the climate, biodiversity and

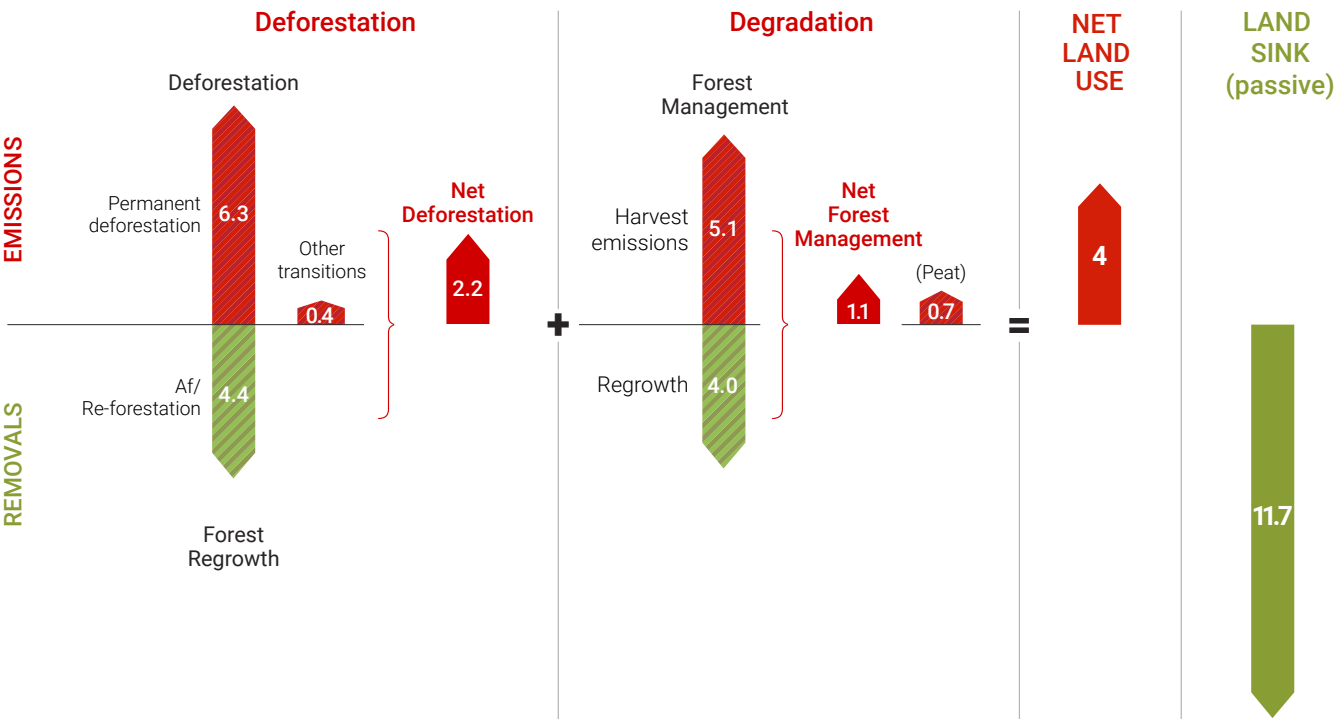
ecosystem functioning that maintain the life-sustaining system of the planet (Barber et al., 2020).

Despite several decades of high-level political effort to tackle deforestation, particularly in the tropics, forest loss continues apace, with 7.2 million ha of deforestation in 2024. The area of tropical moist forests degraded annually is estimated to be 30 percent higher than the area deforested in 2024 (FDAP, 2025). Deforestation and forest degradation are large sources of GHG emissions, with deforestation (permanent forest loss) contributing 3.7 Gt CO₂ per year globally and degradation by wood harvesting an additional 1.1 Gt CO₂ per year (Friedlingstein et al., 2025). Under current reporting standards, wood harvest emissions are reported as a net figure, which obscures their true impact (see Figure 2.1). Land-use change emissions rose by 0.5 Gt CO₂ in 2024, driven by fire linked to deforestation and degradation (Friedlingstein et al., 2025). These emissions estimates

Figure 2.1 Role of forests in the global carbon cycle

Fluxes are annual rates (Gt CO₂ per year) as a decadal average (2014–2023). Gross fluxes of emissions and removals are shown as hatched bars and net fluxes as solid bars. Net land use has been separated into deforestation and degradation components resulting from human activities. The emissions and removals included in net deforestation include equivalent losses and gains due to shifting cultivation. Other transitions are included in the net deforestation flux. Degradation is separated into the gross fluxes of harvest emissions

from decomposition and combustion of debris and wood products, and regrowth post-harvest. The difference is the net emissions from forest management including wood harvest. Emissions from peat drainage and fires are included in degradation. Net Land Use refers to the net flux from deforestation and degradation. The terrestrial passive sink refers to removals attributed to increased forest growth in response mainly to the CO₂ fertilization effect and increased nitrogen deposition.



Source: Adapted from Friedlingstein et al., 2025

do not fully capture the impacts of forest degradation inclusive of logging, fire, edge effects and fragmentation, with regional studies in boreal, temperate and tropical forests showing forest degradation contributing more to carbon loss than deforestation (Ceccherini et al., 2020; Qin et al., 2021; Yu et al., 2024). If emissions from deforestation and degradation were reduced or eliminated, the net land sink would be significantly greater in contributing to removals of CO₂ from the atmosphere.

Human activities create feedbacks where deforestation increases forest degradation; degraded forests become more vulnerable to disturbance, and this cycle drives further deforestation, land-use change and emissions that exacerbate climate change. The 2024 edition of *The State of the World's Forests Report* found that nearly 75 percent of the global forest area had been degraded and transformed (FAO, 2024), with thresholds for functional biospheric integrity crossed on 60 percent of global land area (Stenzel et al., 2025).

2.1 Assessing the ‘forest gap’

Countries have set a target of halting and reversing both deforestation and forest degradation by 2030 in the first Global Stocktake of the Paris Agreement (UNFCCC, 2023a) and the 2030 Agenda for Sustainable Development (UNFF, 2024), which are extensions of multiple previous political declarations and commitments. Yet assessments of rates of deforestation and degradation show the current rate of deforestation is 63 percent

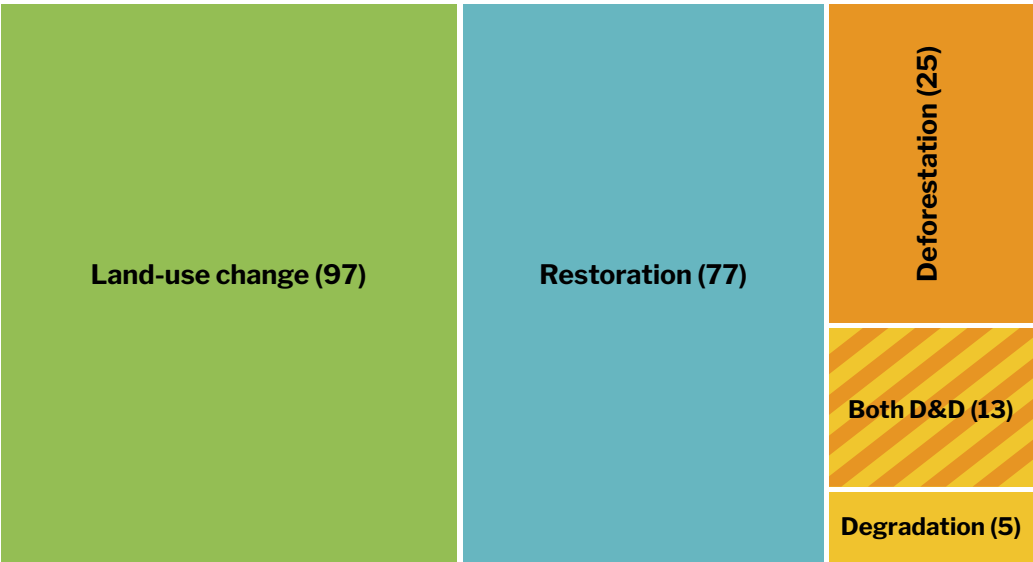
higher than required for the timeline of halting deforestation by 2030 (FDAP, 2025).

The ‘forest gap’ assessed here represents the difference between the current rates of deforestation and degradation, the rate of reduction required to meet the 2030 target of halting deforestation and degradation globally, and the pledges made by countries to reduce deforestation and degradation. Rather than assuming a linear continuation of the rate of reduction in degradation without an indication of how this would be achieved, this report assesses the gap between commitments in countries’ climate pledges and the zero target by 2030. This gives an estimate of whether and how the target may be achieved and the relative differences between countries’ ambition.

Our analysis of countries’ climate pledges (NDCs and LT-LEDs) submitted to the UNFCCC up to November 2025, shows that 38 countries have made explicit commitments to tackle deforestation. Eighteen countries have commitments that specifically mention efforts to reduce degradation. Of these, only 13 countries have made commitments related to both deforestation and forest degradation. This compares poorly with commitments on forest restoration (77 countries) and reforestation (97 countries), as reported in Chapter 1 (see [Figure 2.2](#)).

The review also indicates that climate pledges provide limited information of the areal extent and location of land that may be protected under plans to reduce deforestation and degradation. Our review of NDCs and LT-LEDs calculates that they contain pledges related to protecting 3.9 million ha from deforestation

Figure 2.2 **Country pledges for carbon removal (land-use change and restoration) vs forest protection (reduced deforestation and degradation)**



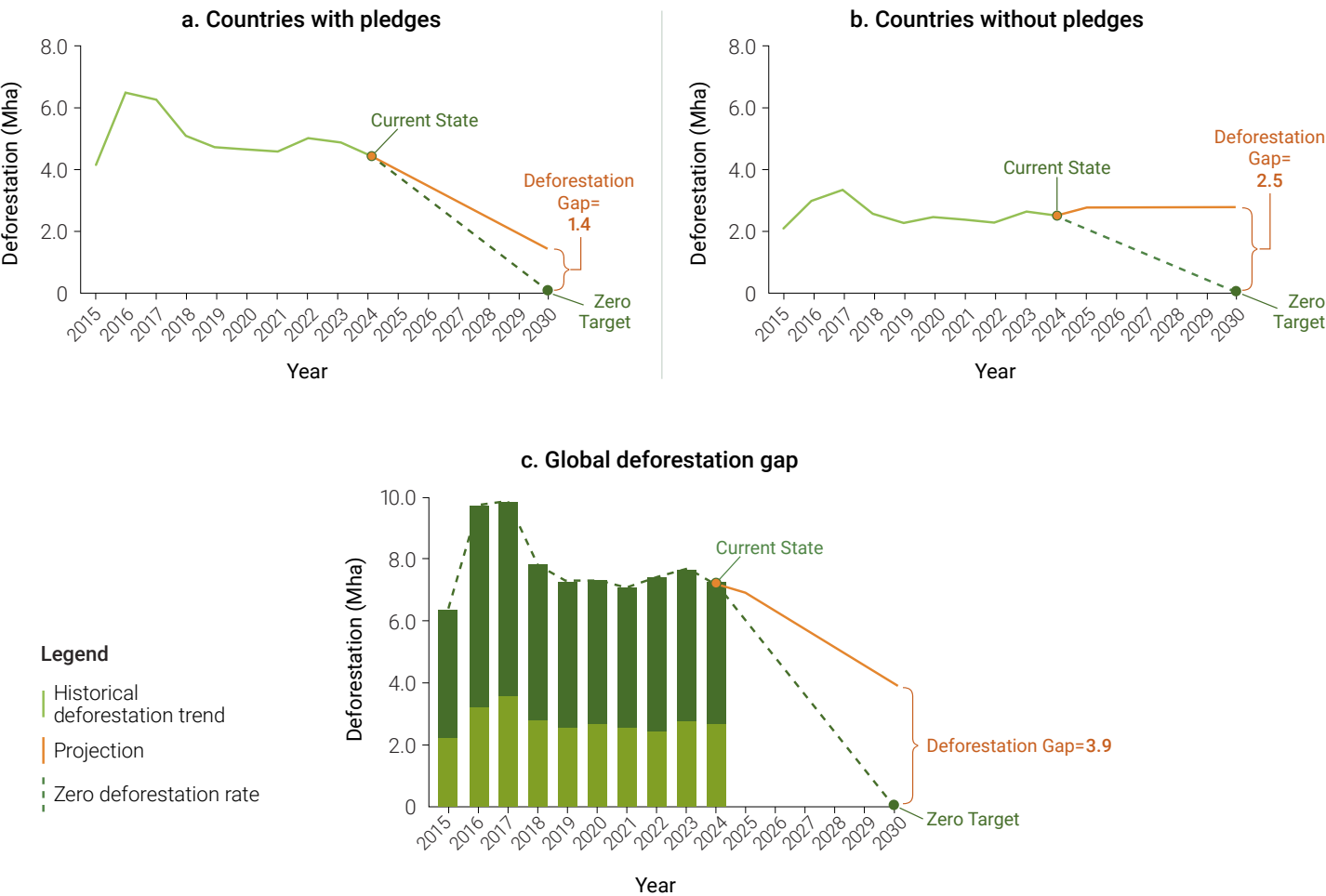
Source: Author's own data

and 2.5 million ha from degradation. If implemented, these pledges would see deforestation rates reduced from the decadal average of 7.8 million ha per year to 3.9 million ha per year for deforestation, and 15.7 million ha per year for degradation. When compared with current rates of deforestation and forest degradation, this results in a gap of 19.8 million ha compared with halting forest loss and degradation by 2030. This analysis includes the United States, whose 2 million ha degradation pledge will raise the forest gap to 21.8 million ha upon its withdrawal from the Paris Agreement in January 2026.

As of 2024, countries that have deforestation pledges in NDCs were responsible for over 5 million ha of forest loss, representing almost 65 percent of the global total. Of this, more than one-third occurred in Brazil, and almost 20 percent in Indonesia. In 2030, this will be reduced to 1.4 million ha if all these countries meet their pledges to halt or reduce deforestation (see [Figure 2.3a](#)). Countries contributing over 2.5 million ha per year to current global deforestation rates do not have deforestation pledges included in their submissions to the UNFCCC (see [Figure 2.3b](#)).

Figure 2.3 **The global deforestation gap**

The historical deforestation trend (green line) and projection (orange line) for a) countries with pledges to reduce or halt deforestation, b) countries without pledges, and c) all countries (dark green represents countries with pledges, light green is countries without). For countries without pledges, the 10-year trend is assumed to continue to 2030. The global deforestation gap is 3.9 million ha per year, representing the rate that exceeds the target of zero deforestation by 2030.



Source: Authors' own analysis using tree-cover loss data from GFW (2025)

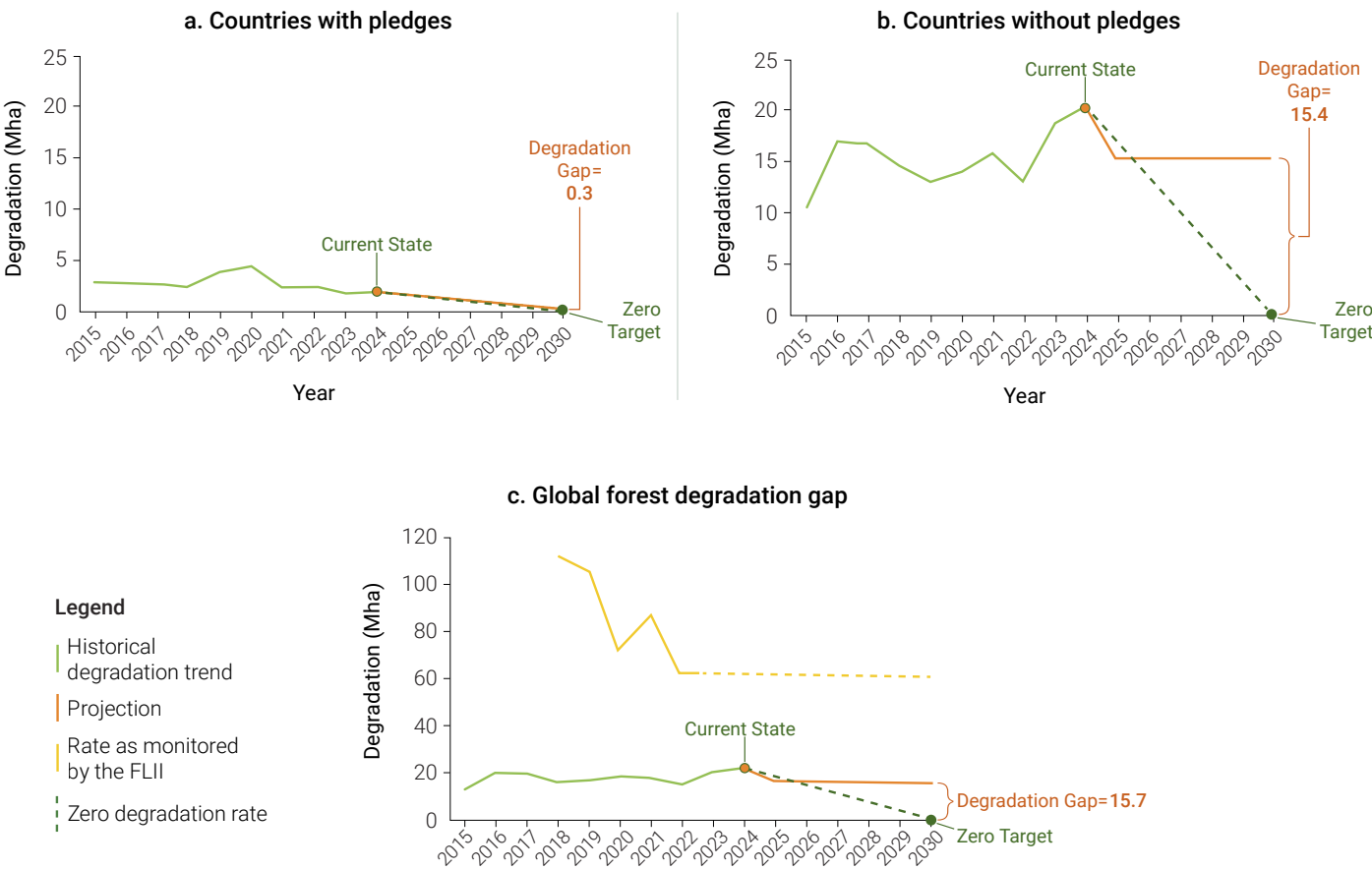
When considering the global degradation gap, in 2030 there is expected to be only a slight decrease from the decadal average rates of forest degradation (at 18.2 million ha per year according to GFW), to an expected annual rate of 15.7 million ha per year in 2030 based on current pledges (see [Figure 2.4c](#)). This reflects the very limited number of countries that have offered quantitative pledges to reduce degradation in their NDCs and LT-LEDS.

2.1.1 Deforestation and degradation both matter for climate impacts

Climate policy to date has focused largely on deforestation because it is easier to identify and detect. The lack of recognition of the importance of forest degradation and its under-reporting derives from the definition of forests (see [Box 1](#) and [glossary](#))

Figure 2.4 The global forest degradation gap

The historical degradation trend (green line) and projection (orange line) based on submissions to the UNFCCC for a) countries that have degradation pledges b) countries without degradation pledges and c) all countries. For countries without pledges, the 10-year trend is assumed to continue to 2030. In c), the degradation rate as monitored by the FLII is also shown in yellow. Using the country-by-country analysis from Global Forest Watch (GFW) and submissions to the UNFCCC, the same rates of change are applied to the FLII's degradation estimates out to 2030.



Source: Author's own analysis using tree cover loss data from GFW (2025)

that is based on the extent of tree cover, but does not include an assessment of condition that would identify the effects of degradation (Keith et al., 2021). Forests that have been exposed to industrial-scale human activities, ranging from clearing then regrowth to removal and damage of trees, are in a degraded condition. The structure, composition and function of the forest ecosystem have been impacted by these activities such that the ecosystem integrity and the carbon stocks have been reduced. However, land with tree cover in all forms—primary forest, regrowth secondary forest, degraded forest and temporarily destocked areas awaiting regrowth—are all classified as forest land for the purposes of country reporting to the UNFCCC.

Exacerbating this problem is the fact that many countries do not fully acknowledge or monitor the state of forest degradation. Country reporting on the state of forests to the FAO varies greatly in the distinction between deforestation and degradation. Only one-quarter, or 59 countries, representing 37 percent of the global forest area have official national definitions of forest degradation and 17 countries have operational definitions, where two-thirds of these countries are in Africa and Asia (FAO-FRA 2025). Of these countries with definitions, only three-quarters indicated that they had attempted to monitor the extent of degradation and reported to FAO. These numbers have changed little since the previous reporting for the Global Forest Resource Assessment 5 years ago (FAO-FRA, 2020). Such a low rate of monitoring and reporting hinders the assessment of progress towards NDC commitments. Reporting of degradation is also needed for other targets, such as the Global Biodiversity Framework Target 2 on effective restoration of more than 30 percent of degraded forest ecosystems, which requires identifying and assessing the extent of forest degradation before effective restoration strategies can be implemented.

2.2 Spotlight on forest degradation

The reduction in ecosystem integrity that occurs with forest degradation is a core concern of the three Rio Conventions (UNFCCC, Convention on Biological Diversity (CBD) and United Nations Convention to Combat Desertification (UNCCD)) due to the loss in benefits from the ecosystems in terms of climate, biodiversity, water and land. Addressing the extent, drivers and impacts of forest degradation is essential to assess human pressures and unlock forests' potential for climate mitigation and other benefits. Degradation of forest ecosystems creates four key categories of impacts by reducing the benefits of forests. First, reducing the climate change benefit of forests in the global carbon cycle by decreasing carbon storage and sequestration in

ecosystems. Second, reducing the climate stability benefit of forests at local to global scales through their influence on energy and water balances that control temperature and rainfall patterns (Seymour et al., 2022). Third, reducing the provision of ecosystems services, such as water supply and filtration, clean air and erosion control. Fourth, reducing the resilience and adaptive capacity of ecosystems to the impacts of disturbances and climate change.

A key limitation for incorporating forest degradation into policies and targets is the lack of a universally agreed definition of the term and common methods for monitoring. The definition in Box 1 provides a theoretical basis for identifying and quantifying forest degradation by focusing on the differences between categories of forest condition.

The emissions from degradation are not reported transparently in national GHG inventories (other than direct biomass removal)—and hence will not be reflected in national Biennial Transparency Reports to the UNFCCC, nor incorporated into regional and global carbon budgets. Degradation also occurs where net deforestation is reported, because gains and losses in forest area often differ in characteristics of ecosystem condition, including age structure. Hence, the contribution of land-use and land-cover changes to the total atmospheric CO₂ concentration is not fully estimated (Silva Junior et al., 2020) and the total impact of sectors such as industrial logging is not recognized (Arneth et al., 2017). The impact of logging by reducing carbon storage of regrowth forests at landscape scales is 30 to 70 percent across tropical, temperate and boreal forest biomes, representing a significant loss of biosphere carbon stocks (Keith et al., 2022; Mackey et al., 2020; Noormets et al., 2015). Conversely, the potential to restore lost carbon stocks from past degradation has not been fully realized. Improved carbon accounting is required by governments to report on the full extent of changes in tree cover and ecosystem condition, so as to give a clearer picture of the area and impact of forest loss and degradation (Keith et al., 2021).

Degradation adjacent to deforested areas occurs through edge effects and fragmentation, which alter microclimates and water cycles by increasing temperatures, and generating drier air, more intense winds and more solar radiation. The changes in forest structure and microclimate caused by degradation make the remaining forest more vulnerable to disturbances. The vulnerabilities associated with edge effects include increased occurrence of fire, windthrow, potential for increased landslides and flooding. In addition, the increased access to forest margins promotes illegal logging (Banbury Morgan and Jucker, 2025; Briant et al., 2010). The changes in microclimate are detrimental to many forest-dwelling species (Willmer et al., 2022), leading to changes in diversity (Esquivel-Muelbert et al., 2019).

Box 1 Forest definitions

Forests

Commonly accepted definitions of forests, which are based on structural characteristics of woody vegetation, such as tree height, canopy cover, and intended land use, do not allow for differentiation due to the condition of the ecosystem, status of degradation, or differences between biomes, making comparisons across biomes or countries difficult. Tree height and canopy cover of forests in each biome differ significantly, so that thresholds for identifying primary forest, as distinct from disturbed forest, in one forest type will not be appropriate in another type. For example, thresholds need to differ between coniferous boreal forests and broadleaf tropical forests. Differing thresholds need to be ecologically based and consistent for a forest type or biome, rather than the current situation where countries can select specific thresholds within the stated ranges for UNFCCC reporting that suit their circumstances. This highlights the case that consistent definitions and reporting standards are needed.

Deforestation

Deforestation is the conversion of forest to other land uses, such as agriculture or settlements, and involves a permanent reduction in tree cover below the canopy cover threshold defined as a forest. The loss of trees may result from human activities, impacts of disturbance, overutilization, or changing environmental conditions such that tree cover cannot be sustained (FAO, 2025a). Tree cover loss where there is the potential or intention for regrowth, such as temporarily destocked areas

post-harvest, are not counted as deforestation but remain classified as forest land. The amount or condition of regrowth is not assessed, and hence the time frame and degree of tree cover loss is unknown, allowing potentially severe losses of carbon and biodiversity in areas still classified as 'forest'.

Forest degradation

Forest degradation is a change in ecosystem condition that reduces the ecosystem integrity of the forest. Degradation is the result of changes in both land cover and land use and includes impacts from human activities (including forest management for commodity production), as well as severe climate events, fire, pests, diseases and other disturbances. The composition, structure, function and productivity of the ecosystem is impacted by these land uses. The impacts are long-term and persistent (CBD, 2006; FAO and UNEP, 2020; IPCC, 2019). Detecting degradation involves monitoring the magnitude and scale of changes in ecosystem characteristics and ecological processes. These changes include species loss, introduction of invasive species, reduced structural complexity, reduced age distribution, particularly in the case of old trees, decreased carbon stocks, increased forest fragmentation, as well as reductions in many other characteristics of ecosystem condition. Assessing changes in condition encompasses both state variables and ecological processes that drive forest dynamics, determine ecosystem resilience and trajectories of recovery from disturbance (Ghazoul et al., 2015). Degradation of forest ecosystems reduces the provision of goods and services (FAO, 2011),

as well as biodiversity values, productivity and health, and may negatively affect other land uses and cause emissions of GHG.

A range of on-ground and remotely sensed techniques are used to detect degradation (see Annex A1), but none is comprehensive of all potential changes in ecosystem characteristics. The definition of degradation and techniques are not standardized and there is no general commitment to monitoring and reporting of degradation. Hence, many areas and types of forest degradation remain undetected, and their impacts are not included in decision-making processes.

Ecosystem integrity

Ecosystem integrity refers to the system's capacity to maintain composition, structure, autonomous functioning and self-organization over time using processes and elements characteristic of the ecoregion and within a natural range of variability. The system has the capacity for self-regeneration and adaptation by maintaining a diversity of organisms and their inter-relationships to allow evolutionary processes for the ecosystem to persist over time at the landscape scale. Ecosystem integrity encompasses the continuity and full character of a complex system required to maintain resistance and resilience to the threats of disturbances (Keith et al., 2020).

Maintaining ecosystem integrity is the reference point for assessing degradation. Challenges exist in quantifying integrity and the natural state of ecosystems, but it is critical that ecosystem integrity is the conceptual reference level to provide an understanding of what has been lost through degradation and the potential gains through restoration.

The extent of degradation ranges from 400 m to 7 km from the disturbance, depending on the variables. Areas subject to edge effects constitute a significant portion of forest landscapes, affecting 18 percent of the remaining forest area globally (Bourgoin et al., 2024; Chen et al., 1999). Globally, an estimated 70 percent of forest areas are within 1 km of forest edges (2000 data) (Haddad et al., 2015; Hansen et al., 2020). Fragmentation of forest areas, particularly due to roads, has resulted in more than half of forest areas being less than 100 ha, and only 7 percent greater than 10 000 ha (Ibisch et al., 2016). This fragmentation means that the degraded area can far exceed the area that has been deforested, and the smaller the remaining patches, the greater the proportion of degradation.

2.2.1 Drivers of forest degradation

Forest degradation results from industrial-scale human activities, with a range of direct and indirect factors, with the most prevalent driver being commercial logging (Curtis et al., 2018), while extreme fires play an increasing role as an indirect driver (Huang et al., 2025) (see [Figures 2.5](#) and [2.6](#) for an overview of deforestation and degradation drivers by area of tree cover loss). The feedback between human activities and climate

change impacts exacerbates disturbance regimes, leading to reduced ecosystem integrity and increased vulnerability of their carbon stocks and biodiversity. These changes often increase tree mortality, both immediate and long-term, and alter regeneration patterns (Silva et al. 2018). Often, the multiple drivers interacting cannot be attributed individually, but are shifting ecosystem dynamics to new states.

Drivers of tree cover loss differ by biomes and regions, with tropical regions experiencing more permanent tree cover loss due to land-use change to permanent agriculture, and boreal and temperate regions in the northern hemisphere experiencing more temporary tree cover loss as degradation from logging and wildfires (Curtis et al., 2018; Sims et al., 2025).

Forests managed for wood commodity production comprise one-third of the world’s forests (Puettmann et al., 2015). This type of land use invariably results in removing trees, damaging remaining trees and other vegetation, soils and waterways (Mayer et al., 2020) and creates younger even-aged stands dominated by commercially valuable tree species (Pearson et al., 2017; Puettmann et al., 2015). Industrial logging in northern hemisphere forests is one of the largest drivers of tree cover loss globally (Banbury Morgan and Jucker, 2025; Sims et al., 2025). The effect of degradation

Figure 2.5 Drivers of degradation in categories related to direct or indirect human activities

Direct human drivers				Indirect human drivers
Extractive industries	Infrastructure development	Ecosystem modification	Changed disturbance regimes	Climate change impacts on disturbance regimes
• Logging, selective & clearcut • Mining	• Roads & railways • Telecommunication lines • Hydroelectric power • Urban expansion	• Wood fuel extraction • Charcoal production • Livestock grazing • Over-hunting • Pollution • Invasive species • Erosion	• Fire ignition • Hydrology • Pest/diseases	• Fire • Droughts • Storms/windthrow • Pests/diseases

Source: Erb et al., 2018; Hosonuma et al., 2012; Keith et al., 2017; Mackey et al., 2020; Maxwell et al., 2019

caused by logging is evident in Europe, where forest ecosystem condition is approximately 50 percent lower than for natural forests (Maes et al., 2023), and in temperate forests of Australia and Europe, where carbon stocks are halved (Keith et al., 2024, 2022).

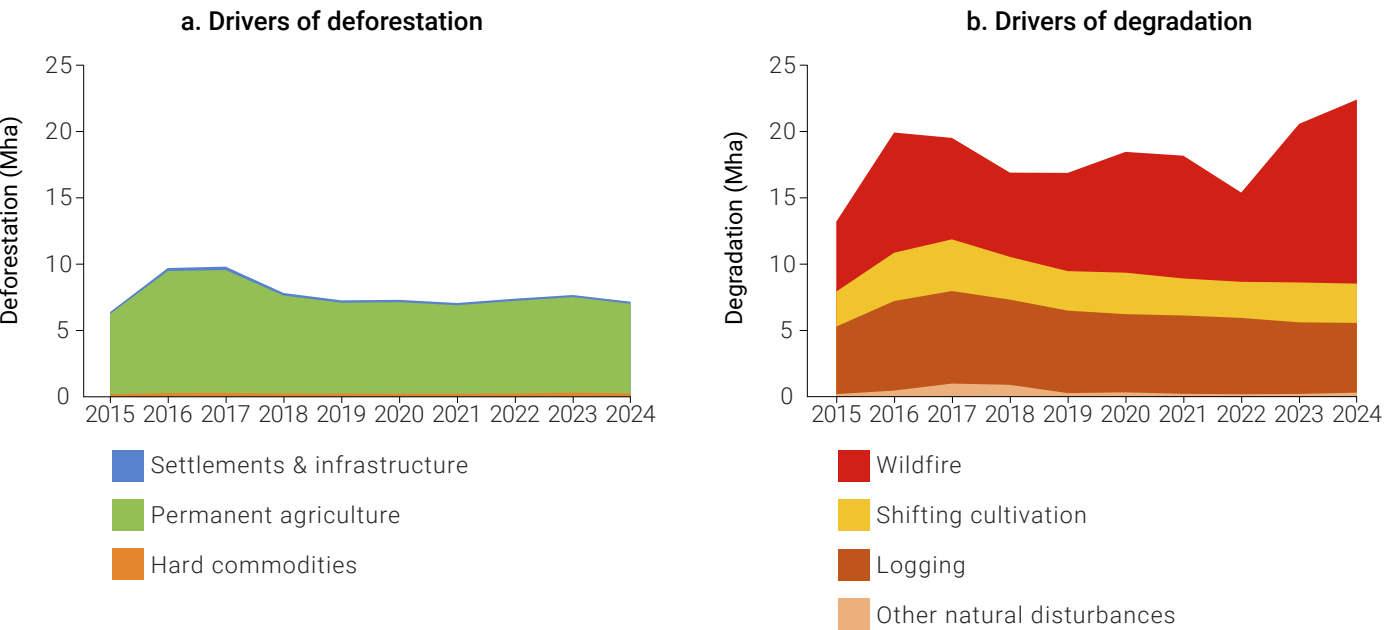
Fire is part of natural processes of disturbance in many ecosystems, but the severity and frequency of fires are increasing due to climate change and human activities. Fires are also occurring as a result of human activities in ecosystems where they are not part of the natural state, such as in tropical forests where emissions from fires have increased greatly (Gatti et al., 2023). Fire as a natural process is not a driver of degradation, but increased intensity and frequency of fires is likely to reduce the characteristics of ecosystem integrity, for example the capacity for regeneration, changes in tree age distribution, and soil erosion. Changes in fire occurrence are the result of direct human activities such as increased ignition sources; indirect activities causing drying and fragmentation that increase the flammability of the forest;

and climate change effects such as increased temperatures, reduced humidity and increased wind. The loss of ecosystem integrity reduces the resilience of forests to threats such as fire and drought. Logging and maintaining younger-aged forests are activities that increase the severity and extent of fires in tropical forests (Barni et al., 2021), temperate broadleaf forests (Taylor et al., 2014; Zylstra, 2018) and conifer forests (Bradley et al., 2016).

Globally, fire-induced forest loss increased twofold from 2001 to 2024, with this growing trend related to both the frequency and severity of fires (Huang et al., 2025; Potapov et al., 2025). In 2023 and 2024, the area of forest loss from wildfires escalated (see Figure 2.6), resulting in an increase in emissions of 7.0 Gt CO₂ in 2024 (11–32 percent above the decadal average) (Friedlingstein et al., 2025) and a 75 percent decline in the forest carbon sink compared with an average year, the lowest level in at least two decades due to extreme fires (Harris and Rose, 2025). In ecosystems where fire does not occur naturally, such

Figure 2.6 Global tree cover loss categorized by drivers¹

Permanent tree cover loss is considered deforestation a), Temporary human-induced tree cover loss when it reduces ecosystem integrity is considered degradation b). The drivers of wildfires and natural disturbances result in temporary tree cover loss and are considered contributors to forest degradation if the disturbance regime (such as droughts, storms, pests, diseases) has been altered due to human-induced climate change or other factors (e.g. ignition sources).



Source: GFW, 2025.

¹ Tree cover loss is a stand-replacement disturbance or the complete removal of tree canopy cover at the pixel scale. Tree cover is defined as woody vegetation taller than 5 m and canopy density of at least 30 percent at 30 m resolution (Hansen et al., 2013; GFW 2025). Tree cover loss can be permanent or temporary.

as tropical forests, extensive fires are now prevalent due to deforestation and the consequent widespread degradation of the remaining forest (Mataveli et al., 2022).

2.2.2 Monitoring forest degradation

Forest degradation is heterogeneous in space, time and intensity, creating difficulties for detection. Degradation involves a wide range of forms and degrees of ecosystem modification and hence is more challenging to capture in remotely sensed indicators than permanent tree cover loss. Detecting degradation involves identifying changes in canopy cover; structural characteristics such as tree height, density and canopy layers; species composition; and spatial distribution such as fragmen-

tation or patch size. Changes to forest structure are more readily detected remotely but can be small-scale, diffuse and unevenly distributed, and require thresholds for detection that differ by forest type. Many changes occur beneath the forest canopy and are difficult to detect—invasive species are a prominent example. Since degradation varies, many indices exist using different data and scales, but no single metric captures all ecosystem changes. It is critical that degradation is assessed in terms of overall losses in characteristics of ecosystem integrity. A range of indices in current use for monitoring forest degradation are summarized in [Table 2.1](#) and details are provided in Annex A1. The comparison shows that quantifying the area of degradation is reliant on the specific remotely sensed characteristics applied in deriving the indices.

Table 2.1 **Summary of indices for monitoring forest degradation**

Index	Data description	Scale	Time period	Source
FAO Forest Resource Assessment	Country reporting differentiating primary and secondary forest and preliminary monitoring of degradation based on national definition	many countries but not complete	5-yearly from 2020	FAO, 2025a, 2020b
Global Forest Watch	Annual tree cover loss by driver	global	2001 - 2024	GFW, 2025; Sims et al., 2025
Forest Management Intensity	Frequency of tree cover losses and gains	global	2000 - 2020	Betts et al. 2024
Intact Forest Landscape	Map of large areas with little human impact	global	2000 - 2013	Potapov et al. 2017
MapBiomass	Spatial data for land cover, land use, fire scars used to map fragmentation, fires, age of secondary forest	regional	1985 - 2024	MapBiomass, n.d.
Canopy Stability Index	Remotely sensed time series of canopy photosynthetic and water stress function	regional	2003 - 2018	Shestakova et al. 2022
Light Detection and Ranging	Airborne and satellite sensing of canopy structure, particularly tree height	regional / global	2016 - 2018	Csillik et al., 2024
Light Detection and Ranging, Landsat	Change in canopy cover, height and biomass related to edge effects	pan tropical	1990-2022	Bourgoin et al., 2024
Moderate Resolution Imaging Spectroradiometer, Light Detection and Ranging (MODIS)	Change in biomass carbon stock	pan tropical	2003-2014	Baccini et al., 2017
Forest Landscape Integrity Index	Human pressures as edge effects and fragmentation from tree cover loss	global	2019, potentially annual	FLII, 2025; Grantham et al., 2020
Relative forest maturity index	Spatial data for canopy height, aboveground living biomass and canopy cover	regional	potentially annual	Norman and Mackey, 2023

Analysis of fire in monitoring degradation is especially problematic because distinguishing natural fire regimes from those influenced by human activities or climate change is difficult, but this distinction is important as the outcomes in terms of ecological processes are different. For example, forests experiencing natural fire regimes would be expected to restore canopy cover, whereas changes that increase fire severity and or frequency may reduce canopy recovery.

Monitoring forest degradation at global, national and regional scales would ideally involve an approach derived from data at multiple scales and resolutions and from multiple sensors. These data need to capture the impacts in terms of the area of forest affected by different human activities, and the resulting changes in characteristics of ecosystem integrity, such as loss of carbon stocks, big old trees and required habitat for species. A multi-layered approach to estimating forest degradation would involve global remote sensing of forest structural characteristics, empirical case studies quantifying impacts on various characteristics of ecosystem integrity, and quantifying the area and characteristics of edge effects from deforestation.

Two data sources are used in this report to provide estimates of forest degradation at a global scale. Global Forest Watch provides data on annual rate of tree cover loss distinguished by permanent or temporary change and drivers (GFW, 2025; Sims et al., 2025). Temporary forest loss due to logging, wildfire, shifting cultivation and other natural disturbances are indicative of deg-

Addressing the extent, drivers and impacts of forest degradation is essential to assess human pressures and unlock forests' potential for climate mitigation and other benefits.

radation, but this does not include the impacts of edge effects adjacent to deforestation. The Forest Landscape Integrity Index (FLII) provides annual data from 2018 on the status of forests in terms of total areas impacted by tree cover loss with associated edge effects based on proximity to the area of loss (FLII, 2025; Grantham et al., 2020). The FLII is more comprehensive of types of impacts of degradation and their spatial extent, but does not include broadscale impacts not related to tree cover loss, such as selective logging and fire not causing tree mortality. Neither index incorporates all the characteristics and distributions of the impacts on forest ecosystems.

2.2.3 Current extent of deforestation and degradation

The *total area* of deforestation (permanent tree cover loss) is estimated at 1.4 billion ha, equivalent to the loss of 25 percent of the historical forest area of 5.7 billion ha (Grantham et al., 2020). The *total area* of degraded forest estimated by the FLII in 2019 was 2.6 billion ha (two-thirds of this in the medium integrity category and one-third in the low integrity category)—almost twice the area that has been deforested (Grantham et al., 2020).

Annual rates of deforestation, as indicated by permanent tree cover loss, averaged 7.8 million ha per year from 2015 to 2024, with the highest rate in 2017, due mainly to clearing for agriculture and logging (see [Figure 2.6](#)). *Annual rates* of temporary tree cover loss, indicative of a subset of the impacts of degradation, averaged 18.2 million ha per year from 2015 to 2024, with the highest rate in 2024, of 22 million ha, when large areas were impacted by wildfire. Hence, the rate of degradation was approximately twice that of deforestation when measured as temporary tree cover loss (GFW, 2025).

The *annual rate* of forest degradation estimated from the FLII uses a more expansive definition of degradation than temporary tree cover loss. The annual rate of degradation is estimated as areas moving to a lower integrity category. The calculation is the net change in categories but does not reveal the gross reductions in integrity categories (Grantham et al., 2020). The larger area of annual rate of degradation estimated by the FLII compared with GFW is indicative of the broader scope of impacts included in the calculation. Within critical regions, such as the Brazilian Amazon, the area of forest degradation (33.7 million ha) surpassed the area of deforestation (30.8 million ha) during 1992–2014 (Matricardi et al., 2020).

Based on the current extent of forest cover (see [Figure 2.7](#)), the proportion of loss in forest cover is shown by country (see [Figure 2.8](#)). The distribution of forest degradation (see [Figure 2.9](#)) shows the proportion of degraded forest area by country based on the FLII (Grantham et al., 2020).

Figure 2.7 **Global map of forest cover for year 2025**

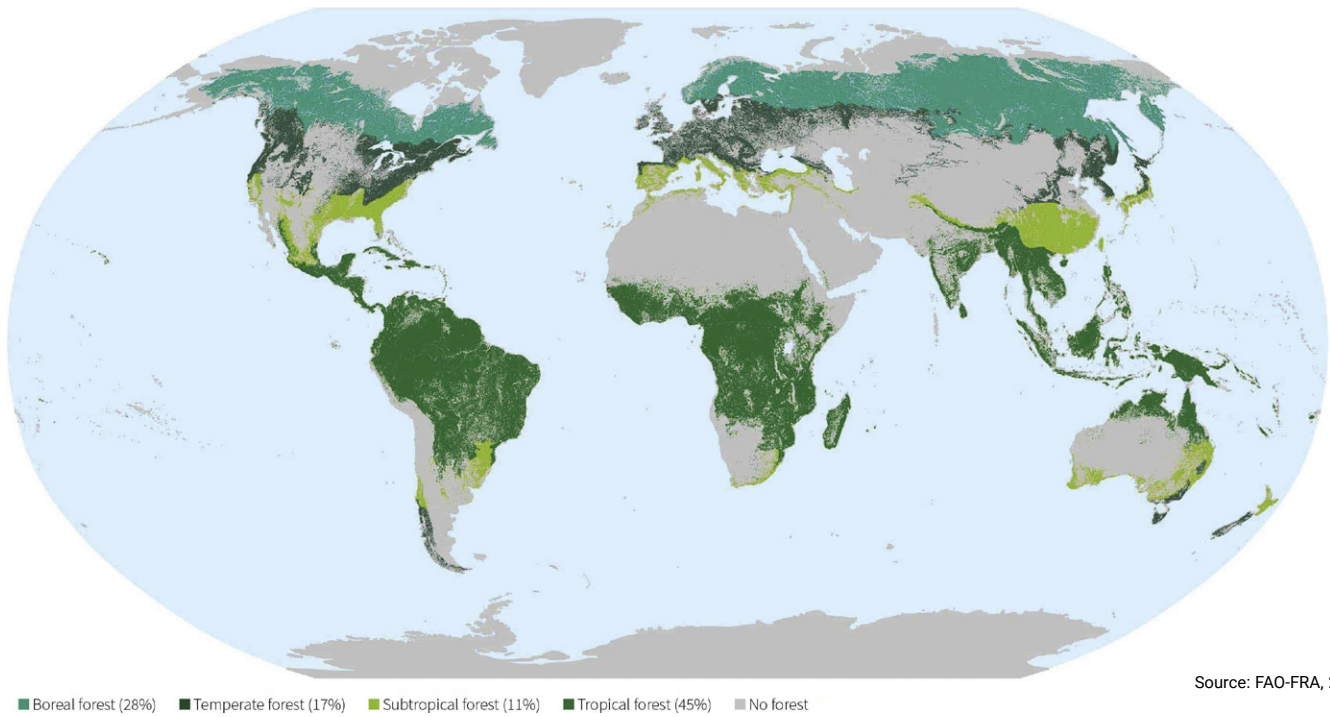
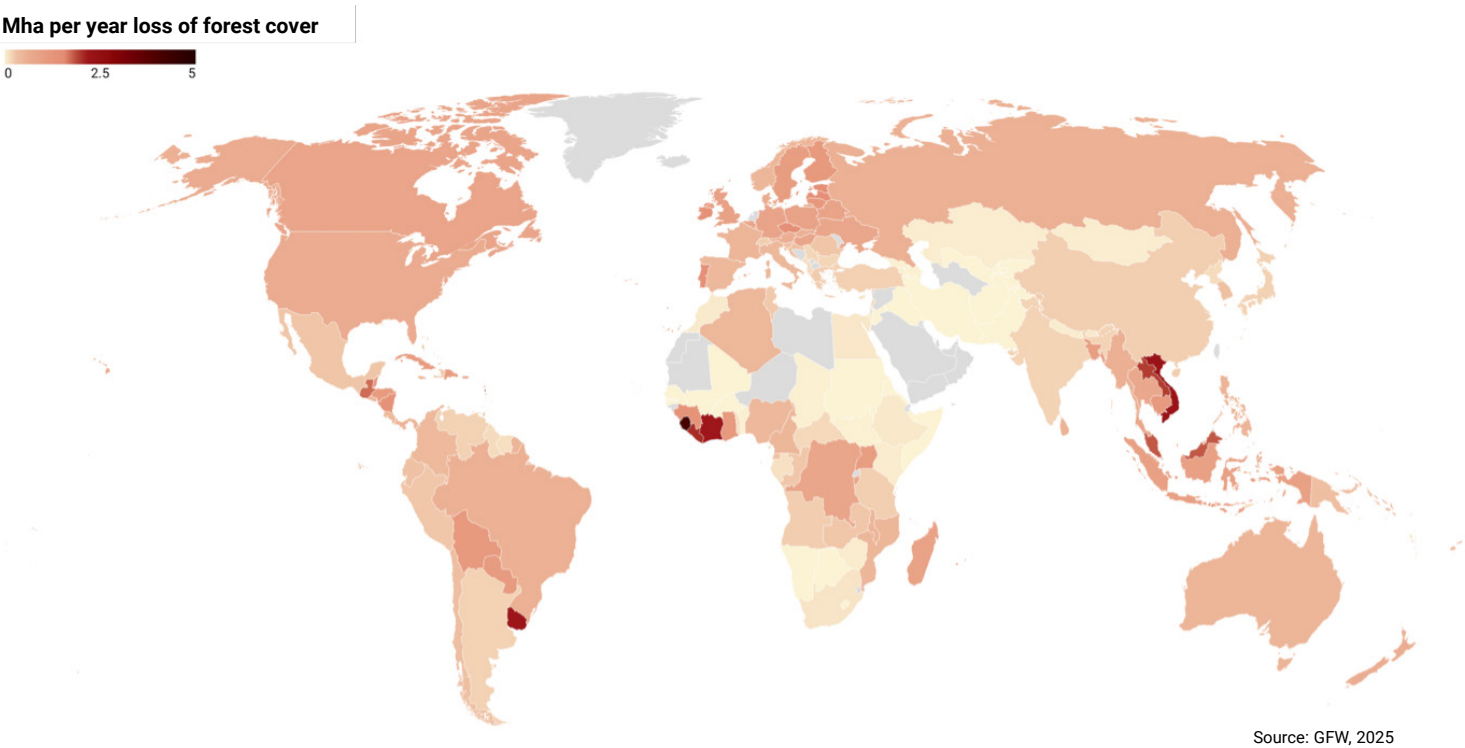


Figure 2.8 **Global tree cover loss**



Most deforestation occurs in the tropics and only 4.6 percent of recorded net deforestation occurs in temperate and boreal forest biomes. However, gross deforestation and degradation continue in these biomes and at rates that will not meet zero 2030 targets, including in wealthy and industrialized regions such as Australia, Europe and North America (FDAP, 2025). For example, in Europe, harvested forest area increased by 49 percent over the period 2016–2018 relative to 2011–2015 (Ceccherini et al., 2021, 2020). Even this figure may be conservative as this study used Global Forest Change data (Hansen et al., 2013) to monitor harvested forest area and would not therefore have detected the partial removal of trees and hence some forms of degradation.

Degradation has a greater areal extent than deforestation and hence the total emissions are often greater. The proportion of emissions derived from degradation compared with deforestation within a region, which are reported in the literature, vary depending on the drivers of disturbance that are included in the

analysis (see [Table 2.2](#)). Emissions occur from loss of vegetation and soil organic matter, and from reductions in biomass productivity due to sensitivity to microclimate changes and disturbances (Sullivan et al., 2020).

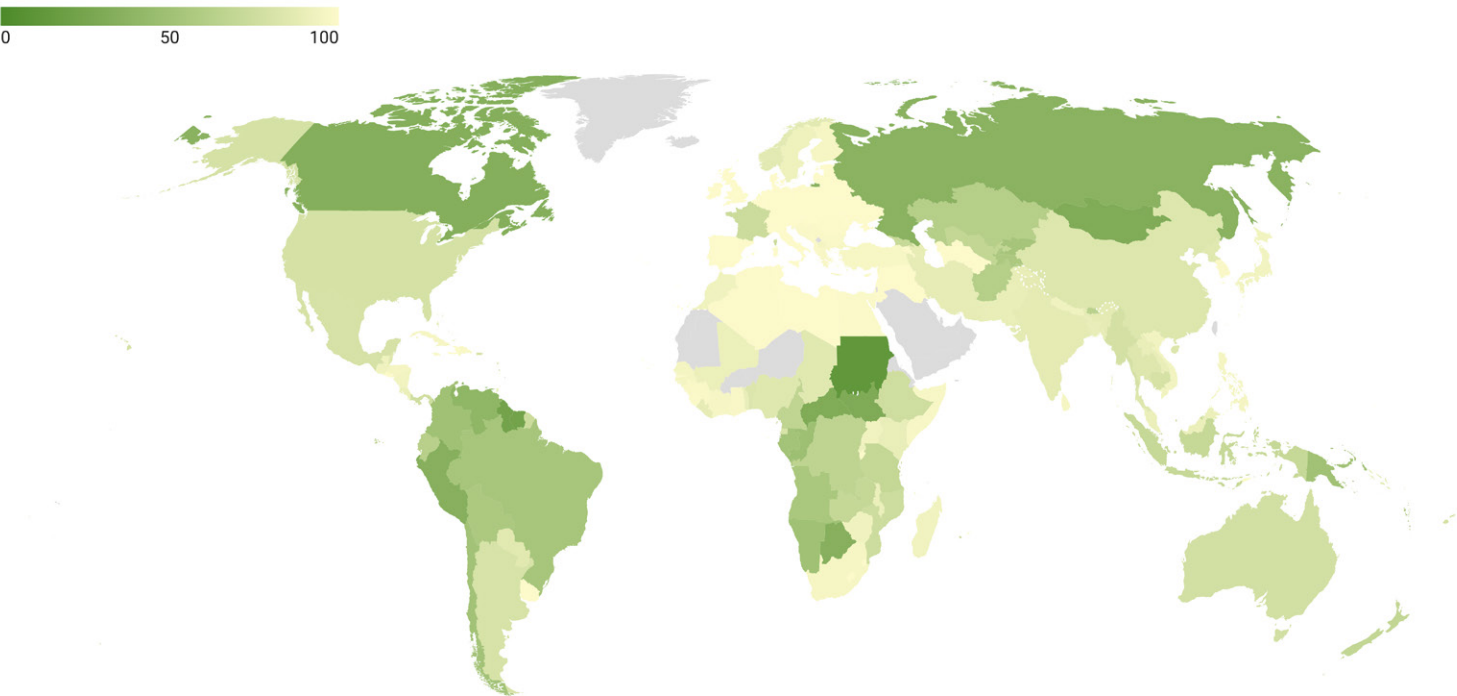
2.3 Quantifying the deforestation and forest degradation gap

Even under current COP30 pledges, around 20 million ha of forest are projected to be lost or degraded each year by 2030, revealing the inadequacy of planned actions to halt and reverse deforestation and forest degradation. Key countries contributing to this gap include countries with some of the highest rates of primary forest loss, such as Russia, Canada, and Indonesia. Pledges to take action against deforestation and degradation are

Figure 2.9 **Distribution of global degradation by country**

Data are sourced from the Forest Landscape Integrity Index 2019, which assesses global forests as having 'low', 'medium' or 'high' integrity. In the figure forests considered 'low' or 'medium' integrity are considered degraded.

Countries by % of degraded forest area



Source: Grantham et al., 2020

dominated by tropical developing countries, but achieving these pledges is conditional on the availability of climate finance.

2.3.1 The Forest Gap

Countries’ climate pledges provide limited information on the area of land that may be protected under plans to reduce deforestation and degradation. The data available indicate specific pledges related to protecting 3.9 million ha from deforestation and 2.5 million ha from degradation. These results are based on 95 new NDCs and LT-LEDs submitted up to November 2025, which saw less than 40 percent of countries submitting new NDCs. In addition, many commitments were vague or incomplete, and as such these figures may not represent the full intended commitment of countries.

As of 2025, countries with pledges to halt or reduce deforestation contributed to 5.2 million ha of yearly deforestation (average 2015–2024), representing almost two-thirds of the global total. Of these countries, Brazil accounts for over 40 percent of current deforestation (2.2 million ha), while Indonesia accounts for almost 20 percent (0.9 million ha). In 2030, pledges indicate that this group of countries’ deforestation levels will be reduced to 1.4 million ha. Brazil’s zero deforestation pledge by far contributes the most to this reduction, while reduction pledges by Indonesia (to 175 000 ha per year), Colombia (to 50 000 ha per year), and Australia and Mexico (halting deforestation) are also significant. As of 2025, countries without deforestation pledges were responsible for 2.5 million ha of annual deforestation. These countries deforestation rates are assumed to continue at the 10-year average (2015-2024) rates of deforestation.

Table 2.2 **Global and regional examples of areas and emissions from degradation expressed as a multiple of deforestation**

Areas and emissions are estimated on an annual basis but over varying time periods in different studies.

Region	Activities	Degradation as a multiple of deforestation		Source
		Area	Emissions	
Global	Logging, fire, shifting cultivation, other disturbances	1.9	1.4	GFW (2025)
Pan tropical	All disturbances		2.3	Baccini et al. 2017
Tropical and subtropical	Logging, wood fuel, fire		0.33	Pearson et al. 2017
Southern Brazilian Amazon	Logging, fire	5	1.6	Csillik et al. 2024
	Logging, fire, windthrow, edge effects		4.6	
Brazilian Amazon	Logging, fire, edge effects, isolation, drought		3.0	Qin et al. 2021
Amazon	Edge effects		0.33	Silva Junior et al. 2020
Brazilian Amazon	Logging, fire, edge effects, isolation	1.1		Matricardi et al. 2020
Brazilian Amazon	Logging	0.6 – 1.2	1.25	Asner et al. 2005
Brazilian Amazon	Logging		1.15-1.19	Huang & Asner 2010

When considering all countries (those with and those without pledges to reduce deforestation), by 2030 global deforestation rates (current decadal average 7.8 million ha per year (2015–2024)) will decrease by 50 percent, to a rate of 3.9 million ha per year, based on country submissions to the UNFCCC (see [Figure 2.10](#)).

In terms of degradation, as of 2025, countries with pledges to tackle forest degradation were responsible for 2.7 million ha of degradation annually (average 2015–2024), around 15 percent of the global total of 18.2 million ha per year (average 2015–2024). These areas are based on GFW temporary tree cover loss data, which do not include edge effects, etc. As explained above, the true extent of degradation is much greater if considering all characteristics of forest ecosystem condition.

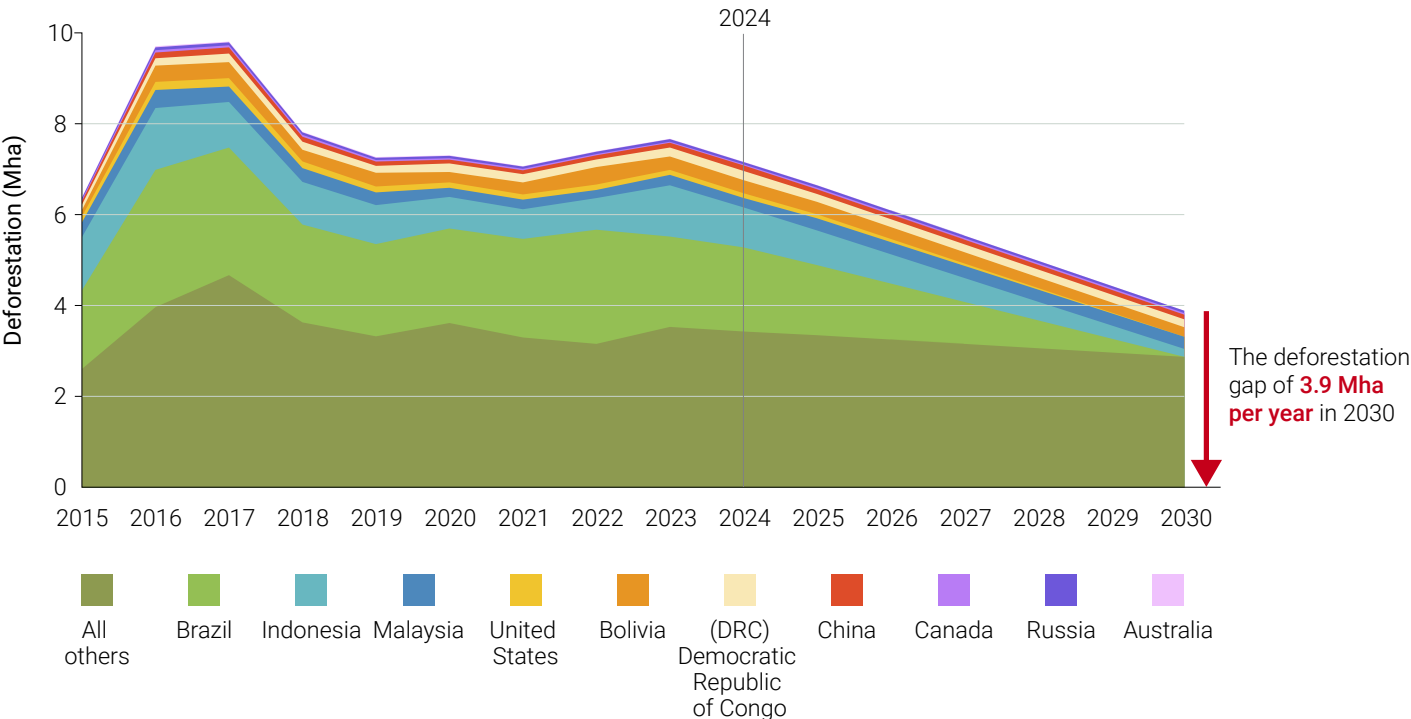
Based on their submissions to the UNFCCC, the degradation rates of countries that have made pledges will be reduced from

2.7 million ha to 0.3 million ha in 2030. The majority of this reduction is due to pledges by Australia and the United States, with both countries including targets to halt and reverse forest degradation by 2030. The remaining countries with pledges to tackle forest degradation all resulted in reductions of less than 100 000 ha per year each. As of 2025, countries without degradation pledges are responsible for 15.4 million ha of forest degradation annually. These countries’ degradation rates are assumed to continue at the 10-year average (2015–2024) to 2030 (see [Figure 2.11](#)).

Throughout these results, the United States stands out as a country which had pledged to halt what are significant areas of deforestation and forest degradation, in an NDC submitted under the Biden administration. The United States’ zero deforestation pledge would see its rate dropping from 134 000 ha of deforestation each year to zero in 2030. Correspondingly, the

Figure 2.10 **The deforestation gap**

Historical deforestation rates shown to 2024, followed by projected rates to 2030 based on pledges submitted to the UNFCCC to halt or reduce deforestation. The countries with the highest rates of historical deforestation and degradation are shown individually. All other countries are combined in the group ‘all others’.



Source: Authors’ own analysis, based on tree-cover loss data from GFW 2025

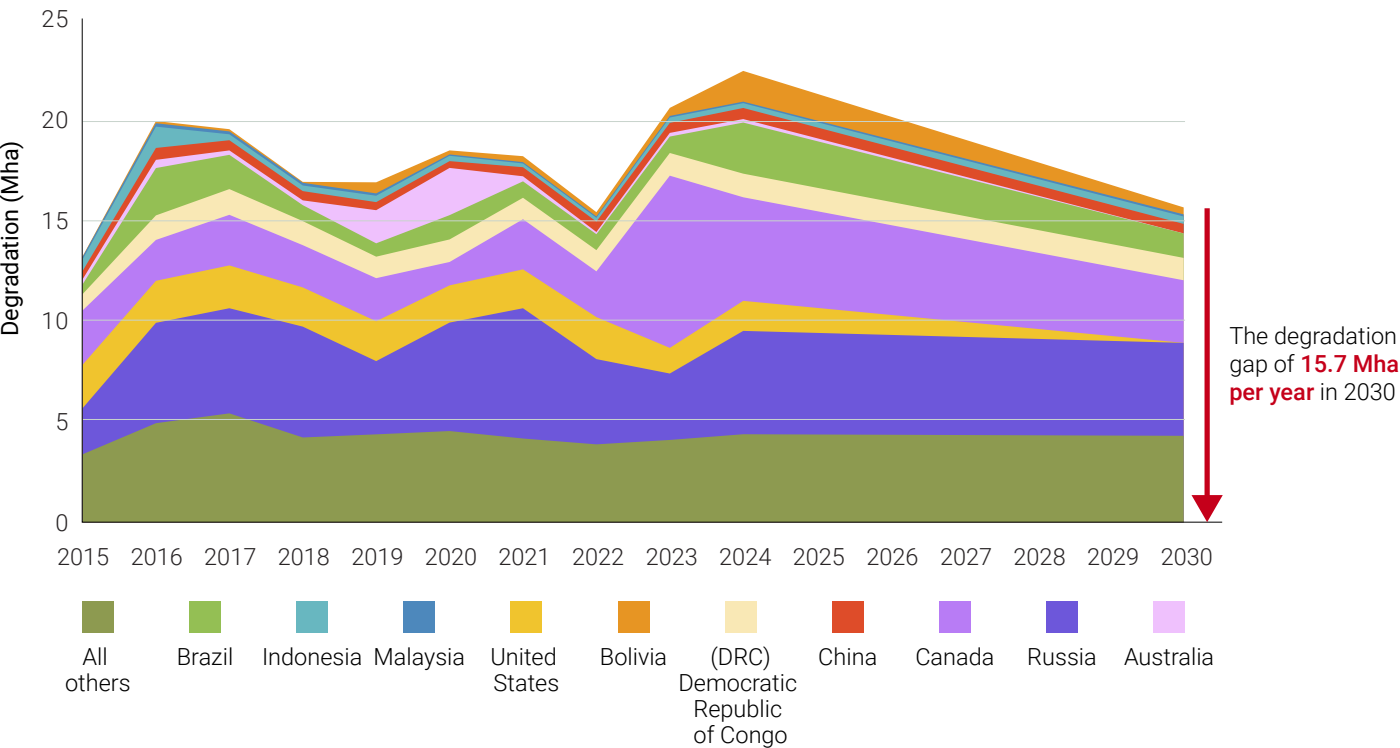
zero-degradation pledge would see its rate dropping from 1.9 million ha of forest degradation each year to zero in 2030. However, when the Trump administration’s withdrawal from the Paris Agreement comes into effect in January 2026, the United States’ NDC will no longer be valid. Subtracting the United States’ zero deforestation and forest degradation pledge from the results increases the forest gap by 2 million ha, to almost 22 million ha per year in 2030.

2.3.2 Uneven Ambition: Disparities in Land Commitments and Support

These results are based on all current NDC and LT-LEDS submissions to the UNFCCC, with less than 40 percent of countries having submitted a new NDC since January 2024, and 8 percent of countries having submitted a long-term strategy for 2050. Hence, while the results should be interpreted with some caution, there are distinct trends that can be drawn.

Figure 2.11 The forest degradation gap

Historical degradation rates shown to 2024, followed by projected rates to 2030 based on pledges submitted to the UNFCCC to halt or reduce forest degradation. The countries with the highest rates of historical deforestation and degradation are shown individually. All other countries are combined in the group ‘all others’.

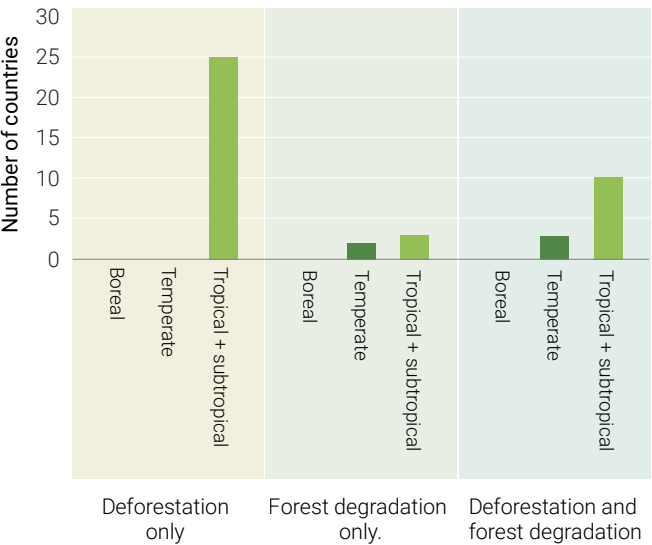


Source: Authors’ own analysis, based on tree-cover loss data from GFW 2025

The first is that the majority of pledges come from tropical and sub-tropical countries, with only 3 countries in temperate forest biomes submitting pledges related to deforestation and forest degradation, and no country with boreal forests submitting a pledge (see [Figure 2.12](#), [Table 2.3](#)). This is despite Russia, Canada, China, countries with extensive temperate and boreal forests, being in the top 10 countries that are losing primary forests, suggesting urgent action is needed in these countries. These results accord with other recent findings, such as 75 percent of countries reporting on forest degradation to FAO being tropical and subtropical countries in Africa, Asia, Oceania and South America (FAO-FRA, 2025)

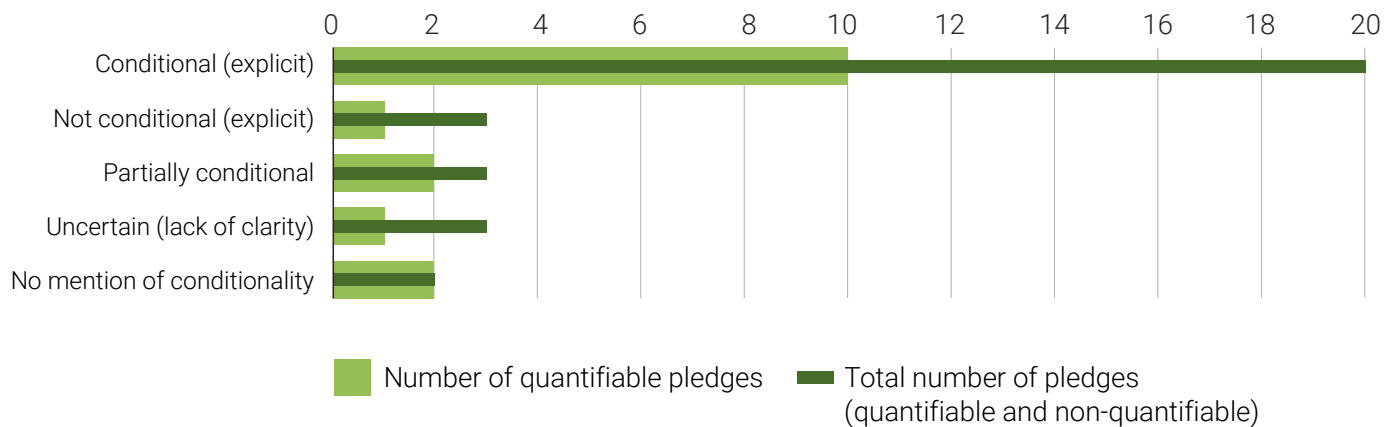
Analysis of the pledges to reduce deforestation and forest degradation also showed that most pledges are conditional on forest finance. This is to be expected, given the majority of pledges come from Global South countries located in tropical and sub-tropical regions (see [Figure 2.12](#)). These results show that an area of at least of 23 million ha of forest could be protected if climate finance was made available, based on the conditional pledges made that are quantifiable (see [Figure 2.13](#)). Conditional pledges are spread throughout Africa, Latin America and Asia. The largest conditional pledges are from Indonesia (14 million ha), Cambodia (2 million ha), Burkina Faso (1.9 million ha) and Bolivia (1.1 million ha).

Figure 2.12 **Number of countries that include specific deforestation and forest degradation pledges in submissions to the UNFCCC**



Source: country biome classification from FAO-FRA, 2025

Figure 2.13 **Deforestation pledges as number of countries by target conditionality**



Source: Author's own analysis

2.3.3 Defining the gap between pledges and targets for top 10 forest loss countries

Despite national and international policies to halt and reverse deforestation and forest degradation, our review of pledges shows a lack of plans and programmes, quantification and monitoring, and targets to implement forest-related mitigation activities that would achieve those targets. For pledges to effectively contrib-

ute to mitigation, the actions need to be described explicitly and be quantifiable to support implementation.

For the top 10 countries that account for over 80 percent of tree cover loss (both permanent and temporary), commitments submitted to the UNFCCC were compared with other sources to understand these pledges in the context of national policies. For deforestation pledges, the analysis considered the average annual rate of change in gross deforestation required to achieve

Table 2.3 Countries with pledges related to deforestation and degradation in NDCs and LT-LEDs up to November 2025

43 countries have quantified pledges related to reducing or halting deforestation and forest degradation in new NDCs or LT-LEDs submitted to the UNFCCC since January 2024 (indicates degradation pledge is a Land Degradation Neutrality pledge, which may or may not cover forest lands).

Country	Degradation Pledge	Deforestation Pledge
Angola		YES
Australia	YES	YES
Belize	YES	YES
Benin		YES
Bolivia		YES
Brazil		YES
Burkina Faso		YES
Cambodia		YES
Chad		YES
Chile	YES	YES
Colombia	YES	YES
Congo		YES
Costa Rica	YES	YES
Côte d'Ivoire		YES
*Dominica	YES	YES
Equatorial Guinea	YES	YES
Ethiopia		YES
Fiji		YES
Guatemala	YES	YES
Guinea		YES
Guyana		YES
Haiti		YES

Country	Degradation Pledge	Deforestation Pledge
Indonesia		YES
Jamaica	YES	YES
*Lebanon	YES	
Liberia		YES
Mexico		YES
Mongolia	YES	
Morocco	YES	
Myanmar		YES
Nepal	YES	YES
Nicaragua		YES
Nigeria		YES
Papua New Guinea	YES	YES
Peru		YES
Senegal		YES
*Sierra Leone	YES	
Somalia	YES	YES
South Sudan		YES
Sri Lanka		YES
United States	YES	YES
Uzbekistan	YES	
Zimbabwe		YES

Source: Authors' own analysis

zero-deforestation by 2030 and how this compared to both the rate of change in deforestation over the last 10 years and the change to deforestation pledged in submissions to the UNFCCC and national policies and plans.

To better contextualize commitments towards reducing degradation, the data were compared with the share of total forests affected by degradation by drawing on existing datasets. These included those of FAO (2025b) and the work underpinning the FLII (Grantham et al., 2020). The countries included in this more detailed analysis are shown in [Figure 2.14](#). Additional analysis on the deforestation and degradation commitments of these countries can be found at landgap.org.

In terms of **commitments to halt and reverse deforestation**, all of the top 10 countries contributing to tree-cover loss have made reference to this in their NDCs, although only 3 have made zero-deforestation commitments. Based on additional country level analysis, as described above:

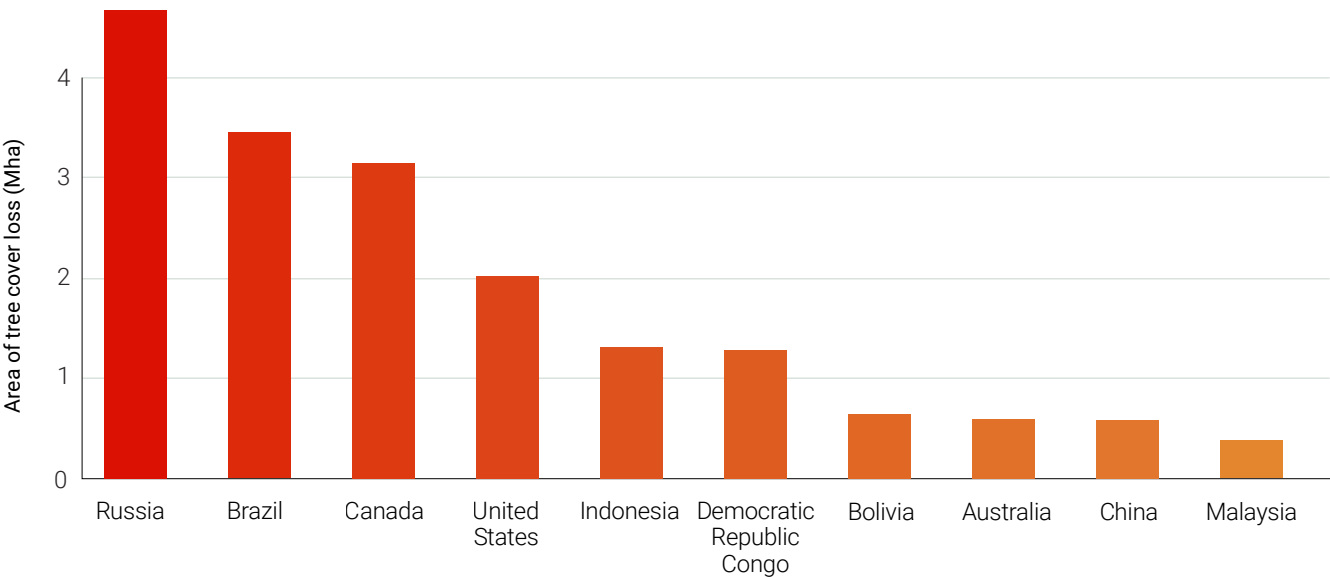
- **2 countries—Australia and Brazil**—have commitments that may lead to zero further deforestation by 2030. The United States previously had this commitment, but will leave the Paris Agreement in January 2026.

- **3 countries—Bolivia , the Democratic Republic of Congo and Indonesia**—will not reach a zero-deforestation target based on NDC commitments.
- **4 countries—Canada, China, Malaysia and Russia**—lack clarity in their commitments to be able to assess their alignment with a zero-deforestation target in 2030.

While Indonesia has imposed moratoriums on new harvesting licenses in primary forests and experienced a period of declining deforestation, Indonesia has not made a pledge to halt deforestation or forest degradation. While targets have been set, these are for restoring degraded lands and reforesting cleared areas to achieve a net land sink, but the pathway falls short of achieving zero deforestation or degradation by 2030.

In terms of **commitments to halt and reverse forest degradation**, while 18 countries have made reference to this in their NDCs (see [Table 2.3](#)), only 2 countries out of the top 10 countries for tree-cover loss have made zero degradation commitments—**Australia and the United States**. However, the United States will leave the Paris Agreement in January 2026. The remaining 8 countries do not include specific pledges to reduce degradation. In addition, the lack of harmonised definitions and

Figure 2.14 **Top 10 countries based on tree-cover loss**
Based on annual average rates of tree-cover loss (permanent and temporary) between 2015 to 2024.



Source: GFW 2025

indicators make comparability of pledges and actions difficult. For example, Canada has the largest intact boreal forest and ranks third globally in total forest area, after Russia and Brazil, making it a critical country for global forest conservation. Canada has not included targets to reduce degradation in either its NDC or LT-LEDS, and does not comprehensively monitor loss (including degradation) of primary forests.

2.4 Conclusion

Our analysis shows that the 'Forest Gap' revealed in country climate pledges means that up to 20 million ha of forests will still be being deforested and degraded by 2030. Countries are not serious about meeting global commitments to halt and reverse deforestation and forest degradation by 2030.

Changes to forest management strategies are a priority for climate change mitigation actions. Ceasing deforestation and forest degradation result in immediate reductions in emissions and require no additional land or human inputs. These actions avoid emissions, which is the top of the mitigation hierarchy referenced by the IPCC (Riahi et al., 2022). Restoration of previously degraded forest is also a critical pathway for mitigation, resulting in slow but consistent increases in carbon stock over decades; it does not require a change in land use. In all cases forest protection and forest ecological restoration require human and financial resources, to remove existing pressures on forests, and, where needed, for replanting, removing weeds, etc that hinder forest restoration. IPs and LCs are often at the front-line of large-scale forest conservation efforts (Garcia et al., 2024)

Mechanisms to incentivize reducing degradation and enhancing restoration

An enabling environment that incentivizes change in forest management involves the following key actions:

- recognizing that human activities are causing degradation in all countries; it is not just a problem in tropical forests and developing countries;
- demonstrating the synergistic benefits of forest protection and restoration for climate, biodiversity and sustainability goals;
- monitoring and reporting the area affected, the resulting reduction of ecosystem integrity and carbon stock loss to promote transparency about the impacts of human activities on forests;
- improving the rules and guidelines for national and corporate GHG inventory reporting that include gross areas of forest change and their associated changes in ecosystem condition and carbon stocks;
- demonstrating economic development trajectories not premised on deforestation and forest degradation;
- providing examples of activities to reduce degradation and the magnitude of their impact that could be incorporated into country NDCs;
- incorporating specific and quantitative targets for forest-related mitigation activities in NDCs, including deforestation, degradation, restoration, primary forest loss and biodiversity.

CHAPTER 3

From extraction to restoration: Transforming global economic governance

Farmers in the
Ruhengeri region
of Rwanda, Africa



KEY MESSAGES

- Current global economic governance frameworks significantly constrain national policy and fiscal autonomy, limiting countries' ability to implement actions aligned with deforestation goals. These global rules incentivize and can even directly mandate ongoing extraction of natural resources.
- The current structure of global economic governance—the institutions, rules, decision-making processes and mechanisms that coordinate, regulate and manage international economic interactions—is an important and under-recognized underlying driver of deforestation and forest degradation.
- Transforming global economic governance arrangements that lock countries into extractive sector growth models is critical for realizing global climate and biodiversity goals. Structural policy reforms in critical areas of debt, fiscal policy, tax, trade, capital flows and credit rating agencies are needed to create the conditions for that transformation.
- Forest policymaking has too narrowly focused on creating market or financial instruments that promote private investment in nature and forests, instead of reckoning with the structural global political-economic barriers that many, if not all, countries face. A new economic order is needed that privileges a reparative, rights-based economy over financialized capital for the benefit of the few at the expense of the many.

Governments around the world have repeatedly committed to protecting forests to meet both climate and biodiversity goals, yet these ecosystems remain under threat from continued extractivism, as pledges and targets are often neither implemented nor achieved.¹ An ever-proliferating body of evidence shows the rapid decline in forest and biodiversity health, and the existential threats that this loss poses to societal well-being (O'Brien et al., 2025; Watson et al., 2019). However, this abundance of data has failed to translate into meaningful action. While the direct drivers of forest loss and degradation are clear—commodity driven deforestation and commercial logging, along with urbanization and wildfires—forest policymaking at the national and international level has thus far failed to meaningfully transform the conditions that keep forest loss and biodiversity decline implacably in place, as evidenced by the scale of the Forest Gap.

As Chapter 1 and 2 of this report show, NDCs are failing to articulate the needed transitions, both by over-relying on land to remove carbon—thereby delaying the required energy transition, and failing to commit states to urgent action to halt emissions from forest loss and degradation. Conventional explanations for the failure to halt deforestation and forest degradation tend to focus on, for example, lack of: political will, financial resources, commitment from private sector actors, and state capacity to implement decisions (Moreira-Dantas and Söder, 2022; Seymour and Forwand, 2010; Taylor and Streck, 2018) and this understanding has continued to shape policy interventions focused on supply chains, governance, and finance in the land and forest sector for decades. These gaps and deficiencies provide only partial explanations. **What is rarely discussed is how the current structure of global economic governance—the political economic “rules of the game”—significantly limits a country’s policy and fiscal autonomy to take necessary actions aligned with deforestation goals.** These rules constrain what governments can or cannot do to address both economic development and ecological crises (Almeida et al., 2024; Althouse and Svartzman, 2022; Dempsey et al., 2024), at times incentivizing and directly mandating ongoing extraction of natural resources. As such, genuine progress toward deforestation goals demands critical and meaningful policy engagement with global economic governance structures that influence the boundaries of national policy action.

This chapter has three core aims. First, it outlines on a broad scale how the current political economic rules, norms and institutions—the rules of the game—constrain national governments from pursuing alternative development pathways that prioritize forests and rights. The second goal is to introduce the specific economic structures that hinder greater ambition for forests

and land, discussed in more detail in subsequent chapters. This chapter highlights that far from being implacable features of global policy, approaches to transforming the rules of the game have begun to take hold. Finally, it makes suggestions for how the forest community can harness this ambition to better achieve climate and biodiversity goals.

3.1 Unlocking ambition in NDCs: The economic barriers to progress

Decisions related to land use, and thus deforestation and forest degradation, fall under national authority, making national commitments such as those assessed in this report via NDCs (along with National Biodiversity Strategies and Action Plans (NBSAPs) and other national strategies), vital policy and planning instruments in the fight against the twin crises of climate change and biodiversity loss. While market pressures such as consumer demand clearly play a role in the expansion of extractive sectors, it is governments that continue to approve, subsidize, and provide preferential tax treatment for resource sectors and projects that cause emissions and biodiversity loss from deforestation and forest degradation.

Political and economic dynamics at the national and sub-national levels are part of the explanation, for example, government legitimacy linked to economic growth (Hausknost 2020) and regulatory capture (Li, 2023; OECD, 2017a), but they are not the full story. Global economic governance rules, norms, and institutions also constrain what policy pathways are available to governments to respond to both economic and ecological crises. As one recent report states, deforestation trends are “exacerbated by the international financial architecture, which requires forest-rich developing countries to prioritize policies favored by international investors, often to the detriment of the objectives of forest conservation” (Almeida et al., 2024). Facing short-term pressures to pay debts, balance imports, maintain ‘investability’ (think credit ratings), and sometimes comply with international financial institutions (think the International Monetary Fund (IMF)), states often rely on maintaining or even expanding sectors that cause deforestation and forest degradation (Almeida et al., 2024; Althouse and Svartzman, 2022; Dempsey et al., 2024). These pressures are built into the global economic system: failing to respond to these pressures would be risking financial instability, stability that affects both people’s daily lives and state’s ability to secure vital imports (such as technology and medicine) and maintain public spending. In other words,

¹ Extractivism, a concept born of anti-colonial struggle and thought in the Americas, is a mode of accumulation based on hyper-extraction with lopsided benefits and costs: concentrated mass-scale removal of resources primarily for export, with benefits largely accumulating far from the sites of extraction.

there are significant conflicts between the short-term, urgent pressures states face to secure financial and economic stability and the equally urgent need to maintain ecological stability (Dempsey et al., 2024). All states face these pressures, but those with the least political-economic power are most subject to them. These states are often described as subordinated states (Alami, 2024; Althouse and Svartzman, 2022).

Even when there is domestic political will for alternative development pathways less focused on resource extraction, governments experience challenges realizing their goals. If states introduce new environmental laws or policies, or signal strong transition plans that devalue certain industries, capital flight can ensue, and financial markets can react with their own discipline—with credit ratings downgrades or rising bond market yields. In 2024, when Colombia publicly declared its commitment to a fossil fuel phase-out, the production of which is affecting vast swaths of pristine rainforests (González-González et al., 2021), the Colombian peso was devalued and credit ratings agencies responded by downgrading the country's standing (TWN, 2024). The potential implications are manifold: higher borrowing costs cause fiscal strain on government budgets, capital outflows weaken the currency while depreciation raises the cost of imports (especially food, fuel, and medicine), fueling inflation and governments then face pressure to impose austerity measures to reassure investors. These consequences have real impacts on people's lives, and have sparked public backlashes, protests, and unrest the world over, even toppling governments. Without focusing attention on and addressing these underlying drivers of forest loss, the inherent contradictions

While there are significant resource imbalances to be corrected and ecological debts to be paid, the finance gap narrative does not reckon with the structural political economic constraints that many, if not all countries face advancing alternative pathways.

between tackling the drivers to climate change and biodiversity loss on the one hand and maintaining economic stability on the other means that national climate plans are set up to fail.

The drivers of deforestation and forest degradation, which in turn contribute to climate change and biodiversity loss, vary widely across countries and regions. Different tropical forest countries, each with their own capacities and stages of development, will experience these systemic constraints differently. The challenges faced by Brazil and Indonesia, both middle income countries with access to capital markets and significant trading relationships, are not the same as those experienced by Congo Basin countries, nearly all of which are in debt distress. Nevertheless, all countries exist within and are subject to the rules of the global economic order. Tropical forest countries exist within this larger system in which developing countries are subordinated in the global economy and therefore experience the structural constraints of the international financial order more acutely than those in Global North.

The realities of the current polycrisis (Tooze, 2022), a cluster of connected and potentially amplifying crises, including the COVID-19 pandemic, biodiversity loss, the climate crisis, geopolitical shakedowns, a sovereign debt crisis, and the rise of authoritarianism, invite and demand new ways of thinking about how to support, enable, and incentivize forest protection globally. Many have begun calling attention to the inadequacies and frailties of the current international economic system, but these pressures have not yet begun to shape decisions over forest policy. Progress across these arenas stands to generate much needed fiscal space for climate action and tackle the core drivers of ecological destruction. More importantly, rebuilding global economic governance is necessary to remove the impediments to and create the conditions for sustainable and inclusive prosperity, including thriving forests and the communities that depend on them.

3.2 Economic structures that lock in extractivism

Unwinding the rules, policies and institutions that hinder countries' ability to extricate their economies from a reliance on natural resource extraction is necessary to deliver on our shared climate and biodiversity goals. Structural policy reforms in critical areas of debt, fiscal policy, tax, trade, capital flows and credit rating agencies are needed to create the conditions to move to more equitable and sustainable forms of development.

The **sovereign debt** crisis (see Chapter 4), reaching acute levels in recent years, has increasingly attracted the attention of nature-focused policymakers. Global public debt reached a record



Tall mountain ash forest and tree ferns on the Black Spur near Melbourne, Australia

high of USD 102 trillion in 2024 and public debt in developing countries has grown twice as fast as in developed economies since 2010 (UNCTAD, 2025a). Developing countries face a high and growing cost of external public debt, with debt service payments reaching USD 487 billion in 2023 (UNCTAD, 2025a). Many climate-vulnerable countries are now spending twice as much on interest payments to foreign creditors than they are on addressing the climate crisis (IIED, 2024)). Many forest countries are often unable to borrow in their domestic currency and are forced to offer higher interest rates to attract investors. Weak currencies and high borrowing costs lead to persistent external indebtedness, limiting fiscal space to invest in climate action, forest protection, and land restoration.

Sovereign debt not only limits the ability to invest in climate action; it creates the conditions for ongoing extraction, forest loss and degradation of forests and other lands. Under current rules of global economic governance sovereign debt acts as a structural driver of ecosystem loss, pushing governments to expand commodity exports to secure foreign exchange, meet external debt payments, and maintain credit ratings (see Chapter 4 and Dempsey et al., 2024). Key institutions of the global economic order that manage economic crises, particularly the IMF, incentivize, and sometimes mandate, quickly expanding extraction at the expense of ecological integrity, forest health or long-term economic development, in order to generate resources to pay

external creditors. A recent study found that participation in an IMF programme leads to an average additional 9.2 percent of annual deforestation on average because IMF austerity requirements drive countries to invest in extractive sectors to increase revenue (Forster et al., 2024).

These debt dynamics also reveal a deeper imbalance in the global economic order. Instead of receiving net inflows of capital to meet their sustainable development needs, the most climate vulnerable low- and middle-income countries are net exporters of capital to the Global North. In 2023, nearly USD 200 billion left developing economies in bond and loan repayments to private creditors, far more than the new financing they received from international institutions (Summers and Singh, 2024). Moreover, since 2004, these countries have also accumulated more than USD 15.5 trillion in foreign assets and reserves, channeling domestic savings into low-yield 'safe' assets in advanced economies instead of investing at home (Volz et al., 2024). These combined outflows from debt service and precautionary reserve accumulation are not accidental but are built into the 'rules of the game' as defined above, which protect creditor security and dollar liquidity at the expense of development needs. The result is a global order in which countries most vulnerable to environmental degradation (biodiversity decline, forest loss, etc.) and most in need of structural transformation are financially constrained from preserving their own environments.

However, the role of sovereign debt has not yet penetrated forest policymaking. The Expert Review on Debt, Nature & Climate, launched by Colombia, France, Germany, and Kenya provided an independent assessment of the relationship between sovereign debt, nature conservation and climate action in low and middle income countries but only mentioned deforestation obliquely as an example of depleting natural capital (*Songwe and Kraemer, 2025*). In September 2025, the Forest and Climate Leaders' Partnership (FCLP), a coalition of 34 governments, released the Forest Finance Roadmap for Action, a six-point plan to close the world's forest finance gap and accelerate progress toward halting and reversing forest loss by 2030. It included specific mention of the need to "reduce and manage sovereign debt in ways that reward investment in resilience" (FCLP, 2025). This is the first time that a major coalition of forest policymakers has recognized the critical importance of addressing the sovereign debt crisis as a tool to address deforestation, and represents an important step forward, though much remains to be done to embed this recommendation in policymaking. At the sixteenth meeting of the Conference of the Parties to the CBD, held in Cali in October 2024, a decision was adopted directing the CBD Secretariat to study the relationship between debt sustainability and the implementation of the Convention (CBD 2024), with the results due to be delivered to COP17 in 2026. None of the forest-focused decisions of the UNFCCC specifically mention debt. Certainly, the sovereign debt crisis affects more than just forests and land, but debt burdens and austerity measures both drive deforestation and restrict investment in climate and biodiversity action, making sovereign debt an essential locus for forest policymaking. Without deeper consideration of these policy forces, forest policymaking is failing to address a core underlying driver of ongoing deforestation.

Taxation (see Chapter 5) is a key strategy for domestic resource mobilization to generate fiscal space, but the international rules, which have been tightly controlled by the Organisation for Economic Co-operation and Development (OECD) for more than sixty years, disadvantage developing countries and harm forests. The current global tax regime limits the ability of states to capture revenue from the very industries that are causing forest loss and degradation. As a result, soaring levels of tax abuse by multinational enterprises have flourished. According to the Tax Justice Network, "\$492 billion is lost to tax havens every year"—staggering losses that could be captured and used to protect forests and other lands (among a great many other development possibilities) (2024a). Tax avoidance and evasion functions as a form of resource drain from the Global South to the Global North, where the vast majority of multinational corporations benefiting from this system are based. The roots of this unequal system can be traced back to the period following independence, when formerly colonial states sought to impose increased taxation to support

newly established statehood (Dean, 2023). The OECD, which signed its charter on precisely the same day that the UN General Assembly adopted its Declaration on Decolonization, offered an alternative and exclusive locus of tax governance to tame the perceived threat of African independence, and would go on to dominate global tax policymaking for decades (Dean, 2023).

Forest and biodiversity rich countries in the Global South suffer the impacts of these systems acutely, as many lose massive sources of revenue associated with logging and agricultural production to tax avoidance and illicit activities, some of which directly contribute to deforestation and forest degradation. Tax evasion is particularly damaging for developing countries, which rely on corporate and wealth income tax as sources of domestic revenue to a much greater degree than developed countries do (Muchhala, 2022). Moreover, given the structural challenges associated with weak currencies and high borrowing costs in many developing countries, Global South governments are incentivized to offer tax breaks to extractive industries to compete for limited shares of investment (Althouse and Svartzman, 2024). The lack of coherent international tax and transparency rules are enabling illegal logging activities and related illicit financial flows, as secrecy regimes obscure its origins and beneficiaries (see Chapter 5). According to the United Nations Office on Drugs and Crime (UNODC) and the United Nations Conference on Trade and Development (UNCTAD), illicit financial flows refer to "Financial flows that are illicit in origin, transfer or use, that reflect an exchange of value and that cross country borders; The flow can be legally generated, transferred or used, but it must be illicit in at least one of these aspects." (UNODC and UNCTAD, 2020, p. 12). Indeed, illicit financial outflows are shown to be major driver of forest loss in tropical countries because the macro-financial instability that they create—through currency depreciation, tax revenue losses, and tighter credit markets—increases reliance on resource extraction (Kassouri, 2024).

Another dimension of these inequities is the persistence of trade misinvoicing, a form of trade-based money laundering and tax evasion where importers or exporters deliberately falsify the price, quantity, or quality of goods and services in international transactions. Misreporting on trade invoices allows companies to evade tariffs, taxes, or capital controls, contributing to capital flight, the erosion of domestic resources, and the loss of critical government funds. Trade misinvoicing drains hundreds of billions of dollars annually from developing economies (Ndikumana, 2025), depriving governments of vital public revenues that could otherwise be invested in climate adaptation, biodiversity protection, and social development. Since it is often facilitated by major multinational firms and financial institutions, misinvoicing compounds the structural disadvantage of producer countries: wealth is extracted from the Global South under the

guise of trade, while accountability mechanisms remain weak or non-existent. Unlike the stringent rules enforcing intellectual property or investor protections, international trade rules provide little recourse for countries suffering from misinvoicing, entrenching a system in which the rules serve capital rather than people or ecosystems.

Trade rules (see Chapter 6) operate alongside these financial mechanisms of debt and tax in global economic governance. While trade liberalization has increased overall trade volumes, the benefits of trade remain unevenly distributed, disproportionately favoring wealthier countries (Yu, 2025). Patterns of trade today are still shaped by the legacies of colonialism, in which countries in the Global South provide raw material for the benefit of colonial, and neo-colonial, powers (Dorninger et al., 2021; Infante-Amate et al., 2022). Unequal exchange, or resource drain from the South remains a significant feature of the world economy in the post-colonial era; rich countries continue to rely on imperial forms of appropriation to sustain their high levels of income and consumption (Hickel et al., 2021). A recent study found that the drain of resources resulting from this unequal exchange from 1960 to 2018 totaled USD 62 trillion (constant 2011 dollars), or USD 152 trillion when accounting for lost growth, or 7 percent of Northern gross domestic product (GDP) and 9 percent of Southern GDP (Hickel et al., 2021). The continuous outflow of inexpensive raw materials and energy feeds the productive and financial power of wealthy countries, privileging unsustainable growth. Current global economic governance perpetuates a system where a select group of powerful countries gain short-term

Many countries continue to face considerable development challenges and are forced to operate within an economic system that relies upon the extraction of natural resources, degrading the very land that is necessary for our shared prosperity. The current rules do not meet the needs of the present day.

benefit from the continued financial and ecological dominance of other countries (Althouse and Svartzman, 2022).

Industrial agricultural production, the single largest driver of deforestation over the past two decades (Curtis et al., 2018), provides a useful lens through which to understand these dynamics. Many countries in the Global South, such as Argentina, Brazil, Côte D'Ivoire, Ecuador and Kenya are deeply dependent on the income from agricultural commodity exports (UNCTAD, 2025). Moreover, a handful of powerful firms dominate most agricultural trade, and they have been the biggest winners from trade liberalization (Clapp, 2023; Goyal et al., 2025). Yet current trade rules do nothing to address this concentration of power or the restrictive practices (actions that limit or distort competition) these firms use. As a result, international trade arrangements give multinational firms in commodity value chains a consistent edge over local food producers and domestic food markets (see Chapter 6). Like taxation, trade rules also have their roots in the post-Independence period. As noted in Chapter 6, many Global South countries were already deeply dependent on the export of primary commodities when the current trade rules were formalized in the 1990s. The integration of developing countries into global markets after World War II was highly unequal, as the capital, processing capacity and final consumption were located in richer countries, while countries in the Global South were often not paid fairly for their production.

While trade policy, writ large, has long been embraced in forest policymaking as a lever for reform, these efforts have been largely limited to preventing the import of illegally sourced materials or conditioning market access on a series of governance reforms to demonstrate legal provenance. The European Union Deforestation Regulation (EUDR) is a notable exception to this trend. Aiming to prevent import of agricultural commodities grown on recently deforested land, the regulation places binding legal obligations on entities importing agricultural commodities into the European Union. However, as discussed in Chapter 6, the EUDR does not address the hyper concentration of agricultural value chains, nor does it address the significant power asymmetries experienced by producers in the Global South within the current trade rules.

Trade and foreign investment policies have also created new rules that allow foreign investors to sue governments for monetary compensation for any laws and regulations that might affect future anticipated profit. Originally intended to shield foreign investors against nationalization of key industries or assets, particularly following independence from colonial rule, investment rules have become a sword to pierce national capacity to implement regulatory reform in line with climate, public health or biodiversity goals. National climate and biodiversity policies have been regularly challenged in opaque, private tribunals cre-

ated by bilateral and multilateral investment treaties (UNCTAD, 2022). Even if some governments have defended these challenges, companies' ability to bring them creates a resounding regulatory chill. While there are thousands of distinct bilateral investment treaties, the overwhelming majority include provisions that allow corporations to sue governments over such disputes. The rules governing investment protections, including investor-state dispute settlement, across all such treaties require significant reform to be aligned with global climate, biodiversity and development goals.

3.3 Dominant approaches to forest policymaking: A decade of missed opportunities

These rules of the game—the policies, norms and institutions of global economic governance—shape and determine the possibilities for robust and effective national climate and biodiversity action. Over the past 15 years, many countries and numerous initiatives have pledged to protect forests and other ecosystems, but these pledges and targets are often neither implemented nor achieved. Many of these initiatives have relied on transforming the production practices of the commodity supply chains responsible for driving deforestation, and on mobilizing private finance for forest protection, including through the use of carbon offset finance mechanisms (Delabre et al., 2020). Global economic governance, including the international financial architecture, has received comparably less attention.

To the extent that forest policy making has considered economic policies, it has largely been limited to creating innovative market instruments that promote private investment in nature and forests to fill a so-called 'finance gap.' While there are significant resource imbalances to be corrected and ecological debts to be paid, the finance gap narrative does not reckon with the structural political economic constraints that many, if not all, countries face in advancing alternative pathways. This reliance on private capital mobilization to meet development and environmental objectives has arisen in the context of declining international aid budgets and rising prominence of financialized capital within this deeply flawed and unequal system, which has in turn narrowed the possibilities for international cooperation on forests. Daniela Gabor, in her seminal paper coining the term "Wall Street Consensus," argues that the emphasis on private sector mobilization requires creating a safety net for investors at the expense of policies that would yield meaningful development benefits for governments and communities (Gabor 2021). The "policy commandments" of the de-risking approach attempt to

protect investor profits from a range of policy approaches that are beneficial for development but threaten potential profits, including nationalization, higher minimum wages and, critically, climate and environmental regulation, which limits the policy space available to design a just transition (Gabor, 2021).

Forest policy has been besieged by this same logic for the last fifteen years. The dominant 'development as derisking' paradigm has largely failed, even garnering criticism from within the World Bank itself, a key proponent of this model (Indermit, 2024). The lack of predictable finance to support the implementation of policies and measures that address forest protection has driven reliance on carbon offset funding for nearly two decades. Efforts to mobilize private finance have produced a range of 'fit-for-purpose' mechanisms for forests, yet these remain marginal compared with the scale of fiscal space lost under current global economic rules. In practice, carbon markets have delivered only a small fraction of the funding needed to protect and restore forests (Blanchard et al., 2024). The underlying logic—that forests can be made 'more valuable standing than cut down'—while perhaps economically rational in models and theory, is flawed, as it attempts to assign a per-hectare value to standing forests that is neither reflected nor rewarded in contemporary economic systems. Meanwhile, activities that drive deforestation, such as soy or cattle production, are heavily subsidized and incentivized by state actors, reinforcing their dominance in national economies, driving ecological degradation.

3.4 Shifting the arc from collapse to transformation

Long ignored in climate and environment policymaking, global economic governance, with its interrelated network of institutions and rules, has been thrust into the spotlight as countries experience increasingly severe and overlapping crises of extreme climate events and economic shocks. Many countries continue to face considerable development challenges and are forced to operate within an economic system that relies upon the extraction of natural resources, degrading the very land that is necessary for our shared prosperity. The current rules do not meet the needs of the present day.

Developing countries continue to press for meaningful transformation of the system that has kept their economies subordinated, and their aspirations for sustainable development out of reach. Particularly following the COVID-19 crisis, when developing countries faced significant macro-financial consequences of both the pandemic and developed country policy responses, a greater and clearer consensus emerged that the status quo was insufficient to catalyze the scale of transfor-



Entrance of International Monetary Fund, Washington, D.C

mation needed. Governments, alongside social movements, civil society organizations, and rightsholders, supported by an increasingly robust body of academic scholarship, have continued to draw attention to the need for reform of global economic governance and put forward transformative policies proposals. These include mechanisms to more quickly and fairly restructure or refinance sovereign debt, reform taxation and trade rules, while also challenging dollar hegemony through local currency arrangements and allocations of Special Drawing Rights (SDRs), an international reserve asset issued by the IMF.

The COVID-19 pandemic drew into sharp relief the nature of the challenge, but these are not new demands or concerns. Calls to reform global economic governance to enable sustainable development were central to developing country positions in the original Rio Conventions (Chee, 2011). Indeed, since the creation of Bretton Woods Institutions and the period following the independence of newly created states, developing countries have highlighted their unequal and subordinate position in the global economy. The United Nations Conference on Trade and Development was formed in 1964 to address growing concerns about the role of developing countries in international trade and to find ways to integrate them more equitably into the global economy (see discussion in Chapter 6).

More recently, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) has recommended the need for transformative change to tackle biodiversity loss by addressing systemic and underlying drivers, rather than just direct drivers (O'Brien et al., 2025). This requires moving beyond incremental reforms toward fundamental shifts in institutions, economies, governance, and societal values. The assessment calls for transforming the sectors that drive forest loss and degradation—such as agriculture, forestry, fisheries, mining, and energy—and reorienting economic and financial systems to prioritize nature, equity, and collective well-being over short-term private gain. Central to this transformation is upholding rights, including secure land tenure, gender-inclusive governance, and Indigenous-led approaches, which are shown to deliver lasting benefits for both people and nature.

The Bridgetown Initiative, a high-level forum convened by Prime Minister Mia Motley of Barbados, has helped catalyze a paradigm shift in the discourse surrounding the necessity of international financial architecture² reform. The agenda set forth in the third iteration of the Bridgetown Initiative in 2024 provides a comprehensive view of the policy reforms needed, from tax and trade policy to debt sustainability and capital market access. The Vulnerable Twenty (V20) Group of Finance Ministers, a dedicated

² The international financial architecture (IFA) refers to the framework of institutions, policies, rules, and practices that govern the global financial system. The IFA is a subset of global economic governance, which includes trade policy.

initiative of 55 climate vulnerable economies has made a clarification call for debt reform as a necessary part of climate finance architecture. Borrower countries have renewed collaborative efforts to address their specific needs in the context of the current sovereign debt crisis. Several African Ministers have called for a review of how SDRs are allocated. The UN's High-Level Advisory Board on Effective Multilateralism (2023) called for the "immediate, and thereafter regular" annual issuance of additional SDRs to aid countries facing foreign-exchange shortages. Some developing countries have begun to implement new approaches that avoid the 'original sin' of borrowing in dollars by setting up local currency lending and regional payment agreements. This allows governments to avoid reliance on USD and instead use local currencies to reduce financial costs and save foreign reserves, while at the same time strengthening economic integration among the region's countries.

Developing countries, through sustained and courageous advocacy, have now placed the global rules of international taxation prominently on the global agenda. Brazil, in its leadership of the Group of 20 (G20), has advanced proposals for a new 'wealth tax' which stands to raise USD 200-USD 250 billion per year globally, if taken up and implemented (Zucman, 2024). The Africa Group, standing up to the powerful OECD, which has controlled negotiation of international tax cooperation policy for decades, has now shifted tax policymaking to the more democratic auspices of the United Nations. The UN Framework Convention on Tax Cooperation is presently under negotiation and set to conclude in 2027. Reform of international financial transparency and tax cooperation rules has the potential to recover hundreds of billions of dollars in lost revenue while also combatting the opacity and profitability of environmentally-harmful activities. The effective democratization of tax policymaking at both national and international levels is essential to provide revenue for forest and land rights, and also to reorient the global economy away from destruction and degradation of the same.

The world economy is experiencing a profound shift in trade and investment policy. The long-held assumption that global policies would continue toward greater liberalization no longer holds true, as the concept of deglobalization has gained traction (El-Erian, 2023). Raghuram Rajan, an influential Economist and former

Governor of the Reserve Bank of India, notes "deglobalization is well underway" (Rajan, 2022). Felicia Wong and Todd Tucker of the Roosevelt Institute point out that: "Politicians around the world have learned the hard way that globalization didn't work. Over the last 30 years, living standards rose for many people, but inequalities have widened within countries. Neoliberals imagined that democratic reforms would spread on the coattails of free trade and that the likes of China, Russia, and other autocratic countries would become more democratic and better integrated into the liberal international order. Instead, the opposite happened: autocrats have grown stronger in recent years and now seek to revise the order to their benefit" (Wong and Tucker, 2023). This realization is profoundly shaping national policies and in particular domestic policy approaches to climate action as countries. While the current circumstances can be fairly described as chaotic and generating significant uncertainty, the scope and extent of its fracturing present an unprecedented opportunity to begin to re-imagine the system that has been held as doctrine for decades.

While driven by increasingly severe and overlapping crises, the current moment presents important new opportunities to transform the conditions that have allowed environmental degradation to persist. Today's economic model, the rules and financial flows that shape our societies, push many countries into extractive sectors to power their development. To repay foreign debt, attract international investment, and to maintain financial stability, governments approve, support, and even subsidize extraction driving deforestation, sometimes even at odds with mandates given by their own citizens. This system has further concentrated wealth and power in the hands of a few, while driving widespread biodiversity loss and deepening inequality.

The structures of global economic governance have evolved through centuries of geopolitical power struggles. Current uncertainty and shifting power dynamics offer an important moment of opportunity that must be seized; undoing its harms to reimagine a better future for all is a difficult but necessary and urgent task. Increased fiscal space alone will not guarantee the transition to a less extractive economy. A new economic order that privileges development and a reparative, rights-based economy over financialized capital for the benefit of the few at the expense of the many is needed.

CHAPTER 4

Virtuous or vicious? Choosing the relationship between debt, communities and nature



Farmers harvesting coffee berries in Cameroon, Africa

KEY MESSAGES

- Tropical forests—and the communities who depend on them—need protection during sovereign debt crises. The current business-as-usual model of resolving debt crises deepens nations' dependence on short-term commodity revenue, pushing plantations, mines and oil wells into previously intact ecosystems—and pushing out traditional communities. This model exacerbates climate change vulnerability and exposes entire national economies to more risk from extreme droughts, floods, fires and tropical storms—making future debt crises more likely.
- A better approach to sovereign debt crises must allow governments the fiscal breathing space to regulate commodity sectors and protect traditional communities and the ecosystems that support them. This means that all creditors—including bondholders, multilateral development banks (MDBs) and sovereign lenders—need to offer meaningful debt relief to low- and middle-income countries.
- New and innovative sources of finance are less likely to lead to cycles of instability and unsustainability. Commodity price-linked bonds decrease pressure on governments to increase commodity production to make up the shortfall and service their debts during commodity price declines. Including natural disaster clauses in bond issuances enables reduced or paused repayments during climate change-linked extreme weather events. Local currency lending and regional payment agreements present a promising approach, allowing governments to avoid reliance on US dollars and instead use local currencies to reduce financial costs and save foreign reserves.

In 2025, parties to the CBD adopted the Kunming-Montreal Global Biodiversity Framework, which pledged to mobilize USD 200 billion per year for biodiversity, including USD 30 billion from developed to developing countries (CBD, 2025). However, the countries most in need of biodiversity support are also those with the least access to international sources of finance, as they face the highest costs of capital and the highest risk of sovereign debt crises (Ray and Simmons, 2024). This correlation is no coincidence. An increasing number of countries find themselves trapped in a cycle of debt distress and biodiversity loss. Current dominant approaches to resolving sovereign debt deepen countries' commodity dependence and weaken their ability to protect marginalized communities and vulnerable ecosystems from the expansion of agricultural and extractive sector pressures. This approach leads to biodiversity loss, greater vulnerability to climate change, economic fragility, higher borrowing costs and ultimately, a greater chance of additional debt crises.

These trends are particularly notable in global centres of biodiversity, including the Amazon and Congo basins, as well as in Southeast Asia. As research by GFW (2025) and UNCTAD (2025b) show, these regions stand out for an unfortunate confluence of high commodity export dependence and tree cover loss. Here, forests and forest communities are under threat from commodity extraction for exports, which is expanding without adequate regulation or protections due to the austerity footing of countries facing debt stress and the need to expand exports quickly. This report traces the steps of this vicious cycle, with a particular focus on Cameroon, which has experienced dra-

It is key to ensure that all creditors—including creditors' groups such as the Paris Club and the G20, but also commercial creditors and bondholders—are included in restructuring, and that the intra-creditor competition does not lead to a race to the bottom, where debtors end up with very thin debt relief.

matic growth in deforestation and forest degradation, including encroachment on traditional sacred forests, to fuel export commodity growth amid a growing debt burden. It then reviews several emerging options for more sustainable approaches to debt resolution, new debt issuances, commodity sector regulations and community-centred forest protection.

4.1 Business-as-usual: the vicious cycle

Since the onset of the COVID-19 pandemic, currency market volatility and advanced economies' interest rate hikes have raised borrowing costs for developing countries and made existing and new debts more expensive to repay. In 2024, sovereign debt service payments rose to an all-time high, reducing the fiscal space and leaving the majority of economically vulnerable emerging market and developing economies (EMDEs) unable to invest in climate and development goals without facing insolvency (Zucker-Marques et al., 2024). According to the latest IMF debt sustainability analysis, 9 low-income countries are in debt distress, unable to repay existing debt without restructuring, while 26 are at high risk of external debt distress (IMF Independent Evaluation Office, 2025).

How that distressed debt is restructured can have significant impacts on EMDEs' sustainability prospects. The Independent Expert Group on Debt, Nature and Climate, established by the Governments of Colombia, France, Germany and Kenya, has concluded that this relationship amounts to a 'vicious cycle' that can trap countries in financially, environmentally and socially unsustainable patterns of commodity dependence, biodiversity loss and financial instability (Songwe and Kraemer, 2024). Academic and civil society researchers have likewise called attention to this relationship, particularly in the Amazon Basin (Red Latinoamericana por Justicia Económica y Social—Latindadd, 2024). **Figure 4.1** traces this 'vicious cycle', in which an austerity- and commodity-export-focused debt resolution process deepens an EMDE's dependence on unregulated and under-regulated commodity production, threatening community land rights, damaging biodiversity, worsening climate vulnerability and economic fragility, and ultimately positioning them to need more borrowing in cases of extreme weather events.

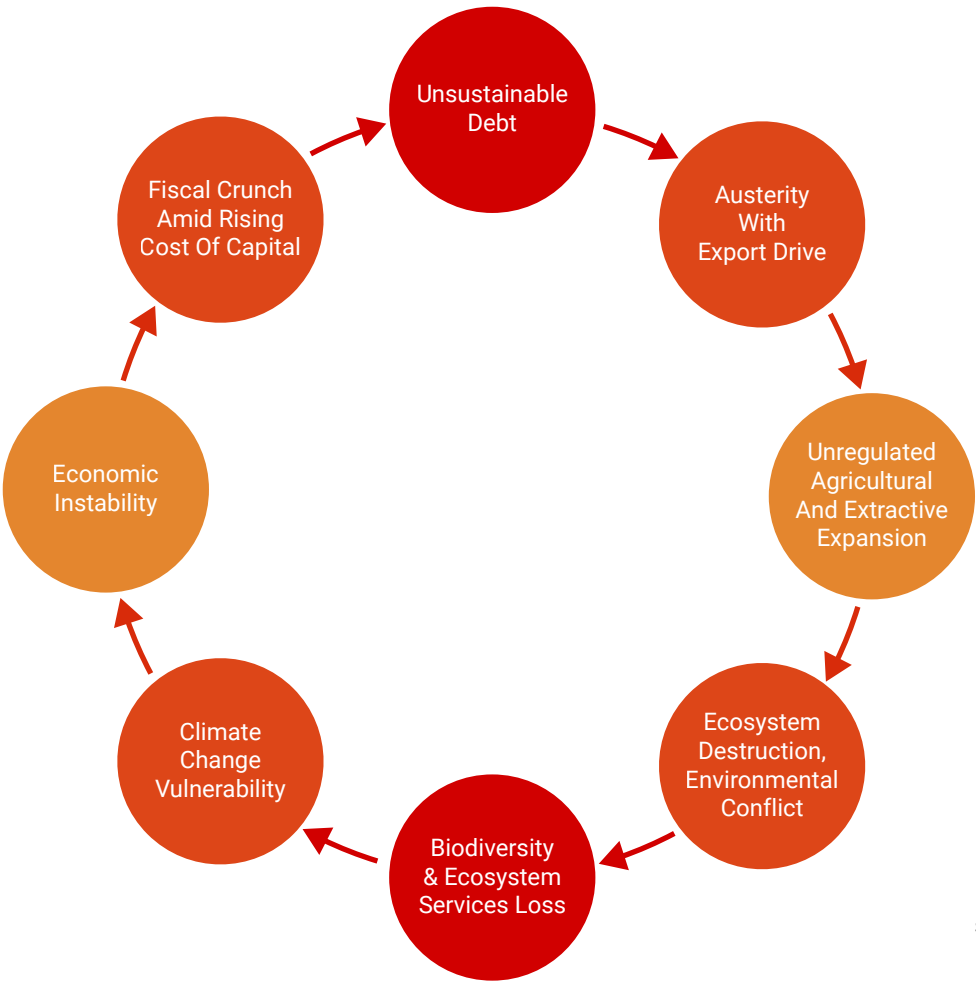
As **Figure 4.1** illustrates, sovereign debt restructuring processes are typically accompanied by IMF agreements, which come with policy conditionalities aimed at enabling debt repayments, but which may cause other negative impacts (see for example Forster et al. 2024; Kentikelenis and Stubbs 2023). These typically include fiscal austerity measures—reducing government deficits or requiring government surpluses—often carried out by reducing government payrolls and eliminating public sector jobs and

investments (Kentikelenis and Stubbs, 2023; Ray et al., 2022). While austerity may lead to balanced budgets in the short term, in the long term it is linked to disinvestment from human and natural capital and efforts to diversify away from commodity dependence (Kharas and Rivard, 2022). During these periods of debt resolution, governments face strong incentives—sometimes including direct conditions in IMF agreements—to boost exports so as to build up international currency reserves to ensure their ability to repay debts.

While exports are key to economic recovery prospects, developing countries’ traditional dependence on commodity production—paired with the high cost of capital during debt restructuring—makes it likely that these export booms will be concentrated in natural resource-intensive agriculture and extraction sectors rather than industrial production. The combination of government austerity and a commodity export drive can prove a dan-

gerous mix, resulting in reduced institutional capacity for regulating the natural resource sectors that traditionally comprise the majority of developing country exports. For example, recent research by UNCTAD estimates that 85 percent of least developed countries are commodity-dependent, meaning that raw materials in the agriculture, mineral or energy sector comprise 60 percent or more of their exports (UNCTAD, 2025a). Thus, during a rapid export expansion, growth is likely to be concentrated in natural resource-intensive sectors rather than manufacturing sectors with greater value-added. This represents a lost opportunity for economic diversification, and also has direct costs, as commodity production encroaches on ecosystems, threatens the traditional communities that depend on those ecosystems for their livelihoods, and deepens climate vulnerability by eroding ecosystem services. Not surprisingly, UNCTAD (2025a) finds that 19 of the 20 most climate-vulnerable countries in the world are also the heavily commodity-dependent.

Figure 4.1 **A vicious cycle of debt, extraction, biodiversity loss and climate vulnerability**



Source: Authors’ compilation

Reducing government oversight during an expansion push of natural resource sectors can create unregulated or under-regulated agricultural and extractive expansion into previously intact ecosystems, damaging forests and threatening Indigenous Peoples and other forest-dwelling communities (Forster et al., 2024). Ultimately, such expansions risk ecosystem destruction and environmental conflict, as formal sector productive frontiers move into lands traditionally owned, managed or set aside for Indigenous Peoples and other community use. In the first attempt to measure this relationship, Forster et al. (2024) find that IMF programme participation is associated with 9.2 percent additional average annual deforestation in the borrowing country. This association is striking but unsurprising, as IMF agreements tend to recommend an austerity footing for governments, while also promoting export growth, without measures to protect vulnerable ecosystems and local communities.

Another important aspect of austerity's impact on natural resource sectors is its ability to exacerbate corruption, which is already a common aspect of the 'resource curse' in commodity-dependent countries (see for example Bulte and Damania, 2008; Sharma and Mishra, 2022). Under commodity dependence, incoming revenues from exports are typically concentrated among a relatively small and well-connected economic interest group such as large landowners or mining firms, giving them outsized influence over policy. Under conditions of austerity, questions of which parts of national budgets are cut and how severely can depend on which sectors are best connected to decision-makers. Thus, Reinsberg et al. (2021) find that IMF

The IMF's own research suggests that austerity provisions do not enhance growth prospects during times of crisis, and that therefore both the IMF and its member countries would be better served by a new approach, one less dependent on austerity and the danger it poses to traditional communities and the ecosystems that support them.

lending is associated with increased corruption, making it more likely that economically powerful sectors will be able to use moments of austerity to further their own economic interests and reduce government oversight of their activities. These pathways exacerbate the relationship between austerity and deforestation.

The loss of intact ecosystems intensifies climate change by destroying carbon sinks and can be devastating for Indigenous Peoples and other forest-dwelling or ecosystem-dependent communities. Less well-known are the commercial impacts of biodiversity and ecosystem services loss, often affecting the same commodity-based industries that took the place of intact ecosystems. Tropical forests serve as important regulators of local temperature and rainfall patterns, meaning that agro-industrial activities in associated areas are likely to suffer from reduced and less predictable rainfall patterns in the future (Duku and Hein, 2021; Gou et al., 2022; Lovejoy and Nobre, 2018; Nasi, 2025; Qin et al., 2025; Spracklen et al., 2018).

In essence, the loss of ecosystem services—such as rainfall regulation, hydropower and transportation—is the opposite of climate change adaptation investment. As the Asian Infrastructure Investment Bank noted in its 2023 report *Nature as Infrastructure*, ecosystems are a form of natural infrastructure, creating public goods that provide the basis for and protection of economic activity (Asian Infrastructure Investment Bank, 2023). Without these services, productive sectors face greater risks from climate change-linked extreme weather events such as droughts, floods and tropical storms. These increased levels of climate change vulnerability can undermine investors' confidence and result in downgrades in countries' credit ratings, raising the cost of capital, making financial crises more likely, and even cutting off access to international capital markets. For example, the Task Force on Climate, Development and the IMF (2023) finds that highly climate-vulnerable countries are more likely to go to the IMF for agreements to support economic stability, which has been undermined by increasing climate variability.

In the ever more frequent cases of extreme weather events, countries face an immediate reduction in fiscal space from increased demands for reconstruction and social supports, as well as a reduced tax base from a damaged productive base. Furthermore, these risks are priced into bond ratings, so countries in this situation face a higher cost of capital to support these new fiscal demands (Serhan and Jalles, 2021). This combination makes debt stress more likely, as higher fiscal demands meet higher capital costs, leading to a return to the beginning of the cycle with unsustainable debt.

Amidst this vicious cycle, coordinating debt relief among creditors is becoming a more complex task, because the number of creditors has broadened. [Figure 4.2](#) shows the importance of

different sovereign creditor categories over the past 20 years to low-income, lower-middle-income and upper-middle-income countries. Twenty years ago, most of low-income and lower-middle-income countries' debt was made up of two categories: Paris Club creditors and multilateral lenders, whose boards were dominated by Paris Club countries. Thus, debt relief initiatives could be fairly easily coordinated among a handful of high-income governments and their representatives to multilateral lenders. More recently, all these levels of developing countries have relied less on credit from Paris Club creditors, and more on multilateral and commercial creditors (for low-income countries); China (for low-income and lower-middle-income countries); and sovereign bonds (for middle-income countries).

The following section shows how this vicious cycle—and the complicated task of coordinating debt relief and building a more constructive approach to resolving unsustainable sovereign debt—has emerged in the case of Cameroon. This country has resolved debt with the assistance of the IMF, involving a commodity export boom amidst fiscal austerity, resulting in soaring levels of

deforestation, exacerbating climate vulnerability and economic instability and raising the likelihood of future debt crises.

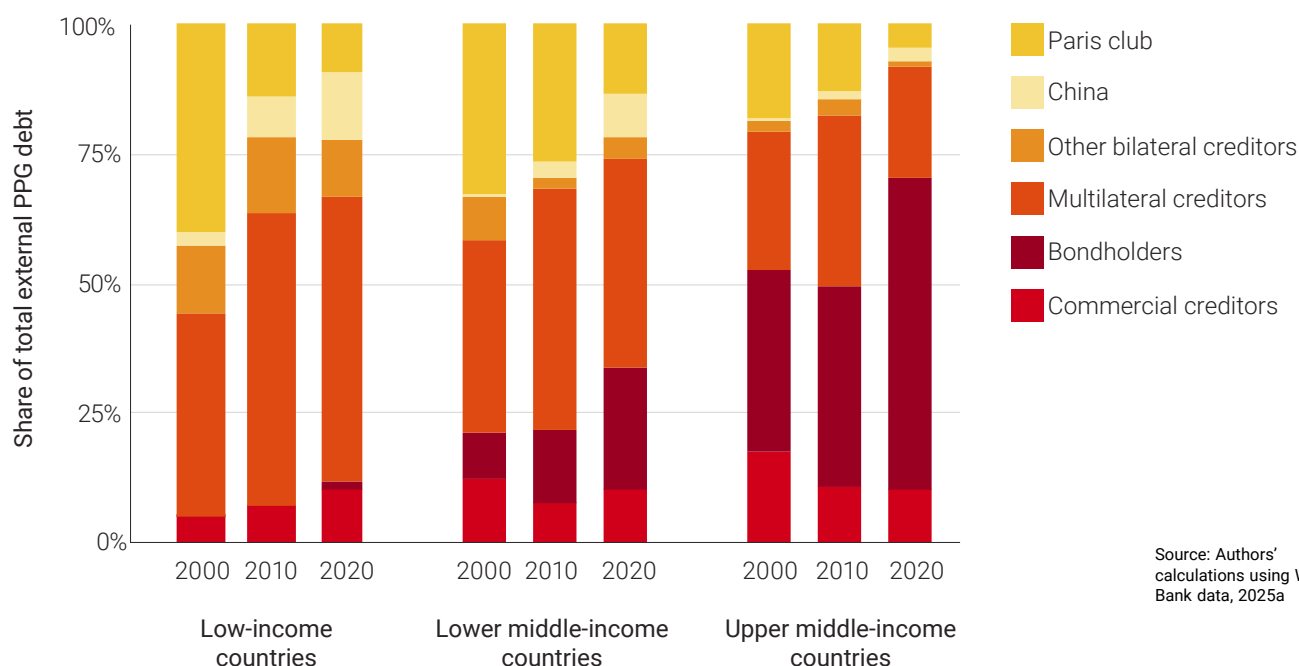
4.2 Case study: Cameroon

At first glance, Cameroon's external public and publicly guaranteed (PPG) debt levels do not appear historically high. As Figure 4.3 shows, they rose to a COVID-19 era peak of approximately 30 percent of GDP in 2020. This pales in comparison with the level of 86 percent of GDP in 2000, the year Cameroon entered into the Heavily Indebted Poor Countries (HIPC) programme, through which the IMF and the World Bank oversaw debt relief. As Figure 4.3 shows, during the years of Cameroon's HIPC participation—2000–2006—approximately USD 1.27 billion in debt was cancelled and the country's external PPG debt fell by over three-quarters (African Development Bank, 2006).

Nonetheless, Cameroon's challenge in repaying its debt has risen beyond the historic levels of the 1990s. As Figure 4.3 shows,

Figure 4.2 **Low- and middle-income country debt, by creditor category, 2000–2020**

Multilateral creditors include use of IMF credit. PPG = public and publicly guaranteed



Source: Authors' calculations using World Bank data, 2025a

Figure 4.3 **Cameroon’s external PPG debt burden, 1998–2023**

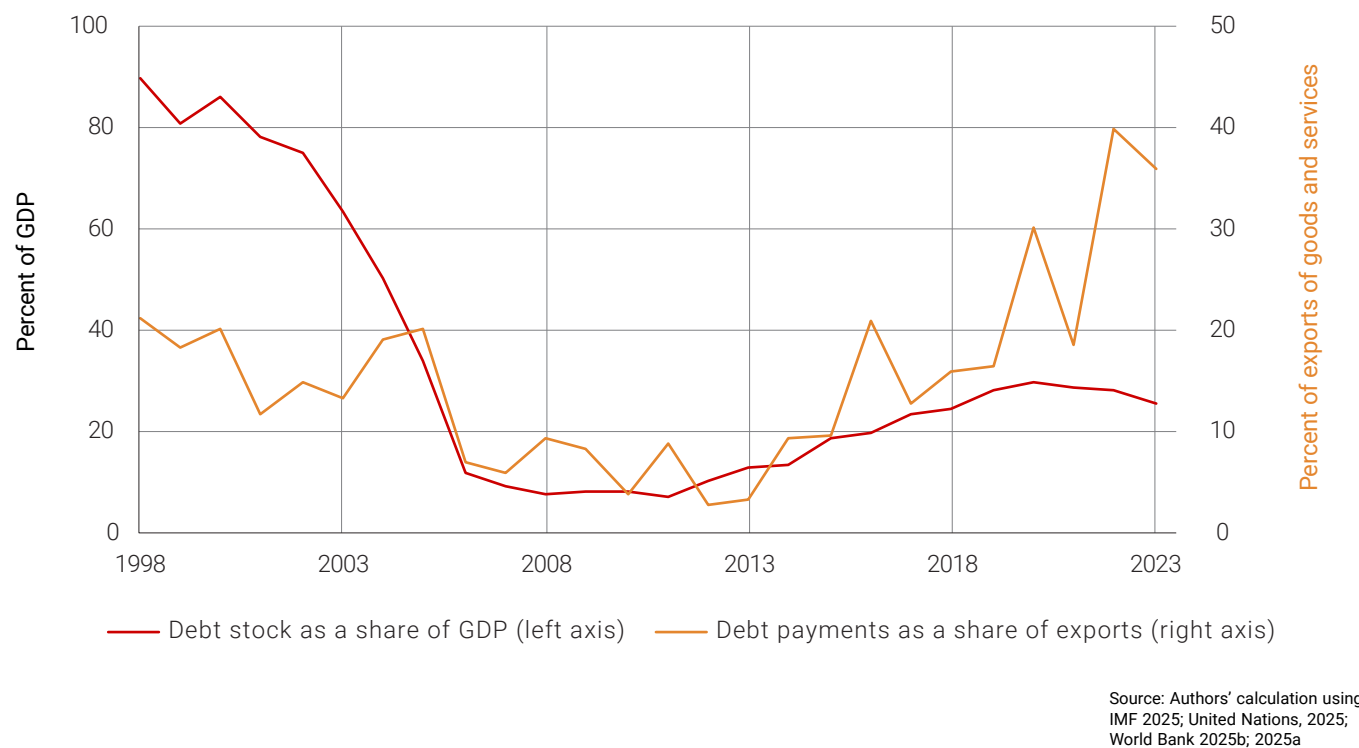
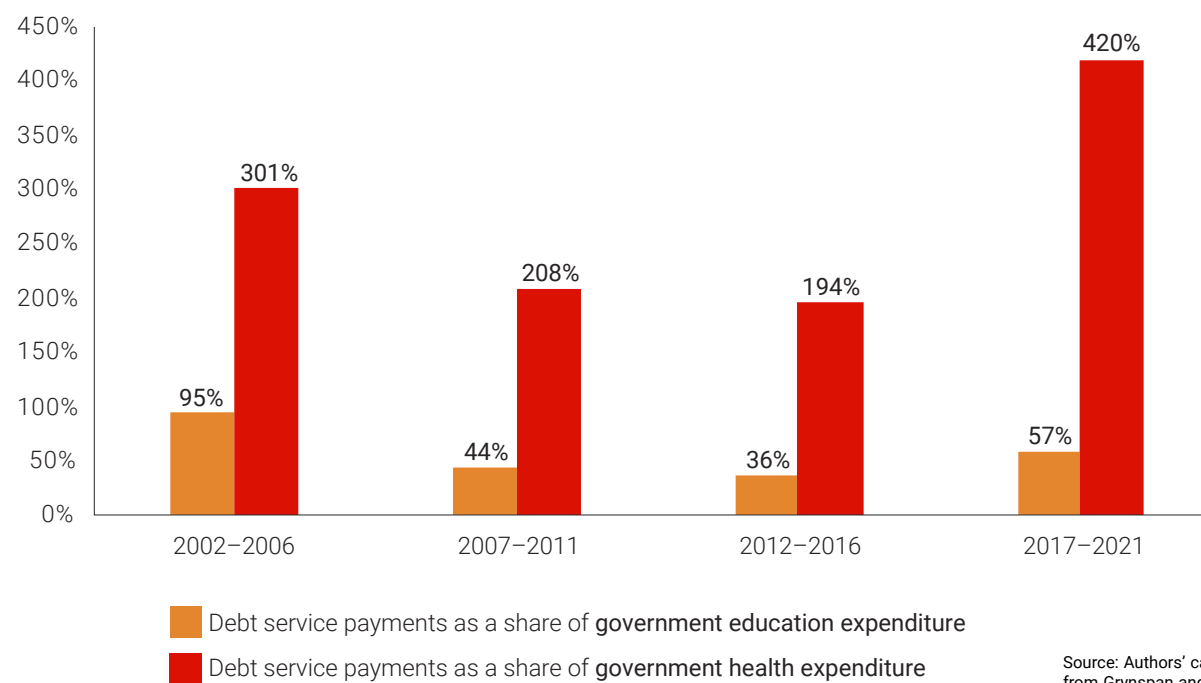


Figure 4.4 **Cameroon’s external PPG debt service payments, relative to government health and education spending**



Cameroon’s debt service payments have doubled as a share of exports, rising to 40 percent of the dollars flowing into the country from exported goods and services. Thus, even as Cameroon’s debt levels may seem sustainable, the country must dedicate more than one-third of its incoming dollars to repaying this debt.

This debt repayment burden has also grown recently in comparison with other government priorities such as health and education spending, as shown in [Figure 4.4](#). While Cameroon’s debt repayment has always been high relative to social spending—during the lower debt burden years of the late 2000s it fell to just under twice the healthcare budget and one-third of the education budget –it has rebounded dramatically in the past decade. From 2017 to 2021, external PPG debt service payments amounted to more than half of domestic education spending and over four times domestic health spending.

Part of the reason for this increasing burden of debt service payments as a share of export revenue and as a government spending priority is that export revenue itself has fallen, due to declining petroleum production, which has declined by nearly half, from the equivalent of 245 511 terajoules in 2000 to just 148 102 terajoules in 2022 (Hyacinthe and Nagar, 2000; International Energy Agency, n.d.). In line with this falling oil production, Cameroon’s exports of goods and services fell by the same amount: from 17 percent to 9 percent of GDP (IMF, 2025).

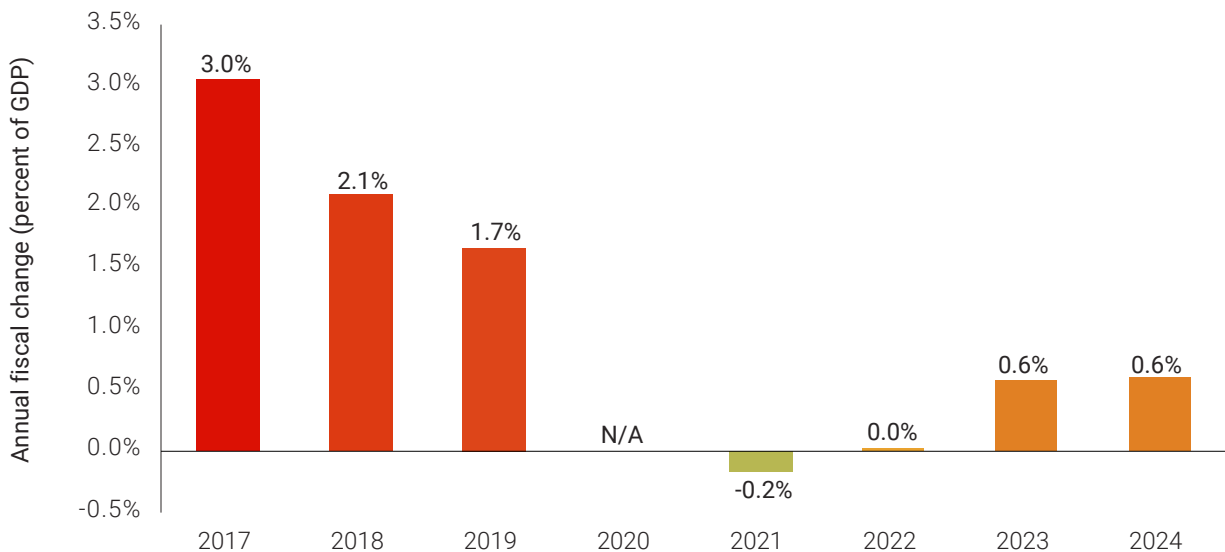
Since 2017, Cameroon has had two active agreements with the IMF, signed in 2017 (extended through 2021) and 2021 (extended through 2025). Each of these agreements had the stated aims of achieving economic stability in both the fiscal and external (trade and debt) sectors amid declining exports and increasing debt service payments (IMF, 2021, 2017).

These agreements’ quantitative performance criteria (binding targets) aim to tighten government fiscal balances, to ensure that the Government has an adequate supply of dollars to pay debts and address other obligations. To meet this binding target, the IMF advised that Cameroon reduce tax exemptions and fuel subsidies, including ‘fuel at the pump’ subsidies that directly benefit consumers (IMF 2017; 2021).

[Figure 4.5](#) shows the size of the fiscal tightening (positive numbers) or loosening (negative numbers) prescribed each year in Cameroon’s IMF agreements, as a share of GDP. Cameroon did not have an IMF agreement in 2020; in 2021, its IMF agreement allowed the country’s budget balance to fall by 0.2 percent of GDP as it continued to face challenges related to the COVID-19 pandemic, but thereafter the agreements returned to requiring significant fiscal tightening, of 0.6 percent of GDP in 2023 and 2024.

While these targets do not specifically require the Government of Cameroon to cut personnel or government services, they effectively pass on the austerity footing to households and firms

Figure 4.5 **Budget tightening (positive) or loosening (negative) prescribed in Cameroon’s IMF agreements, 2017–2024**



Source: Authors’ calculations using IMF data and Ray et al. 2022

through higher taxes and reduced fuel subsidies. Facing these higher costs, households and firms must cut their own expenses or increase their own revenues to compensate. As a result, this fiscal consolidation, combined with the scarcity of US dollars needed to pay for debts and imports, has increased macroeconomic pressure on firms to expand export-oriented production in order to generate hard currency.

This raises pressure to increase production of Cameroon's top non-petroleum export commodities: cocoa, cotton and hardwood. These three products, together with petroleum, accounted for 75 percent of Cameroon's exports in 2021, the last year for which complete data are available (United Nations, 2025). Commodity price growth for the three non-petroleum commodities has compounded the incentive to expand production into more distant areas that had not previously been financially attractive. In particular, cocoa has seen its price grow more than tenfold since 2000 (IMF, 2025). Unsurprisingly, Cameroon's exports of cocoa have more than tripled in the past 20 years, and hardwood exports have doubled in the same period (United Nations 2025).

These shifting uses of land pose a major threat to Cameroon's forests. Prior to 2016, the major driver of deforestation and for-

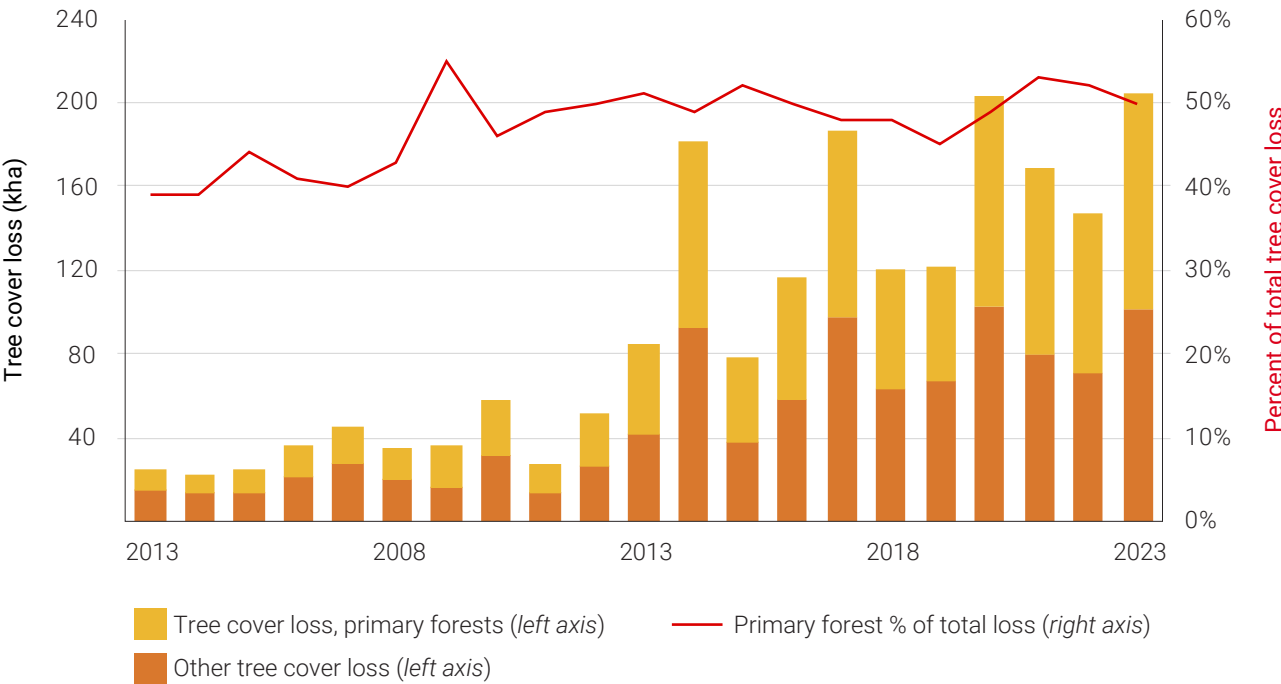
est degradation was small-scale farming, but thereafter the main driver has shifted to commodity production, particularly cocoa and logging (Defo, 2023; Epule et al., 2014; Ngouhouo-Poufoun et al., 2024; Teegne et al., 2016; World Bank, 2022). Overall, by 2023 more than 98 percent of tree cover loss was attributable to these shifts in agricultural commodity production (GFW, 2025). This trend falls within a long-documented history of commodity price increases driving commodity-linked deforestation (Berman et al., 2023; Gaveau et al., 2009; Grogan et al., 2019; Larson and Bromely, 1991; Richards et al., 2012; Verburg et al., 2014).

The country's tree cover loss has accelerated dramatically in recent years. **Figure 4.6** shows Cameroon's annual tree cover loss, both within and outside primary forests, and the share of tree cover loss that has occurred within primary forests. Annual tree cover loss has grown more than eightfold during this 20-year period, and annual rates of tree cover loss within primary forests have soared more than tenfold. The share of tree cover loss occurring within primary forests was below 40 percent in the early 2000s, but has risen above 50 percent in the past few years.

As commodity production has threatened Cameroon's biodiversity, it has also encroached on Indigenous lands. In particular,

Figure 4.6 **Cameroon's tree cover loss by type, 2003–2023**

Tree cover loss shown here includes loss in areas with 30 percent + canopy density.



Source: Authors' calculation from GFW 2025

Cameroon's *sacred forests* have customarily been reserved for tribal ritual and livelihood purposes, and are protected by custom and religious tradition, but not by law. Cameroon's legal system for land tenure recognizes two categories of land: public and private. Private land is owned individually rather than communally, and is distinguished by showing 'visible development', which excludes the possibility of formally recognized communal land rights or privately held forests (Ngono and Olinga, 2023; Wily, 2011). This land tenure system leaves chiefdoms vulnerable. According to civil society reports, as much as 60 percent of sacred forests have been lost over the past 30 years (Robinson, 2024).

A growing body of scientific literature shows that tropical forests provide crucial support and regulation for rainfall in downwind areas. As upwind tropical forests are disturbed, downwind rainfall patterns become more volatile and less plentiful. Recent empirical research has demonstrated this pattern in Western and Central Africa and specifically within the Congo Basin (Duku and Hein, 2021; Gou et al., 2022). Modeling suggests that a tipping point may exist, and that a Congo Basin forest reduction of 26 percent may interrupt the hydrological cycle, which is in line with previous research into such a tipping point in the Amazon Basin (Ewane, 2022; Lovejoy and Nobre, 2018).

A lack of dependable rainfall brings risk to agriculture anywhere. This pattern is particularly strong in Cameroon, which hosts one of the world's most climate-vulnerable agricultural sectors,

Cameroon's increasing climate vulnerability is putting downward pressure on bond ratings and thus exerting upward pressure on the interest rates that it faces when it issues sovereign bonds.

due in part to extremely low irrigation rates of just 0.1 percent of farmland (FAO, 2025c; Notre Dame Environmental Change Initiative, 2025). Thus, any interruption in rainfall is likely to bring significant interruptions to the very agricultural commodity production that is threatening the forests.

Cameroon's increased dependence on commodity agriculture, which in turn is dependent on increasingly volatile rainfall, raises the country's cost of borrowing. In its March 2025 bond rating announcement for Cameroon, S&P Global specified that "... volatile commodity prices, security issues, and climate-related events add risks" to Cameroon's growth outlook (S&P Global, 2022). Cameroon's increasing climate vulnerability is putting downward pressure on bond ratings and thus exerting upward pressure on the interest rates that it faces when it issues sovereign bonds. These higher interest rates reflect expectations that Cameroon's economic prospects have become more fragile, and that any future extreme weather event will raise the likelihood that it will need to borrow more, or encounter difficulty in paying existing debts, as it faces the need to finance rescue and reconstruction operations, as well as to compensate for lost revenue from damaged crops.

The Government of Cameroon has shown significant political will to curb deforestation and build sustainable agricultural practices. Cameroon is a signatory to the 2021 Glasgow Leaders' Declaration on Forests and Land Use, and a participant in the Central African Forest Initiative (CAFI) in partnership with donor governments from Europe, the Republic of Korea and the United States of America (Glasgow Leaders' Declaration on Forests and Land Use, 2021; CAFI-Cameroon, 2024). With CAFI support, Cameroon has developed the *Fonds de Développement des Filières Café et Cacao* (FODECC), a fund to support smallholder coffee and cacao growers in sustainable intensification of production methods (FODECC 2020). CAFI has pledged to provide approximately one-third of FODECC's budget over a three-year period, with the remaining funds expected to come from levies on coffee and cocoa exports (CAFI-Cameroon 2024). Furthermore, in 2025 Cameroon instituted a reduction of 20 percent of export levies for cocoa, rubber and logs that have 'zero deforestation' certification, to incentivize producers to meet the standards of the European Union's 2023 Regulation on Deforestation-free Products (Business Cameroon, 2025; Regulation on Deforestation-free Products, 2023). These are important steps, which will need to be complemented by structural changes to the relationship between Cameroon and its creditors in order to fully curb the encroachment of export agriculture on forests and community lands.

Since the outbreak of the COVID-19 pandemic, Cameroon's creditors have extended some measure of debt relief. As [Figure 4.7](#) shows, bilateral debt to G20 countries—particularly China and

Paris Club creditors—accounts for a large share of Cameroon’s external PPG debt, making Cameroon eligible to use the G20’s COVID-era Debt Service Suspension Initiative (DSSI). Cameroon’s participation in the DSSI allowed it to reschedule USD 879 million in payments on bilateral debt to G20 member countries in 2020 and 2021 (Johns Hopkins University China-Africa Research Initiative, 2021; Paris Club, 2021; World Bank, 2025a). In addition, USD 99.4 million of Cameroon’s debts were forgiven by China, France and the United States.

However, other creditors (multilateral banks, the IMF and bondholders) made up over half of Cameroon’s PPG debt stock and almost half of its debt service payments, but did not extend this type of debt forgiveness or suspension (World Bank, 2025a). This disparity is not unusual, as multilateral development banks do not typically engage in debt restructuring and bondholders typically do so after official creditors, benefiting from a *de facto* seniority in their treatment (Schlegl et al., 2019; Zucker-Marques et al., 2023). Without significant structural reforms to the way that sovereign debt is issued and restructured, Cameroon will

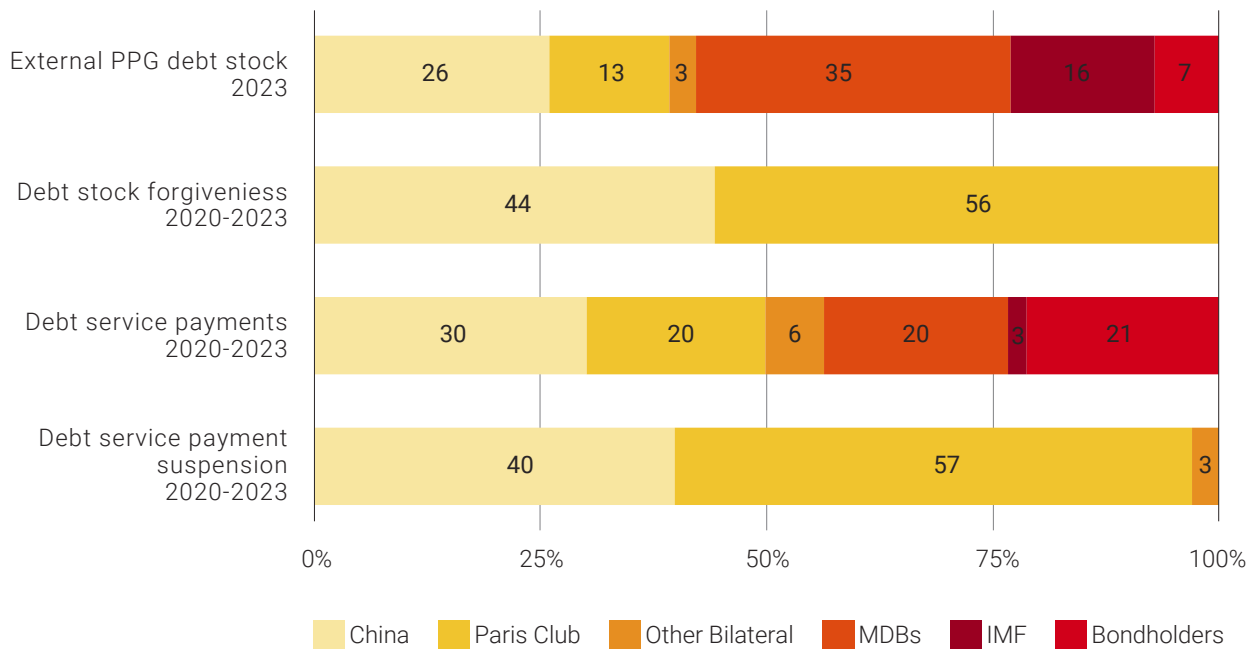
continue to find itself trapped in a vicious cycle of debt, commodity dependence, biodiversity loss, climate vulnerability and economic fragility.

4.3 Business-as-possible: positive alternatives

In Cameroon and more broadly, it is possible to work towards an alternative virtuous cycle around the world, one built on increased institutional capacity, well-regulated agricultural and extractive sectors, forest-dwelling and ecosystem-dependent community participation, climate change resilience, and economic and fiscal stability. [Figure 4.8](#) represents an alternative virtuous cycle.

Interrupting vicious cycles requires changing a key, early policy response. Indeed, the moment in the cycle most closely associated with triggering a vicious cycle is how debt is treated: whether to resolve unsustainable debt through a combination

Figure 4.7 **Distribution of Cameroon’s external PPG debt and debt relief, by creditor category**
Commercial banks are listed according to their county of registration. IMF debt is defined as use of IMF credit and Special Drawing Rights; IMF service payments are defined as repurchases and charges.



Source: Authors’ calculations from (World Bank, 2025a)

of fiscal austerity and commodity-led export growth, or perhaps through a positive alternative.

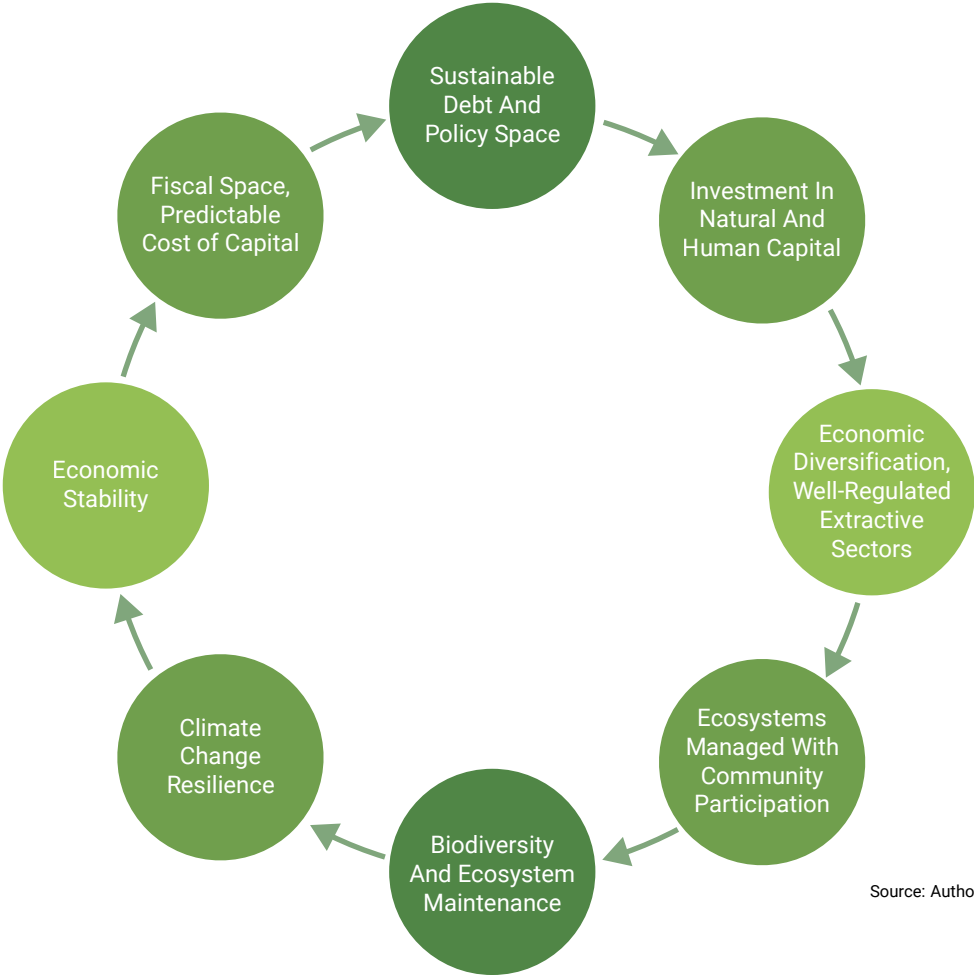
The Independent Expert Group on Debt, Nature and Climate—convened by the Governments of Colombia, France, Germany and Kenya—has released a blueprint for reform, complemented by a host of academic and civil society research (Songwe and Kraemer, 2025). This section summarizes these calls for reform and how they can contribute to a more financially, environmentally and socially sustainable path forward.

First, meaningful debt restructuring depends on a shared understanding of countries’ climate risks and Sustainable Development Goal (SDG) investment needs. Modest restructuring that merely aims for short-term fiscal balances but ignores these longer-term needs will result in rising climate change vulnerability, greater economic fragility and repeated debt crises. The IMF and the World Bank have begun to incorporate climate change

risks into their Debt Sustainability Analyses (DSAs). But they do not yet account for how lost biodiversity feeds climate risks. By incorporating the role of nature in preserving economic stability—as reflected in the Asian Infrastructure Investment Bank’s framework of “nature as infrastructure”—in enhanced DSAs, the IMF can ensure that debt relief provides for a more resilient future (Songwe and Kraemer, 2025; Zucker-Marques, et al., 2024).

Second, the IMF can play an important role in overseeing periods of debt restructuring. The IMF’s own research suggests that austerity provisions do not enhance growth prospects during times of crisis, and that therefore both the IMF and its member countries would be better served by a new approach, one less dependent on austerity and the danger it poses to traditional communities and the ecosystems that support them (Blanchard and Leigh, 2013). Furthermore, during IMF agreements, equipped with the knowledge that austerity during a commodity export

Figure 4.8 **Virtuous cycle of conservation, participation and effective regulation**



Source: Authors’ compilation

boom is likely to bring environmental and social risks, the IMF can safeguard vulnerable communities and the ecosystems that provide their livelihoods by targeting these policy areas for protection, particularly given the frequency with which borrowing countries—like Cameroon—lack comprehensive legal land rights recognition for Indigenous Peoples and other traditional communities. For example, from 2000 to 2020, fewer than one in 1,000 IMF conditions targeted forest policy (Forster et al., 2024). Moreover, these instances were not universally supportive of conservation, but also included instances of targeting reductions in regulatory requirements for exports of agricultural and forestry products. For example, Albania’s 1995 IMF agreement and Indonesia’s 1998 agreement both recommended reducing or eliminating export taxes or licence requirements for wood or timber. Protecting, rather than encouraging the destruction of intact ecosystems, is key for long-term economic growth with stability.

Third, the international community needs a more constructive debt resolution mechanism. It is key to ensure that all creditors—including creditors’ groups such as the Paris Club and the G20, but also commercial creditors and bondholders—are included

in restructuring, and that the intra-creditor competition does not lead to a race to the bottom, where debtors end up with very thin debt relief. As the Cameroon case study shows, multilateral creditors and bondholders have frequently benefited from other creditors’ debt restructuring. After those official creditors have accepted reductions in expected payments, debtor countries are in a better position to be able to repay multilateral creditors and bondholders, which benefit from their own inaction. In repayment renegotiations, China has frequently balked at this inequality of treatment across classes of creditors (Acker et al., 2020; Brautigam and Huang, 2023).

To resolve this tension, creditors should consider adopting a ‘fair’ comparability of treatment (CoT) rule, which would adjust debt relief to the *ex-ante* interest rate provided by creditors (Zucker-Marques et al., 2024). For banks that issue loans on concessional terms—including MDBs, Paris Club governments and the Export-Import Bank of China—haircut levels would be quite modest, while commercial lenders and bondholders would be expected to make larger sacrifices, reflecting the fact that the risk of default was priced into the interest rates they originally

Table 4.1 **Areas for reform in the G20 Common Framework for Debt Treatment**

Brady-type bonds refer to the Brady Plan of 1989, in which unsustainable debts were exchanged for longer-term, lower-interest, sovereign-guaranteed bonds. For more, see Qian, 2021; Shenai and Bolhuis, 2023.

Challenge	Proposed reform
Slow, unclear process: CF negotiations are case-by-case, with unclear steps and timeline	• Create incentives to participate: automatic two-year debt standstill with no interest accumulation • Streamline negotiations: Apply common solutions to all countries in a given systemic crisis
Insufficient debt relief: CF negotiations rely on IMF Debt Sustainability Analyses (DSAs), with overly optimistic growth projections and failure to incorporate climate risk and SDG financing needs.	• Ensure IMF agreements do not worsen the risk of extreme weather events by using an enhanced DSA that incorporates the climate vulnerability impacts of IMF agreement conditions.
Weak enforcement of comparability of treatment (CoT) among creditors: CF has no clear rules or enforcement tools	• Create a simple “fair” CoT rule accounting for ex-ante risk pricing of private creditors and ex-ante concessionality of multilateral creditors
Lack of creditor participation: CF has no mechanism to ensure that all creditors participate fairly	• Create modalities of debt relief for different lenders’ preferences while respecting CoT rules, including options such as re-profiling official debt with reduced interest rates, bond buybacks at deep discounts, swapping non-performing bank debt for Brady-type bonds, and backstopping potential multilateral creditors’ losses with a replenished Debt Relief Trust Fund and selling a fraction of IMF gold.
Limited country coverage: CF excludes many middle-income countries (MICs) in need of debt relief.	• Expand CF eligibility to include MICs.

Source: Adapted from Zucker-Marques et al. 2025

charged. To deal specifically with commercial creditors' claims, the Debt Relief for a Green and Inclusive Recovery (DRGR) proposal suggests a 'carrots and sticks' approach, where creditors providing deep relief would swap old debt for newer sustainability-linked bonds that would come with a guarantee that shields creditors from a subsequent default episode (Zucker-Marques et al., 2024; Zucker-Marques et al., 2023). At the same time, it is important that legislation in countries with large bond markets, such as the United States and the United Kingdom, are suited to enforcing the participation of private creditors in debt restructuring. Beyond specific initiatives such as the DRGR proposal, calls have risen for platforms to resolve debt in a structured and multilateral way, providing predictability and fairness across all creditors and borrowers (Guzman et al., 2016).

These and other related reform proposals are being developed and presented for consideration by the G20 at its December 2025 meeting, convened by South Africa. [Table 4.1](#) summarizes areas for urgent reform in the current Common Framework for Debt Treatment.

4.4 Other proposals: debt swaps and commodity price-linked bonds

Since the spread of the COVID-19 pandemic, scholars have turned their focus to debt swaps as a way to discharge unsustainable debt and simultaneously raise capital for conservation, climate change adaptation or other development goals (Essers et al., 2021; Nedopil Wang and Yue, 2021). However, these swaps frequently present a mismatch between the institutional requirements for conservation planning (which requires significant time for community-based planning but only modest financial budgets) and debt restructuring (which requires rapid movement of large financial sums). For example, recent marine conservation debt swaps in Belize and Seychelles have widely been regarded as successful due to extensive stakeholder engagement to ensure that community ocean use could continue, while curtailing large-scale commercial fishing—a threat to traditional communities as well as to ocean biodiversity (Booth and Brooks, 2023; Jiang and Cao, 2024; TNC, 2022). These consultation processes took multiple years and required high levels of transparency, but a relatively modest level of debt was restructured in each case.

However, when debt stress emerges, debtor countries rarely have the time or institutional resources necessary to undertake multi-year processes. In a more recent example, Gabon sought a similar deal during debt stress, but was unable to muster sufficient institutional resources to guarantee transparency and appropriate use of funds, and The Nature Conservancy removed the label

Developing countries' traditional dependence on commodity production—paired with the high cost of capital during debt restructuring—makes it likely that these export booms will be concentrated in natural resource-intensive agriculture and extraction sectors rather than industrial production.

'blue bonds', as it could not guarantee that all proceeds would go towards marine conservation (Bryan, 2023). Given these challenges, a growing consensus is emerging that, while debt swaps may be useful tools for raising capital for communities-first conservation efforts that aim to dismantle systemic drivers of biodiversity loss, they are not the most appropriate approach for restructuring unsustainable debt levels during a crisis, when time and transparency are in short supply (Chamon et al., 2022).

In addition to resolving current debt in a just, sustainable and equitable way, creditors have important roles to play in shaping how new debt is issued. Given the immense investment needs for countries to meet the 2030 SDGs, it is crucial for development finance institutions—and particularly multilateral development banks that can draw on resources of high-income member countries—to grow with this new challenge. Large, rapid MDB capital increases, expanded options for MDB concessional finance and the use of credit enhancements such as guarantees and political risk insurance can ensure that MDBs play a constructive role in building a virtuous cycle between environmental and financial sustainability (Gallagher et al., 2024; Mariotti et al., 2025; Ray and Simmons, 2024).

Beyond MDBs, new types of credit have emerged, which are less likely to lead to cycles of instability and unsustainability. For example, commodity price-linked bonds are structured to rise and fall in their repayment burden in conjunction with the price of the borrower's export commodities, so that during a price decline, borrowers do not find themselves pressured to increase commodity production to make up the shortfall and

service their debts (Qian and Wang, 2022). Borrowers may also issue bonds with natural disaster clauses, which allow reduced or paused repayments during climate change-linked extreme weather events (Ho and Fontana, 2021).

Once sustainable fiscal and policy space has been maintained, other parts of the cycle can also be changed. Robust, consultation-based strategies for natural resource sectors and the regulations to oversee their production methods take time and resources to develop. For example, several years of civil society consultations formed an integral part of the creation of Chile's 'Energía 2050' energy transition strategy, including the strategy for developing the country's lithium reserves (Ministerio de Energía, Chile, 2021). Processes such as this are capacity-building for policymakers, the ministries tasked with regulating the energy and minerals sectors and the civil society groups that will eventually help to provide accountability for performance, and can result in well-regulated commodity sectors.

As regulatory and strategic capacity expands, ecosystems managed with community participation can be planned and implemented. Community-based biodiversity management has also shown to be an effective tool for biodiversity conservation, with case study evidence emerging particularly in Asian and Latin American experiences (Muttaqin et al., 2019; Norris et al., 2018; Tafoya et al., 2020). Other research shows that this approach benefits from additional time in planning stages to better mitigate specific local risks (Oestreicher et al., 2009; Rasolofoson et al., 2015; Ribot et al., 2010).

Such efforts take time, but by establishing successful biodiversity and ecosystem services maintenance, developing countries can prevent further vulnerability and build climate change resilience, reinforcing the foundation necessary for growth with economic stability, and preventing extreme weather events from eroding their fiscal space and cost of capital (Ziegler et al., 2012).

4.5 Conclusion

Given the interconnectedness of community land rights, climate resilience and biodiversity conservation with financial stability and robust, inclusive economic development, the world must act now to interrupt the vicious cycle that currently places each of these goals further out of reach. Only with meaningful reform to the way that current debts are resolved and new sovereign credit is issued can this cycle be replaced with a virtuous one that supports long-term economic, environmental and social well-being. Debt relief must be meaningful, rapid and involve all creditors. Furthermore, the relationship between countries and creditors must adapt to allow for the increasing climate change-related risks of extreme weather events and their impacts on borrowers' access to dollars. This is particularly crucial given how little responsibility the world's developing countries bear for these increasingly common catastrophic events. Once countries have the necessary breathing space, they can begin to plan and regulate a sustainable and inclusive path to economic production that safeguards their most marginalized communities and the ecosystems that support them.

Current dominant approaches to resolving sovereign debt deepen countries' commodity dependence and weaken their ability to protect marginalized communities and vulnerable ecosystems from the expansion of agricultural and extractive sector pressures.

CHAPTER 5

Tax reform and capturing illicit financial flows for forests

A huge log stacker unloads an entire logging truck in one lift, at the Squamish log sorting yard in British Columbia, Canada.



KEY MESSAGES

- Cross-border tax abuse and illicit financial flows undermine forest and biodiversity protection by depriving Global South countries, in particular, of essential revenue. International financial secrecy also shields multinational corporations and economic elites from accountability and facilitates environmental criminality and corruption.
- The current international tax system is neocolonial in character. It was created by wealthy nations and adheres to outdated principles, enabling massive corporate tax abuse and the degradation of natural resources without accountability.
- The UN Framework Convention on International Tax Cooperation represents a historic opportunity to reorganize the global distribution of taxing rights, to deliver a step change in financial transparency, democratize tax policy-making, confront abusive tax practices and align fiscal justice with environmental sustainability, ultimately creating an international tax system for sustainable development.
- Dysfunctional tax incentives afforded to extractive and fossil fuel industries perpetuate environmental destruction. They contradict the Polluter Pays Principle and deepen socioeconomic and ecological inequalities.
- Conversely, progressive taxation and financial transparency reforms can mobilize domestic resources and advance climate, land and human rights goals. Clear policy priorities should include wealth taxes, progressive environmental surtaxes on environmentally harmful capital and its income, and public beneficial ownership registries.

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Extractive industries, which are among the most environmentally destructive industries as leading drivers of biodiversity and forest loss, are also the lowest taxpayers of the global economy (Beer and Devlin, 2021; TJNA, 2024; Watson et al., 2019). Rather than being held accountable for the immense costs of their ecological damage, these sectors benefit from fiscal regimes that simultaneously subsidize harm and syphon vast sums of revenue away from public coffers (Mager et al., 2024). This chapter examines how tax incentives, illicit financial flows and exemption from a key international tax cooperation deal serve to perpetuate this injustice while also depriving Global South states, in particular, of vital resources. Moreover, the current international financial architecture not only enables massive levels of cross-border tax abuse in the sector, but also facilitates and incentivizes both legal and illegal activities that are devastating forests and biodiversity across the globe.

Conversely, a radical and progressive overhaul of international financial transparency and tax cooperation rules, as is possible through nascent negotiations for a UN Framework Convention on International Tax Cooperation, has the potential to recover hundreds of billions of dollars in lost revenue while also combating the opacity and profitability of environmentally-harmful activities. The effective democratization of tax policymaking at both national and international levels is necessary both to provide revenue for forest and land rights and to reorient the global economy away from destruction and degradation of the same. A transparent financial system is critical both for the collection of taxes and for tackling illicit financial flows linked to environmental crimes and rights abuses. Indeed, illegal deforestation was recognized as one of the key sources of illicit financial flows by the High-Level Panel on Illicit Financial Flows from Africa, known also as the Mbeki Panel (African Union, 2023). The same body defined illicit financial flows as money that is “illegally earned, transferred or utilised”, including for purposes of tax abuse, criminal activities or corruption.

The report highlighted how, for instance, Mozambican records for 2012 showed a total export of 260 385 cubic metres of logs and sawn timber, while records from China alone showed that 450 000 cubic metres of the same products were imported from Mozambique. This discrepancy suggests a major illicit outflow of capital, undermining revenue collection. Similarly, research has highlighted an important value gap in Peruvian timber exports, showing a discrepancy of USD 15.3 million per year in the period 2009–2018 (Pardo-Herrera, 2021). These examples are red flags for non-declaration of exports, whether to evade taxes, environmental or other regulations, or currency controls (Pardo-Herrera, 2021). The Financial Transparency Coalition also found a significant gap between exports and imports in Cameroon’s and Brazil’s timber trade, worth USD 3.2 billion and

USD 2.1 billion respectively in the years 2013–2023. Overall, illicit financial flows emanating from the global timber trade are estimated at between USD 51 billion and USD 152 billion (INTERPOL, 2021).

The following sections first examine how such abuse, along with financial secrecy and dysfunctional tax incentives, underpin and drive ecological harm and deforestation through both legal and illegal modalities, before providing an analysis of current efforts to address international tax abuse and illicit capital outflows. The chapter then examines the fundamental injustices embedded in an outdated international tax system. before elucidating how negotiations for a UN tax convention, together with national tax policies and progressive environmental taxes, might serve to align fiscal justice with forest and land rights protection.

5.1 How the current system lays waste to forest and land rights

Taxation is a key strategy for domestic resource mobilization to provide for societal development priorities, strengthen public services, enable climate mitigation and adaptation and support biodiversity protection. However, the current rules undermine the ability of developing countries, in particular, to capture a fair portion of the revenue of industrial and extractive activity through taxation. The international tax regime incentivizes forest loss and deprives tropical forest countries of critical sources of revenue to fund forest protection.

5.1.2 The big steal: corporate tax abuse

The most obvious manifestation of the way in which cross-border tax abuse erodes land and forest rights is the fact that governments lose billions of dollars in revenue every year—resources that might otherwise be deployed to protect forests and realize rights through, for example, the enforcement of forest policies, funding of Indigenous land titling or monitoring of deforestation. In the absence of such investment, land governance systems remain weak, creating conditions in which land grabbing and large-scale dispossession of IPs and LCs become more feasible for bad actors.

As things currently stand, cross-border tax abuse remains relatively straightforward for both multinational corporations and high net-worth individuals. A global ecosystem of financial secrecy and low- or zero-tax jurisdictions makes it easy for economic elites, including multinational corporations, to conceal their wealth and profits, and thereby avoid paying their fair share of taxation. As a result, some USD 492 billion is lost to cross-border

tax abuse every year (TJN, 2024a). Of this, about two-thirds (USD 347.6 billion) results from multinational corporations shifting profits offshore to avoid paying tax in the countries where they actually operate, and the remaining one-third (USD 144.8 billion) is due to wealthy individuals hiding assets offshore (TJN, 2024b).

Profit shifting and trade misinvoicing—the chief methods through which multinationals avoid paying the appropriate amount of tax on their profits—has been allowed to flourish due to inadequacies in the current international tax system. Through these techniques, companies manipulate the prices of goods and services supplied within their multinational group so as to ‘shift’ their profits from the country of actual economic activity into low- or zero-tax jurisdictions. Often, they have little or no real economic activity in the jurisdictions where they claim their profits were made.

Moreover, the current international financial architecture enables multinational companies to exploit tax incentives in countries other than those where they are actually extracting resources (Mager and Schultz, 2024). For example, Singapore offers generous tax exemptions to companies incorporated there for profits generated by selling resources not found within its borders. The mining giant Glencore is alleged to have avoided paying many millions of dollars in taxes from its operations in Africa and Latin America by channelling its profits through tax havens, including the British Virgin Islands, Singapore and Switzerland (Centre for International Corporate Tax Accountability and Research 2024). The company has even accrued massive tax credits in some countries, which can offset future tax payments. For instance, it booked tax credits of nearly USD 38 million in Colombia in 2020, thanks in part to its ownership of the Cerrejón, the

Profit shifting and trade misinvoicing—the chief methods through which multinationals avoid paying the appropriate amount of tax on their profits—has been allowed to flourish due to inadequacies in the current international tax system.

world’s second largest open pit coal mine. An environmental crisis attributed to the mine’s operations has meanwhile been held responsible for the deaths of over 5 000 Indigenous Wayúu children (Avilés, 2018; Deutsche Welle, 2022; Inter-American Commission on Human Rights, 2017).

The relative ease with which corporations can shift profits offshore also piles pressure on governments, which are incentivized to prioritize corporate interests over the protection of forests or the rights of local land users. As illustrated by the above examples, the perceived imperative of attracting foreign investment leads to overly generous tax policies and lax oversight, which in turn impedes the protection of fundamental human rights. This can in turn create a vicious cycle of dispossession and exclusion from political decision-making around, *inter alia*, land and tenure issues (FAO, 2019).

5.1.3 Financial secrecy: a shield for illegality

Financial secrecy policies simultaneously enable tax abuse and facilitate environmental criminality and corruption. International financial secrecy enables tax abuse by allowing corporations and wealthy individuals to hide profits and evade taxation through offshore accounts. It also facilitates environmental crimes and corruption by concealing the identities and finances of those involved in illegal logging, mining and land grabbing, thereby shielding perpetrators from accountability.

Environmental crimes, such as illegal logging and mining, along with the transport and sale of illegally sourced materials, can be extremely lucrative; environmental crime has been valued at up to USD 281 billion a year, of which approximately USD 51 billion to USD 152 billion a year is attributable to illegal forestry alone (FATF, 2021). The role of financial secrecy as a key driver of deforestation and environmental destruction should not be underestimated; without the opacity of the existing financial system, much of the harmful activity that is currently so lucrative would be either impossible or unprofitable.

Meaningful enforcement of the forthcoming European Union Deforestation Rule, which also prohibits key agricultural products from being imported into the EU from recently (post-December 31 2020) deforested land, is likely to prove exceedingly difficult without new measures to ensure transparency throughout the supply chain, including on who benefits from the trade of agricultural products. As things currently stand, while deforestation can be mapped in terms of satellite data, it is difficult to link deforestation (legal or illegal) to land ownership data unless the latter is made public. This is the case in Brazil, where environmental records of land are available, but land titles are not. A report by the Financial Transparency Coalition estimates that 48 percent of all soy and 15 percent of all beef pasture land in the Brazilian

State of Mato Grosso lacks a deforestation permit, rendering it potentially illicit in terms of exports and worth billions of dollars in annual exports (Daniels et al., 2025). The UN Office on Drugs and Crime, meanwhile, reports that virtually all the deforestation and environmental degradation being experienced in the Amazon Basin is linked to illegal activities (UNODC, 2024).

5.1.4 ‘Greenlaundering’ of ‘legitimate’ finance

It is not only criminal enterprises that are responsible for the fiscal and environmental harm that is playing out. The banks and financial institutions that provide capital and other financial resources to the extractive sector also appear to be complicit in fostering the continued destruction of ecosystems through the use of tax havens and secrecy jurisdictions. Research by Tax Justice Network shows that 68 percent of the fossil fuel financing provided by the world’s 60 largest banks—approximately USD 7 trillion—is channelled through secrecy jurisdictions (Mager and Schultz, 2024).

The widespread use of shell companies enables banks to conceal the extent of their financial support to fossil fuel companies, which are often linked to tropical forest degradation (Mager and Schultz, 2024). Despite signing up to sectoral commitments to phase out support to environmentally destructive activities, such as the Glasgow Financial Alliance for Net Zero and the Net Zero Banking Alliance, many of the world’s largest banks continue to channel funds to precisely these harmful extractive sectors by routing disbursements through financial secrecy jurisdictions (Mager and Schultz, 2024). Worse still, many banks have now pulled out of even these commitments amidst the current global regression in environmental commitments (Gayle, 2025).

It is well-known that multinational companies use ‘internal capital markets’ to distribute resources through complex webs of subsidiaries and, ultimately, to various activities including exploration, extraction and production (Ochiali, 2023). This means that loans or other forms of financial support provided to one company within the group are routinely redirected to and used by another.

Opaque financial structures also enable companies to secure more favourable terms of credit by obfuscating the fact the money will be used to extract fossil fuels, cause deforestation, or otherwise harm biodiversity, in violation of stated commitments by companies and financiers. By failing to establish clear and comprehensive exclusion policies, which take into account the widespread use of secrecy jurisdictions, the banks involved can meanwhile rely on ‘planned ignorance’ to under-report their exposure to environmentally harmful activities (Mager and Schultz, 2024).

Box 2:

In the line of fire: Land rights defenders

Those who seek to defend the land often find themselves targeted for persecution, with financial secrecy again playing a key role in enabling impunity. By structuring their investments through secrecy jurisdictions, corporations can obscure the identity of ultimate beneficial owners (Zucman, 2016), in turn making it difficult for civil society to hold corporate actors accountable for deforestation or forced displacement (Global Witness, 2024).

Following the 2016 murder of Honduran environmental activist Berta Cáceres, investigations revealed a complex money trail that appeared to link the chief executive and chief financial officer of Desarrollos Energéticos Sociedad Anónima—the company behind the dam project against which Cáceres was protesting—to the hit squad that killed her (Olson, 2022).

The murder of Berta Cáceres became one of the most high-profile of recent years, but hers is an exception to the rule in that at least some of those involved were held to account (family members believe the most powerful individuals involved remain at large) (Olson, 2022). Impunity has remained the norm for those behind most of the 2 253 land and environmental defenders killed between 2012 and 2024 (Global Witness, 2024).

5.1.5 Dysfunctional tax incentives drive forest loss

One of the most potent and pernicious, but ‘legitimate’, modalities through which fiscal policies drive the destruction of ecosystems is the provision of dysfunctional tax incentives and subsidies to extractive industries that cause forest and biodiversity loss. Many developing countries, in a bid to attract foreign investment, offer tax incentives to extractive industries (Althouse and Svartzman, 2022; UNDESA, 2024). Tax incentives granted by governments represent a preferential tax treatment in the form of either ‘income-based’ incentives, which change the way a specific income is taxed, for example via reduced tax rates or tax exemptions, or ‘expenditure-based’ incentives, which reduce the tax liability by allowing the deduction of some particular costs (Padilla, 2020). While it is frequently argued that such tax incentives are necessary to attract foreign investment, it is well documented that the importance of such tax breaks is overstated. The presence of adequate infrastructure, human capital, market access and political stability is at least as important to investment decisions (Masiya and et al, 2024; Meinzer et al., 2019).

It is hardly controversial to state that fossil fuel subsidies, which include but are not limited to tax incentives, represent one of



Critical habitat for the critically endangered Swift Parrot. Esperance forest, southern Tasmania, was primary forest with a few large trees logged selectively more than 80 years ago. In 2021, this forest was industrial clearfelled.

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the most significant threats to a just transition. Explicit tax incentives afforded to the sector still run to many hundreds of billions of dollars, with the International Institute for Sustainable Development estimating that government support to fossil fuels reached USD 1.5 trillion in 2023 (Gerasimchuk et al., 2024).

Whereas fossil fuel subsidies, including tax incentives, are widespread and partially documented, global data on tax incentives granted to other sectors hazardous to people's and the planet's health, like agribusiness and mining, are often not available (Beghin, 2024). These tax incentives are nonetheless exacerbating the ecological crises, increasing food insecurity and inequality (Beghin, 2024).

Importantly, the provision of such fiscal support artificially depresses the supply costs of these industries, thereby ensuring that the environmental damage they cause continues. These facts manifestly fly in the face of the Polluter Pays Principle, which states that environmental harms should be internalized by polluters and that such costs should not be passed on to the public (United Nations, 1992).

A case study by Christian Aid, the Financial Transparency Coalition and Latindad (2022) highlights how Brazil's state tax policies contribute to the disastrous exploitation of the Amazon by the industrial bauxite mining sector, using Mineração Rio do Norte (MRN) as the case example. The company's operations in Oriximiná have caused deforestation and harmed the environment and human rights of the local *Quilombola* and riverine communities, polluting water sources, reducing access to food and traditional resources and eroding Indigenous knowledge. This is enabled by Brazil's tax policies, which provide generous exemptions to mining and aluminium companies, significantly benefiting corporations like MRN. At the same time, this is depriving local municipalities of critical public revenue. Indeed, MRN gained more from one tax exemption than Oriximiná's total local public revenue over a decade (Christian Aid, 2022).

Dysfunctional tax incentives are also offered through 'special economic zones'—designated areas within countries that offer exemptions from certain regulations. The paucity of regulation and provision of opacity in these zones makes them extremely attractive to those involved in crimes such as illegal mining, log-

ging and waste trafficking (FATF, 2021). The Suifenhe free trade zone in China has allegedly been used to facilitate illegal logging in Russia, for example, while Spain's Las Palmas-Gran Canaria free trade zone has been linked to illegal fishing (FATF, 2021). The creation of special economic zones is proliferating, with up to 5 000 now in existence around the world (OECD, 2019), despite the fact their purported value in boosting economies has been convincingly refuted (Hall et al., 2023; Holden, 2017).

5.2 An international regime 100 years out of date

This quagmire has its roots in an international system that is a century out of date. For nearly 100 years, international tax rules have been set by a small group of powerful countries—first through the League of Nations and later via the Organisation for Economic Cooperation and Development. In the period between World Wars I and II, countries gathered at the League of Nations agreed that the 'arms-length principle' should underpin international tax cooperation. By presuming that entities within a single multinational group could be trusted to trade with each other just as separate independent companies might, and that the appropriate manner to tax their profits would therefore be to treat them as discreet and separate entities, this principle set the stage for the massive levels of corporate tax abuse that the world sees today (Picciotto, 2016).

For the past 60 years, the international institution tasked with designing policies to confront such abuse has been the OECD—an intergovernmental think tank whose membership is limited to the 38 most advanced economies.

The OECD's stewardship of cooperation on international taxation has been characterized by exclusion and failure (TJN, 2024a). In 2013, amid increasing global concern over soaring levels of tax abuse by multinational companies, the OECD launched the Base Erosion and Profit Shifting (BEPS) initiative. The BEPS initiative consists of two pillars: Pillar One, which focuses on reallocating taxing rights among countries, and Pillar Two, which seeks to establish a global minimum corporate tax rate to end the 'race to the bottom' in corporate taxation. Although the resulting BEPS Action Plan included a limited version of country-by-country reporting, it fell short of delivering meaningful reform. Lower-income countries were then invited to join the process through a so-called Inclusive Framework, but only on the condition that they adopted a previously agreed agenda.

Having been invited to set the workplan through the Inclusive Framework, a group of developing countries led by the Intergovernmental Group of Twenty-Four on International Monetary Affairs and Development (G24) proposed a fundamental shift to unitary taxation—a model that takes each multinational group as a single entity and applies a formula to apportion taxing rights according to actual economic presence and activity in each jurisdiction. If carried forward, this would have spelled the end

Table 5.1 **Protocols to the Framework Convention on Tax Cooperation**

Protocols to the Framework Convention on Tax Cooperation		
	Thematic issue	Completion
Protocol 1	Taxation of income derived from the provision of cross-border services in an increasingly digitalised and globalised economy.	End 2027
Protocol 2	Prevention and resolution of tax disputes.	End 2027
Future Protocols	Measures against tax-related illicit financial flows.	Post-2027
	Addressing tax evasion and avoidance by high-net-worth individuals and ensuring their effective taxation.	Post-2027
	Tax cooperation on environmental challenges.	Post-2027
	Exchange of information for tax purposes.	Post-2027
	Mutual administrative assistance on tax matters.	Post-2027
	Harmful tax practices.	Post-2027

Source: (UNGA, 2025b)

of the arms-length principle, but the proposal was sidelined by the Group of Seven (G7) nations, and an alternative agreement was presented in its place (Giles, 2022). This ‘unified proposal’ maintained the arms-length principle for all but a fraction of the profits of a handful of the largest multinationals (TJN, 2019). As a result, the status quo of massive levels of corporate tax abuse, and with it the syphoning of resources that might fund better forest and land outcomes, would remain largely unchanged.

The continuance of the arms-length principle is not the only shortcoming of the BEPS agreement. Extractive industries are excluded from the proposal, something disadvantageous to many countries in the Global South which heavily rely on the extractive sector. It was argued that this ‘carveout’ was necessary to protect resource-rich countries’ taxing rights, given their reliance on extractive revenues. It was also affirmed that the large sunk costs of extractive sector operations, along with the complexity of extractive companies’ fiscal relationships with governments, would make a formulaic reallocation of profits problematic (Lassourd and Scurfield, 2019). The exemption effectively leaves the door open for this sector to continue to engage in abusive tax practices. In so doing, it also ensures that they remain highly profitable.

Provisions to implement a global minimum corporate tax rate—a crucial measure for halting a ‘race to the bottom’ in corporate taxation—are also wholly inadequate. At 15 percent, the rate is set so low that it may be counterproductive—most developing countries currently have much higher rates—and its implementation requirements are prohibitively complex for most low-income countries (G24, 2022). Meanwhile, various carveouts reduce the ‘effective’ or real tax rate to as low as 10 percent and some jurisdictions have even considered reimbursing the tax through corporate subsidies, thereby nullifying its impact (Gross, 2023).

5.3 The way forward: a revolution in transparency at national and global levels

Debates and consideration within various international fora to address the inefficiencies of the international tax system accelerated in the aftermath of the 2008–2009 financial crisis.¹ And while the latest international tax reform attempts by the OECD (2021) have created some improvements in developed countries, the design of the new rules has created obstacles that prevent developing countries from reaping the same benefits. Indeed, the proposed deal does little to benefit developing

countries because it limits their taxing rights, favours richer nations where multinationals are headquartered, and bans digital services taxes that could raise more revenue locally (Eurodad, 2024). Moreover, with the United States having withdrawn from the OECD process, it now appears unlikely that the BEPS deal will be implemented (Chaparro-Hernandez, 2025; Cobham, 2020).

Developing countries’ dissatisfaction with the OECD process led the Africa Group at the United Nations to bring forward a resolution calling for the development of international tax rules under the auspices of the UN (African Union, 2023)—a more inclusive forum with greater democratic legitimacy (Ryding and Voorhoeve, 2022). As a result, the UN General Assembly adopted several watershed resolutions, which mandated the negotiation of a new UN Framework Convention on International Tax Cooperation (UNFCTIC) by the end of 2027. The subsequent Terms of Reference elaborated to shape the future tax convention were adopted at the end of 2024. These Terms of Reference specify the objective of establishing “an inclusive, fair, transparent, efficient, equitable and effective international tax system for sustainable development” (UNGA, 2025a). In particular, the references to issues such as human rights and the environment establish the links between tax policies and key global sustainable development commitments.

The Terms of Reference also commit governments to address questions of a “fair allocation of taxing rights including the equitable taxation of multinational enterprises” (UNGA, 2025a). Other commitments aim to address tax evasion and avoidance by high net-worth individuals, to improve financial transparency, to address “tax-related illicit financial flows, tax avoidance, tax evasion and harmful tax practices”, and to pursue “[I]nternational tax cooperation approaches that will contribute to the achievement of sustainable development in its three dimensions, economic, social and environmental, in a balanced and integrated manner” (UNGA, 2025a).

A menu of potential protocols will flank the framework convention, enabling the elaboration of particular provisions. Two early protocols will be negotiated in parallel to the convention and have to be concluded by the end of 2027, together with the convention itself, while a menu of possible future protocols has been drawn up for negotiation after that date (TJN, 2025).

Negotiations on the substance of the framework convention and the early protocols will be conducted via the newly established Intergovernmental Negotiating Committee on the United Nations Framework Convention on International Tax Cooperation (UNGA, 2025b). It will hold three substantive sessions per year during 2025–2027, alternating between New York and Nairobi.

¹ See, for example, efforts from the Group of Twenty (G20); the Group of Twenty-four (G24); and the High Level Panel on International Financial Accountability, Transparency and Integrity for Achieving the 2030 Agenda: (FACTI Panel, 2021; G20, 2013; G24, 2022).

The final text should then be submitted for approval to the UN General Assembly in 2027 (TJN, 2025). The level of cooperation and financial transparency achieved through this process will have profound implications for states' capacity to protect land rights and mobilize domestic resources for the preservation and restoration of forests.

US President Donald Trump has pulled the United States of America out of the UN negotiations. While the withdrawal of the world's largest economy from the convention is unfortunate, its absence may enable the delivery of a more progressive and meaningful final text (Chaparro-Hernandez, 2025).

The allocation of taxing rights, in particular the right to tax multinational companies with commercial activities in multiple jurisdictions, has historically been biased towards 'residence' countries—that is, where they are headquartered—mostly in the Global North (Picciotto, 2025). This is underpinned by a system of bilateral tax treaties restricting 'source country' (other countries where those same companies operate) taxation. Together with the pervasive problem of transfer pricing, this enables massive levels of cross-border tax abuse (Picciotto, 2025). The UNFICITC offers the opportunity to introduce a new system of unitary taxation with formulary apportionment (BEPS Monitoring Group, 2023; Picciotto, 2012). This would mean that multinational corporations are treated as single and coherent entities, and taxed on the basis of their global profit, instead of the current

system which treats each entity within the multinational as separate and independent. The taxing rights would be allocated fairly between countries through a balanced and broad-based formula that reflects where business activity takes place.

The UN tax convention also offers another cardinal opportunity to tackle the root causes of tax avoidance, tax evasion and illicit financial flows—namely to anchor and institutionalize tax transparency at the global level. Robust transparency measures will hinder wealthy individuals and corporations from exploiting financial secrecy regimes to evade taxes. Such transparency is needed to close loopholes, strengthen tax enforcement and uphold fairness in the tax system (Knobel et al., 2025). It is equally important to confront both the explicitly illegal activities that undermine land and forest rights, such as illegal logging, and 'bad faith' factors such as greenlaundering and 'planned ignorance' in financial institutions.

The convention should further promote the 'ABC of tax and financial transparency', automatic exchange of information, beneficial ownership transparency, and public country-by-country reporting:

Automatic exchange of information is a system that allows authorities to access information on the financial accounts that individuals and companies within their jurisdiction hold in other countries (TJN, 2020a). It prevents corporations and individuals from abusing accounts held abroad in order to hide the scale of their wealth and thereby avoid paying their fair share of taxation.

Beneficial ownership transparency means establishing registries of who is really in control of and benefiting from companies, trusts, foundations and other legal vehicles (TJN, 2020b). This should ultimately be complemented by a Global Asset Registry, providing data on asset ownership for all countries, as proposed in the Seville Commitment emanating from the 2025 Financing for Development conference (UNDESA, 2025).

Country-by-country reporting is an accounting standard that obliges corporations to disclose their economic activity—including sales, profits, taxes paid, employees, assets etc.—in every jurisdiction where they are present (TJN, 2020c). This information makes it possible for tax authorities, civil society, the media and other stakeholders to ascertain if the company is paying the right amount of tax in each country.

While a variety of such systems already exist in some form today, the convention should ensure one coherent global system designed to work for all countries, including Global South nations. This would enable the convention to demand transparency around tax incentives and exemptions granted by governments. This is critical to assess the benefits of tax incentives and exemptions, and to review and eventually expunge those that have socially inequitable and environmentally-harmful impacts.

Introducing profit surtaxes on industries involved in causing the destruction of ecosystems increases the cost of polluting capital while decreasing asset value. The deployment of such taxes should lead to industrial extraction business models becoming less profitable and thus the continuation of business-as-usual being discouraged.

The above measures would mark a step change for efforts to tackle the international financial system's facilitation and incentivization of land and forest destruction, along with its impact on human rights. Beyond this, the convention should also address the tax issues and challenges stemming from the extractive industries sector, and their impact on climate justice, sustainable land management and human rights, explicitly and directly.

5.3.1 Innovative environmental taxes: a polluter pays profits surtax

Environmental taxes can put the Polluter Pays Principle into practice. This concept is mainly associated with so-called Pigouvian taxes, named after the 1920s British economist Arthur Pigou. Carbon taxes, in particular, have gained a great deal of attention. Pigouvian taxes are levied on goods or activities that cause environmental harm. In theory, the tax rate is determined by the 'costs to society' caused by the consumption of environmentally-harmful goods or services. These 'external costs' are then added to the price of a good. The price increase—via the tax—reduces the quantity of the goods' consumption, the company changes to less environmentally-harmful products and in consequence the environmental impact decreases. Or at least, so the neoclassical economic theory goes.

However, such Pigouvian taxes are largely seen as structurally regressive as they generally target consumers, directly or indirectly, with lower-income households carrying a relatively higher share of the tax burden. The bias against consumers raises concerns about the risk of negative social impacts of such taxes in general, and about conventional carbon taxes in particular.² Regressive environmental taxes cause concern not only about increasing inequalities, but also about undermining public support for specific climate policies. They can even provoke large-scale public protests by actors who might otherwise be in favour of climate action, but who worry about social justice (see, for example, Driscoll, 2023). Moreover, there "is growing consensus that carbon pricing will not generate the necessary momentum for a green transition" (Wedl and Fricke, 2025).

Recognition of the limits of conventional environmental taxes has given rise to consideration of alternative and more progressive ways of using taxes to combat the ecological crisis. For example, policies aiming to catalyse the socioecological transformation of global economies by directly targeting polluting industries have gained prominence (Lazarus and van Asselt, 2018; Paul and Moe, 2023).

Unlike Pigouvian taxes, which generally target the consumer and thus take a 'demand-side approach', taxing corporate income which is based on deriving profit from exploiting nature unsustainably would take a 'supply-side approach'. Such a 'polluting profits surtax' should target corporations that are profiting from deforestation and land-use change such as industrial agriculture, forestry and related global commodity trading.

Taxing profits directly impacts the allocation of capital (OECD, 2023b). Introducing profit surtaxes on industries involved in causing the destruction of ecosystems increases the cost of polluting capital while decreasing asset value (see, for example, Abdul-Salam, 2024). The deployment of such taxes should lead to industrial extraction business models becoming less profitable and thus the continuation of business-as-usual being discouraged.

The proceeds from a surtax on environmentally-harmful profits could be used to offset alternative tax incentives, for example for sustainable agricultural production and forestry. Such incentives could contribute to the promotion of traditional forestry practices and of local agricultural production, while ensuring environmental integrity and protecting Indigenous Peoples and Local Communities. They should be complemented by other measures to reduce and phase out environmentally-harmful subsidies.

5.3.2 National (tax) pathways to land and forest justice

While it represents a once-in-a-lifetime opportunity for meaningful structural change, the UN convention process is by no means a silver bullet capable of righting all the wrongs embedded in existing tax regimes. A robust and holistic commitment to financial and tax transparency is equally necessary at the level of domestic tax policymaking. This requires a rigorous national implementation of the 'ABC' of tax and financial transparency noted above.

Climate and environmental considerations, along with human rights protections, should be incorporated into domestic taxation regimes, with an emphasis on the democratization of tax policymaking. At the most basic level, this requires that governments pursue progressive tax policies, including progressive environmental taxation. This in turn means that taxes must serve to disincentivize activities that harm the environment, while also ensuring that the financial burden falls on higher-income individuals, large corporations and major polluters rather than the poor and marginalized.

² See, for example, the 6th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC AR6): "The most commonly studied distributional impact is the direct impact of a carbon tax on household income. Typically it is regressive; the tax induced increase in energy expenditures represents a larger share of household income for lower income households....[...] '[I]n countries with a limited capacity to collect taxes and distribute revenues to low-income households, such as some developing countries, carbon taxes may have greater distributional consequences'" (Dubash et al., 2022).

Participatory budgeting processes can serve to strengthen understanding of taxation issues while also ensuring that public funds are appropriately raised and allocated to satisfy local needs. Financial disclosures on public record create a society where we know who owns what, and who benefits from which asset or company.

The democratization of tax policymaking would also require the implementation of meaningful wealth taxes, a measure for which there is overwhelming public support (Earth4All, 2024; Oxfam International, 2024). In an era of unprecedented inequality, itself a major driver of climate change, a modest tax on extreme wealth has the potential to raise some USD 2 trillion a year (Palanský and Schultz, 2025; Saez and Zucman, 2019). This is nearly double the estimated annual climate finance needs of developing countries (Oxfam International, 2023; UNFCCC, 2021). Modelling based on Spain's wealth tax and extrapolated to cover 172 countries around the world show that a featherlight wealth tax of 1.7 percent to 3.5 percent imposed on the richest 0.5 percent of households would enable governments to increase their annual budgets by 7 percent (Palanský and Schultz, 2025). It would also help to ensure that those who have contributed most to ecological destruction pay their fair share to remedy it. Such a measure would go a long way towards addressing ecological crises, while also reducing overlapping socioeconomic and ecological inequalities (Piketty, 2014; Saez and Zucman, 2019).

In order to achieve this democratization of global taxation systems while simultaneously ensuring sufficient revenue for a just transition, climate change commitments such as Nationally Determined Contributions should be explicitly linked to inclusive, equitable fiscal policies. To this end, both tax and spending policies should be designed and implemented with robust public participation, and they should serve to redress rather than exacerbate inequalities. Similarly, those areas of fiscal policy that incentivize environmental harms, such as dysfunctional fossil fuel subsidies or other environmentally-harmful tax incentives, should be reviewed in line with environmental and human rights standards. The implementation of fair and environmentally proportionate taxes on extractive sectors, for example, could serve to raise revenue for the protection and realization of Indigenous Peoples' rights.

Such measures need to be part of a coherent and comprehensive matrix of policies in which just, progressive taxation and financial transparency are consistently linked to climate, environmental protection, human rights and social goals. Fragmented and piecemeal approaches—such as sectoral levies on frequent flying—cannot on their own provide the necessary framework for economic transformation needed to meet shared goals. While such measures may provide important signals and even deliver welcome behavioural changes, they must be part of a coherent and comprehensive policy package to catalyse transformational change.

Furthermore, governments committed to leveraging the power of tax policy to protect and advance land and forest rights, along with all other human rights, would also need to regulate the financial services providers who cater to those seeking to avail financial secrecy and tax abuse structures. All such structures should be proactively disclosed to authorities.

5.4 Conclusion

There is a critical nexus between the international tax regime and environmental degradation, which has a determinative impact on the loss of forests and biodiversity. Cross-border tax abuse, illicit financial flows and pervasive financial secrecy undermine states' fiscal capacity to safeguard ecological and human rights. The existing system—structured around the arms-length principle and dominated by the OECD—is neocolonial in character, perpetuating inequalities and facilitating extractive activities that externalize environmental costs. In this context, the United Nations Framework Convention on International Tax Cooperation offers a transformative opportunity to democratize global tax governance, enhance transparency, redistribute taxing rights and realign financial systems around the Polluter Pays Principle and economic progressivity. Complementary national reforms, including progressive wealth and environmental taxation, are equally essential to advance socioecological justice. Indeed, a coherent, transparent and inclusive international financial architecture is a fundamental precondition to sustainable development, including with regard to the protection of land and forest rights.

CASE STUDY

Public subsidies in Europe: A blessing or curse for forest biodiversity and climate resilience?



Summer forest
in Finland

The role of public funding as a policy instrument

Given the many acknowledged limitations and shortcomings of private finance in tackling environmental crises in general and forest destruction in particular (see Chapter 1), public funding can play an important role as a policy instrument in environmental forest policy (Glück, 1998). By granting subsidies or levying taxes in line with positive or negative external effects, public support can provide economic incentives for forest protection and sustainable management of forests within a market economy (Krott, 2005). Public funding can incentivize forest owners, land users and enterprises in the marketplace to supply environmental goods and services such as biodiversity conservation, climate protection and recreation. Being either public goods or common resources, these cannot easily be sold on the market (Ostrom, 1990). Hence, public intervention

in the market economy through public funding aims to improve the cost-benefit calculations of economic operators (Krott, 2005). However, this chapter shows that public funding may undermine, rather than support the provision of environmental goods and services from forests. The chapter provides an overview of both environmentally-harmful and environmentally-friendly EU and national subsidies and draws conclusions for an effective policy reform.

Environmentally-harmful subsidies for forests in Europe

Public funding is seen as an important tool for promoting biodiversity-friendly and climate-resilient change in land use, including forestry (IPBES, 2019). However, a recent study (Sotirov, 2025) shows that more than EUR 5.3 billion of European public money each year—mainly through subsidies for forest biomass

under the EU Renewable Energy Directive (RED)—continues to support intensive forestry practices that harm biodiversity and climate resilience. Similarly, many EU countries run public subsidy programmes—mainly under State Aid rules—that channel more than EUR 0.5 billion a year into forestry practices harmful to biodiversity and climate resilience (Sotirov, 2025).

The most harmful schemes include national biomass subsidies, which the RED paradoxically treats as legal and sustainable. These subsidies are applied in both export-oriented forest-rich countries (France, Finland, Germany, Poland, Sweden) and import-oriented forest-poor countries (Belgium, Denmark, the Netherlands, the United Kingdom). Even though they are officially presented as measures to improve climate resilience and sustainable forest management, further national schemes under State Aid rules in the Czech Republic (State Forestry Aid 2023–2028), France (France Relance 2021–2022; State Forestry Aid 2023–2029) and Finland (Kemera and forestry tax breaks) incentivize intensive forestry (Sotirov, 2025).

These harmful funding schemes score *low* on environmental effectiveness, conditionality and additionality, because they continue to support business-as-usual intensive forestry. In particular, intensive practices include forest biomass harvesting for bioenergy, clearcutting with monoculture plantations, salvage logging with removal of deadwood, and artificial reforestation with non-native or not-site adapted tree species. Intensive practices are often supported by longstanding national forest laws and forestry traditions that run counter to the new forest-related EU and national environmental policies and scientific knowledge about the need to restore the biodiversity and climate resilience of Europe's forests. At the same time, these schemes score *high* on external durability and budget, since they are politically stable and receive large, long-term funding that is often renewed. Their internal durability is usually *medium*, as subsidies are paid for five to ten years (see [Table 6.1](#)).

Mixed impact subsidies for forests in Europe

According to the aforementioned study (Sotirov, 2025), another substantial funding of about EUR 1 billion a year is provided by a group of mixed impact schemes. They include national subsidies in many EU countries (including France, Germany, Italy, Poland, Portugal, Spain) largely paid for forestry measures from the European Agricultural Fund for Rural Development (EAFRD) of the Common Agricultural Policy (CAP) (2014–2022) and for productive investments and non-productive forestry interventions from the new EU CAP/EAFRD (2023–2027). Further examples are Finland's State Forestry Aid programme Metka (2023–2029) and Sweden's Rural Development Programme (RDP) (2011–2013; 2013–2020).

These programmes are designed with mixed outcomes, as they partly fund environmentally-harmful and partly environmentally-friendly forestry practices. However, there is a clear imbalance in actual spending: relatively little public funding goes to biodiversity and climate objectives (about 10 to 20 percent), while far larger sums support conventional forestry (80 to 90 percent)—often justified under the banner of climate mitigation and adaptation. In practice, these mixed impact schemes help to sustain business-as-usual intensive forestry or even increase woody biomass production through clearcutting, salvage logging with deadwood removal, plantation of monocultures with commercial fast-growing tree species, extraction of forest biomass for bioenergy (whole trees, stumps), development of forest road infrastructure and timber harvesting machinery (such as harvesters, forwarders) and support for the marketing capacities of producer organizations and advisory services for timber mobilization. Some support is provided for biodiversity and climate measures, including compensation for income forgone due to conservation management in forest protected areas (Natura, 2000), ecosystem management of forests (close-to-nature forest management), storing carbon in standing forests and other environmental commitments.

The real impact still depends on implementation. For example, RDP subsidies for Natura 2000 areas in France, Finland, Germany and Spain have been used in both biodiversity-friendly ways (such as ecological forest management) and biodiversity-harmful ways (such as plantation forestry). In Sweden's RDP, funding has mostly gone to active management such as thinning, planting and prescribed burning, with far less support for passive management such as conservation of old-growth forests, setting aside strictly protected forest reserves, and increased deadwood retention.

Reflecting this challenging balance, these mixed impact schemes usually score *medium* on environmental policy effectiveness, additionality and internal durability. They score *low* on conditionality, as their design is often flexible, especially in setting environmental conditions. They score *high* on external durability and budget, thanks to continued political support and substantial funding over time.

Environmentally-friendly subsidies for forests in Europe

In contrast, the same study (Sotirov, 2025) identifies encouraging policy shifts: several EU Member States now allocate more than EUR 0.5 billion annually to subsidies that promote biodiversity and ecosystem resilience, for example through forest conservation, climate-resilient mixed forests, and close-to-nature management. These initiatives reflect the policy momentum set out in the European Green Deal, which incentivizes nature-pos-

itive investment, the EU Biodiversity Strategy for 2030 and the EU Forest Strategy for 2030 (Roux et al., 2025).

Particular examples of environmentally-friendly funding include *Forêt.Nature* in Wallonia, Belgium, *Sylv'ACCTES* in France, *METSO* in Finland, and *KAWM+* in Germany (see Table 6.2). Unlike harmful schemes, these programmes foster biodiversity and climate resilience by rewarding conservation management of forests through protected forest areas and biodiversity commitments, integrative nature protection through increased deadwood in

managed forests, close-to-nature forest management based on natural regeneration and avoidance of clearcutting, and the active transformation of coniferous plantations into climate-resilient mixed or deciduous forests.

These environmentally-friendly schemes score *high* on policy effectiveness, additionality and conditionality, since their goals and funding design go beyond minimum legal standards and encourage a transition away from business-as-usual intensive forestry. They also score *high* on internal durability, offering long-

Table 6.1 EU and national public subsidy schemes for forests

	Policy effectiveness	Additionality	Conditionality	Internal Durability	External Durability and Budget
Environmentally Harmful					
EU-28 (multiple countries): National biomass subsidies under RED 2009-to date	Low	Low	Low	Medium	High
Czech Republic: State Forestry Aid 2023-2028	Low	Low	Low	Medium	High
France: France Relance 2021-2022, State Forestry Aid 2023-2029	Low	Low	Medium	Low	High
Finland: KEMERA State Forestry Aid and tax breaks for forestry, 1997-to date	Low	Low	Low	Medium	High
Mixed Impact					
EU-28 (multiple countries): CAP/EAFRD forestry measures 2014-2022	Medium	Medium	Low	Medium	High
EU-27 (multiple countries): CAP/EAFRD forestry interventions 2023-2027	Medium	Medium	Low	Medium	High
Finland: METKA State Aid for forestry 2023-2029	Medium	Medium	Low	Medium	High
Sweden: RDP forestry measures 2011-2020	Medium	Medium	Medium	Medium	Low
Environmentally friendly					
Belgium, Wallonia: Forêt.Nature knowledge-based support to continuous cover forestry	High	High	High	High	Low
France: Sylv'ACCTES collaborative model for climate adapted forests	High	High	High	High	Low
Finland: METSO forest biodiversity programme	High	High	High	High	Low
Germany: KAWM+ climate adapted forest management and forest biodiversity	High	High	High	High	Low

Source: adapted from Sotirov, 2025

term commitments of 10 to 20 years. However, they perform low on external durability and budget, as their funding is not secured over the long term and remains small compared with the far larger budgets of environmentally-harmful and mixed impact schemes.

The challenges and paradoxes of public funding for forests in Europe

Beyond these patterns and examples, available knowledge highlights further funding challenges and contradictions in Europe. While some subsidies are clearly harmful and others clearly supportive of biodiversity, many countries struggle to align their funding with their stated environmental goals.

A key paradox is that large sums of money—especially under the CAP—are available for ecological forestry, yet these funds are often underused. Many forest owners and EU Member States cite complex application procedures, high administrative costs and unclear funding rules as barriers (Geitzenauer et al., 2017; Weiss et al., 2017; Sarvašová et al., 2019). Due to structural inequities, small-scale forest owners (<20 ha) receive only a small fraction of subsidies, while medium-scale (20–200 ha) and large-scale owners (>200 ha) benefit disproportionately (Haeeler et al., 2023; Quiroga et al., 2019).

The EU and national funding challenges and paradoxes can be explained by cross-sectoral policy incoherence and political struggles over decision-making authority (Sotirov et al., 2021). Ambitious environmental regulations under EU biodiversity and climate policy often lack sufficient financial backing, while agricultural, rural development and bioenergy policies provide substantial funding but impose weaker environmental requirements. This policy incoherence is caused by contradicting policy values, conflicts of interest and power struggles among the forestry, agriculture, bioenergy and conservation sectors across the EU and at national levels (Winkel and Sotirov, 2016; Weiss et al., 2017; Sotirov, 2025).

Indirect environmentally-harmful subsidies through regulatory competition in Europe

In addition to direct EU and national public funding, indirect environmentally-harmful subsidies arise from regulatory competition and uneven national legal frameworks—a ‘race to the bottom’ versus a ‘race to the top’ (Winkel and Sotirov, 2016; Sotirov et al., 2025; Roux et al., 2025). Countries that allow widespread clearcutting with few restrictions (such as Denmark, France, parts of Germany, Finland, Ireland, Portugal, Spain, Sweden), or allow it with varying thresholds (such as Czech Republic, Estonia, Latvia, Lithuania, Poland) create market advantages for

intensive forestry. National forest laws in most of these countries also oblige owners to quickly reforest after clearcutting or climate-related disturbances, typically through artificial planting of even-aged monocultures, often with non-adapted coniferous species (Sotirov et al., 2025).

This matters because harvesting costs strongly depend on efficiency. Large clearcuts reduce costs: machines can operate continuously without damaging standing trees, operations are simpler (delimbing, stacking), and transport distances are shorter (Hartley and Han, 2007; Laitila et al., 2016). By contrast, small-scale or selective harvesting is more complex and costly (Renzie et al., 2008; Mizuniwa et al., 2016; Pukkala, 2016).

As a result, lax clearcutting regulations effectively act as indirect subsidies, lowering harvesting costs for conventional rotational forestry by 20 to 50 percent compared with selective logging under close-to-nature forest management, and in some cases by more than 100 percent (Damon and Han, 2007). Expert assessments estimate clearcutting costs at EUR 8–10/m³ in Sweden, EUR 11–18/m³ in France and EUR 7–8/m³ in Poland—up to half the cost of selective harvesting systems (Sotirov et al., 2022). As long as clearcutting remains legal, these regulatory advantages function as a substantial hidden subsidy for intensive forestry (Sotirov, 2025).

The forest degradation gap in Europe

The forest area of the European Union (EU-27) has remained stable or even grown slightly in recent decades (FAO-FRA, 2020). This outcome is partly supported by the abovementioned national legal requirements for reforestation after clearfelling for timber production and salvage logging after disturbance events. At the same time, Europe’s stable forest cover has been offset by high imports of forest-risk commodities such as palm oil, soy, beef and wood, which shift deforestation and forest degradation pressures to the Global South (Sotirov et al., 2021; see also Chapter 3, Chapter 6).

Nevertheless, forest degradation within Europe is a persistent concern, particularly regarding biodiversity loss and reduced climate mitigation potential. Most European forests (70 to 80 percent) are managed intensively for timber and bioenergy with the support of direct and indirect subsidies. These practices involve clearcutting, shelterwood harvesting, removal of deadwood and old-growth forests, as well as planting monocultures that are vulnerable to pests, disease and climate change. Nature-based or biodiversity-friendly approaches, including close-to-nature forestry and effective nature conservation in Natura 2000 forest sites, remain limited (Sotirov, 2025).

The resulting negative impacts include a reduction of EU forests’ carbon sequestration capacity by over 20 percent (Searchinger

et al., 2018), an increase in tree cover openings on 70 percent of all EU forests (Ceccherrini et al., 2020, 2021; Seidl and Senf, 2023) and conservation status decline of 80 percent of forest ecosystems, habitats and species legally protected under the EU Nature Directives (EEA, 2020; Maes et al., 2020; EEA, 2023; Patacca et al., 2023).

The forest gap in the EU's climate policy commitments

Despite the abovementioned forest degradation gap, the EU's climate target commitments under its updated Nationally Determined Contribution include, paradoxically, a significant role for forests as regards land-use-related emissions and removals (EC, 2023). The EU's climate pledge is based on ambitious emissions reduction targets, such as (i) a net domestic reduction of at least 55 percent in GHG emissions by 2030 compared with 1990; and (ii) net-zero by 2050. However, the EU's Land Use, Land Use Change and Forestry (LULUCF) Regulation and Renewable Energy Directive (RED) send out contradicting policy signals: increased forest sinks in standing and old-growth forests vs. increased forest biomass use for carbon pools in harvested wood products and substitution of fossil energy through renewable wood energy (EC, 2023).

Although the LULUCF Regulation treats timber harvesting intensity as a key element of sustainable management, most Member States plan to increase their harvest levels for 2021–2025 by about 16 percent compared with the 2000–2009 reference period. As a result, the EU's forest carbon sink is expected to shrink by 18 percent compared with the 2000–2009 baseline (Korosuo et al., 2021; EEA 2019).

By 2021, the EU's net forest carbon sink was about one-third smaller than in 2005. This decline is mostly due to slower forest growth, more damage from climate change-related events such as storms, pests and fires, and rising demand for wood and biomass. On average, forests absorbed 6 million tonnes less carbon each year between 2005 and 2022. To meet the EU's

legally binding climate target for 2030—removing 310 million tonnes of carbon each year—this trend must be reversed. That means forests will need to capture about 8 million tonnes more carbon annually between 2023 and 2030 to stay on track for the EU's 2050 climate neutrality goal (ESABCC, 2024).

Conclusion

Public subsidies are a powerful policy instrument shaping Europe's forests, but their impacts are highly uneven. On the one hand, billions of euros each year still support intensive forestry practices such as clearcutting, monoculture plantations and biomass for energy—activities that harm biodiversity and weaken climate resilience. These schemes often score poorly on effectiveness and conditionality, but persist due to political stability and long-term budgets. On the other hand, several innovative subsidy programmes in countries such as Belgium, France, Finland and Germany demonstrate how public funding can actively promote conservation, close-to-nature forestry and long-term ecological commitments. However, these positive schemes remain underfunded compared with the scale of harmful subsidies.

Mixed subsidy programmes add to the complexity, funding both conventional and biodiversity-oriented practices but often tipping the balance towards business-as-usual forestry. Cross-sectoral policy incoherence further undermines progress: agricultural, bioenergy and forestry interests continue to outweigh environmental goals. Indirect subsidies through permissive regulations, particularly for clearcutting, further lower costs for intensive forestry.

As a result, forest degradation persists in Europe, with declining carbon sinks, increased biodiversity loss and reduced climate mitigation capacity. Meeting EU climate and biodiversity goals will require a fundamental shift: phasing out harmful subsidies, scaling up ecosystem-based investments and aligning all funding streams with long-term sustainability.

CHAPTER 7

Trade policy reform for forest protection and food sovereignty

Climate-smart village,
Isabela, Philippines



KEY MESSAGES

- Effective policy interventions to slow or halt deforestation and forest degradation must be based on a clear, nuanced, context-specific and current understanding of the characteristics and drivers of commodity trade. Food sovereignty and ecosystem protection are mutually supportive goals; support and commitment to both will point to better pathways forward.
- The deregulation of trade and investment law have contributed to the creation of highly concentrated agricultural commodity value chains. This pattern sees the greater share of the benefits of commodity production accruing to private, mostly foreign firms while governments have to find the resources to pay for the fallout from a sector that externalizes environmental costs and exploits farmers and food system workers. These costs include deforestation and, ironically, producers living in poor and, too often, hungry households.
- International trade relationships reinforce the policy advantage that commodity value chains have over food producers and food markets, despite the fundamental importance of food security to a state's well-being. Trade agreements attract investors and redirect public attention and public spending away from local markets and local food production. The failure to see corporate interests and behaviour clearly has resulted in many unkept promises, thwarted policies and continued forest devastation.
- International commodity markets are rooted in a colonial history of exploitation of Global South countries for Global North consumption that still shapes assumptions about where and how the Global South should obtain capital and what their development pathway looks like. These assumptions undermine efforts to build economic development along alternative pathways that focus on Indigenous knowledge, domestic needs and preferences, and use ecological principles to guide land use and forest management.

Agricultural commodity production is the leading driver of forest loss globally (Donald, 2004; Maeda et al., 2021; Pendrill et al., 2022). While it took climate scientists a long time (and most governments even longer) to focus on agriculture in their climate assessments, the size and importance of agriculture's contributions to global greenhouse gases is now well established (Smith et al., 2007). Agriculture's contribution to global GHG emissions is especially important as a source of methane and nitrous oxide. Large parts of agriculture are also fossil-fuel intensive, and agriculture is also the biggest driver of climate polluting land-use change, including deforestation. Twenty-six percent of global tree cover loss in the period 2001–2015 is attributed to an expansion in the production of seven agricultural commodities (cattle, oil palm, soy, cocoa, rubber, coffee and plantation wood fibre (Dow Goldman et al., 2020). At the same time, agriculture is one of the economic activities most hurt by climate change and biodiversity loss (Dudley and Alexander, 2017).

Today, international trade is a central force driving deforestation. To change this, governments cannot focus only on commodity trade; they must also disentangle their food sovereignty from agricultural commodity production and rebuild trade policies on a foundation that protects food sovereignty, the right to food and the environment. Trade is fundamentally about relationships—both between buyers and sellers and among the countries that decide the rules of those exchanges. Effective trade relationships need clear rules, legitimacy and mutual respect. At the same time, if governments are to achieve effective and lasting protection for forests, their policies need to be aligned on all levels of governance: from local to multilateral, including trade rules. This concertation of governance norms would ideally rest on food sovereignty as a moral and political imperative and would protect the multiple roles of agriculture and of forests in protecting ecological objectives, including biodiversity and limiting GHG emissions, as well as honouring the fundamental human imperative to survive and thrive economically.

This chapter addresses one dimension of the complex challenge of forest governance: agricultural commodity trade. Presenting an analysis of the history and core principles of international trade rules, the chapter considers the role that agricultural trade rules play in deforestation, and how those rules have encouraged and shaped the relentless expansion of commodity production and exchange in global value chains over the past 30 years. This analysis demonstrates that effective policy interventions to slow or halt deforestation must be based on a clear, nuanced, context-specific and current understanding of the characteristics and drivers of commodity trade. To effect better policies,

advocates need to look more widely at the problems agriculture presents for land use and deforestation, and to distinguish between food security and commodity export systems.¹ Geographical differences among those who grow commodities on deforested land and their different motivations and constraints are important. Concentrated international commodity markets have changed in the context of trade deregulation. This recent history, layered on top of colonial-era commodity trade, shapes contemporary assumptions about where and how the Global South should obtain capital, and devalues ecosystems and natural resources, with far-reaching implications for land use and forest management. The chapter explains that focusing on international trade, which is dominated by highly concentrated traders, as the principal lever to realize system-level change in agricultural commodity systems is too narrow, before concluding with proposed pathways to better outcomes.

7.1 Agricultural commodity trade

Industrial agricultural production relies on specialized systems and globalized value chains. Global value chains have emerged alongside the trade and investment agreements of the last three decades. Those agreements greatly reduced legal and policy barriers to foreign investment and pushed trade law premised on non-discrimination between foreign and domestic firms (Plant, 2010). A crucial pillar of this neoliberal economic model was the establishment of the World Trade Organization (WTO) in 1995, at the conclusion of the Uruguay Round of trade negotiations. One of the agreements from that round was the Agreement on Agriculture (AoA). The trade agreements of this era both codified changes already evident in the production and distribution systems operated by multinational corporations (FAO, 2006) and served as an impetus to deepen deregulation and economic liberalization (Hawkes and Plahe, 2013). The WTO Agreements resulted in the lowering of market access barriers, including tariffs and import quotas, and a tightening of the rules that governed standard-setting to reduce non-tariff barriers to trade. The deregulation of trade and investment law, combined with technical innovations in communications and transport logistics, contributed to conditions for the proliferation of global value chains (OECD, 2017b). This proliferation has been both extensive and rapid, with agricultural commodities being traded in agrifood value chains that have evolved to be both concentrated in ownership and diversified in terms of trade pathways (including re-export of semi-processed goods) and products (food, fibre, finance and

¹ The term 'food security' is used throughout this chapter to refer to the specific global governance discourse around trade and agriculture that is focused on ensuring the universal availability of sufficient, nutritious and culturally appropriate food. This is a narrower idea than the concept of food sovereignty, which, crucially, includes a political dimension of decision-making and choice that cannot be assumed to be part of the food security discussion (though it can be included).

services) (Isakson, 2014; OECD, 2020). The extent of agrifood value chain growth and expansion is such that it is referred to as a 'revolution' that has fundamentally transformed food systems and cultures on multiple dimensions, albeit unequally across different geographies (Barrett et al., 2019; FAO, 2024).

Global value chains erase points of origin. Inherent in the idea of a commodity is the quality of being undifferentiated by place; a commodity is something that is sufficiently homogenous that the source does not matter. For example, a commodity retains no physical evidence of whether it was produced on recently deforested land. There has been an effort to counteract this erasure of origin through transparency and various commodity tracing and provenance initiatives. However, it is an uphill struggle to make place and processing methods count in a trade world still governed by WTO rules and principles. Commodities can be traded on futures markets anywhere in the world, bought and sold by contract without taking physical possession of the goods. (Indeed, they can be traded on futures markets before they are even produced.) The invisibility of agricultural commodity systems makes it easier for companies to erase their environmental and social effects, and to deny their responsibility to clean up their value chains. This erasure of place has also contributed to the conditions that enable deeper concentration of economic power in food systems (Howard, 2021).

International trade relationships reinforce the policy advantage that commodity value chains have over food producers and food markets, despite the fundamental importance of food security to a state's well-being.

The power of global commodity traders in global value chains is neither new nor unnoticed, yet it remains an underexplored topic in forest policy (Dallas et al., 2019; Ponte et al., 2019). For 30 years, leading environmental organizations and philanthropists have invested in attempts to make traders use their power for good through voluntary efforts, such as sustainable commodity roundtables. Over time, recognizing the overall failure to halt or even slow deforestation trends through voluntary efforts, initiatives to reduce GHG emissions and other pollution have increasingly looked to binding regulation, such as requirements on companies to certify that the commodities they process and trade are not grown on deforested land. However, the implications of trading companies' power go beyond their (as yet largely unrealized) potential to be better global citizens by using their buying power to conform to higher labour and environmental standards. Their power also determines whether and how national economies benefit from the presence of transnational traders within their borders. The exploitative conditions in which many commodity growers work reflects their relative powerlessness in the market. Value chain economics undermine local efforts to improve sustainability by creating distance between affected communities and corporate decision-makers. They erode food security by generating competition for land and water, creating incentives that undermine ambitious forest protection. The power of commodity traders also reaches into the sphere of governance, with political outcomes reflecting corporations' financial interests (Clapp, 2025; Murphy, 2008; UNEP, 2025).

7.2 Trade theory and globalization—implications for forests and food

Trade agreements establish rules for trade. They set tariffs (border taxes), typically setting a maximum, called a tariff ceiling, and sometimes agreeing a band that sets a tariff floor as well. Trade agreements govern administrative protocols at the border (for example, how a quota should be allocated among importers), determine how standards for product quality and safety should be set, and they often also put in place adjudication mechanisms to be called on if there are conflicts between trading partners. Trade agreements may also set rules on how foreign companies will be treated in domestic markets. Trade rules matter. Although not all trade happens under their aegis, they shape investment decisions, domestic legislation and decisions about what to produce, how to produce, and where and how to add value to commodities.

The WTO agreements launched a period of rapid deepening of economic globalization, facilitated by the technological devel-



Farmers showing their indigenous seeds, Ghana

GLOBAL JUSTICE NOW

opments linked to communications, information and transport. World Trade Organization agreements shape the economy of almost every country of the world. The WTO today has 164 members, covering an estimated 98 percent of global trade (WTO, 2025).

The WTO trade agreements incorporate the neoliberal economic assumptions that had already been adopted by the Bretton Woods Institutions in structural adjustment programmes (Plant, 2010). The agreements reflect a belief in the economic idea that increased trade, governed by predictable and transparent rules, is universally welfare-enhancing. Structural adjustment programmes dictated that countries should move away from using international trade as a residual market for their agricultural commodities. Under that approach, governments used trade at the margin: stabilizing domestic food prices by exporting if there was a surplus and importing only if harvests were poor. Instead, the economics of structural adjustment dictated reducing the role of the state in markets, leaving markets—open to international competition—to set prices according to supply and demand.

Many Global South countries were already integrated into international markets by the early 1990s and were active negotiators

in the Agreement on Agriculture, as well as founding members of the WTO (Cornia and Stewart, 2014). Financial dependence on the export of primary commodities was part of their colonial legacy. The post-World War II integration into global markets was highly unequal; the operating capital, commodity-processing capacity and much of the final consumption was located in richer countries, and Global South countries struggled to be paid fairly for their production. The UN Conference on Trade and Development was first convened with an agenda to address this inequality. Initiatives to reform trade relationships, such as the New International Economic Order, were also developed at this time.² However, the NIEO failed to take hold (Kozul-Wright, 2025). Sixty years later, UNCTAD still has much to say concerning North-South inequality in commodity markets; inequality persists, and has even deepened.

The free trade theory has many critics, including Dani Rodrik and Ha Joon Chang (Chang, 2011; Rodrik, 2001). Free trade has also been challenged by the proponents of ‘complexity economics,’ who instead of assuming a single point of equilibrium between supply and demand use models that assume economies are in constant flux, generating a wide range of potential equilibrium points at any given time. This approach likens economies to

² NIEO sought to restructure global trade rules and achieve economic equality for the Global South through interdependence and post-colonial trade relationships (Hudson, 2005; McFarland, 2015).

'ecologies' that are continuously adapting and evolving (Arthur, 2013; Gunderson and Holling, 2002). Complexity models offer the possibility of different indicators than GDP to assess how well a system works, including long-term sustainability (such as biodiversity and forest protection), providing promising avenues on which to build economies that respect planetary boundaries.

The range and extent of disagreements among theoretical economists is seldom evident in the trade policy advice given to Global South governments through the capacity building initiatives funded by donor governments and the advice given by the International Financial Institutions. The advice given to (and conditionalities imposed on) Global South decision-makers did not reflect the values or assumptions of ecological or feminist economics, or even those of critical classical economists, such as Dani Rodrik. Had the advice been more pragmatic, and understood the ecological necessity of natural resources for any economic activity to thrive, we could expect the pace and extent of the Global South's integration into late 20th century global value chains would have been far more modest.

Another dimension of this long history of unequal commodity trade is the concentrated market power among input suppliers, traders, commodity processors and retailers that suppresses commodity prices at the farmgate (and farm worker wages). After independence, many Global South governments inherited or created state-led commodity corporations. Most were divested under structural adjustment programmes. However, private transnational firms were quick to replace the state entities, leaving commodity sectors largely uncompetitive (with one or a few firms controlling important dimensions of the market). These transnational firms evade taxes, lobby to shape domestic policy to their advantage, are active in price-destabilizing speculation on commodity futures markets and continue to consolidate both horizontally and vertically (Clapp, 2025; IPES Food, 2023).

This pattern sees the greater share of the benefits of commodity production accruing to private, mostly foreign firms, while governments have to find the resources to pay for the fallout from a sector that externalizes environmental costs and exploits farmers and food system workers. The costs include deforestation and, ironically, producers living in poor and, too often, hungry households.

7.3 Global trade rules

The General Agreement on Tariffs and Trade (GATT), precursor to the WTO, subsumed agriculture in the larger category of goods. In the 1950s, first the United States and then the European Economic Community (precursor to the European Union) demanded an exemption for their agriculture sectors, arguing

that agriculture was too sensitive to be treated like other goods. Both the US government and the European Commission introduced agricultural programmes that were contrary to GATT principles. These programmes set floor prices, restricted imports and eventually came to rely heavily on export subsidies as well. The programmes worked to the detriment of exporters that did not subsidize their farmers (including Australia, Argentina, Brazil and Canada) and the domestic producers of many developing countries, whose domestic markets came to be heavily distorted by the dumping of imported commodities such as wheat from the United States or Europe. The GATT exemptions excluded agriculture from international trade regulation for decades.

The WTO AoA ended this exemption by giving the sector its own particular trade rules. The fact that agriculture has its own agreement at the WTO is a tacit acknowledgement at the heart of the international trade system that agriculture is not like other goods. In other words, agriculture is special. This implicit recognition matters in the politics of agriculture and trade because it is an acknowledgement that governments face distinct economic and political pressures with regard to agriculture (not least, their obligation to protect and promote the universal human right to food).

The WTO AoA is also unique as the only trade agreement that regulates domestic spending on agriculture. Domestic support includes subsidies but also other forms of government intervention in markets that are assessed as trade-distorting. The creation of trade disciplines on domestic agricultural spending was fiercely opposed by farmers around the world, from Japan to India and from Europe to the United States. Farmers felt abandoned by their governments in the negotiated outcome, which outlawed price floors and other mechanisms that had offered farmers some protection in their already highly concentrated markets. The AoA is structured around three issues: market access (perhaps the most common subject of trade rules), domestic support and export subsidies. State trading is explicitly disciplined, but there is no mention of the need to constrain restrictive business practices exercised by the private sector (Dommen et al., 2025). The use of agricultural export subsidies was supposed to be phased out by 2000, but in the end this objective took until the WTO's 10th Ministerial Conference, in 2015, to achieve.

The AoA included a list of provisions for further amendment, including deeper cuts to tariffs and domestic spending. But those negotiations have failed, with the exception of the imposition of a firm end date on the use of export subsidies. The agreement also mentions food security, but only as a 'non-trade' issue. Interpretation of WTO rules by dispute panel lawyers has confirmed that environmental and social concerns, such as food security and deforestation, are secondary to the requirement

that agricultural policies be “least trade restrictive” (Musselli, 2024). Accusations of disguised trade protectionism are readily invoked by trade partners, chilling attempts by governments to limit their dependence on imports or to deal with market distortions and social objectives not covered by the AoA rules. For example, proposals intended to protect domestic producers in developing countries from import dumping through a Special Safeguard Mechanism and a list of Special Products that could be protected with higher tariffs have both failed to pass. The narrow reading of the WTO rules combined with the failure of new negotiations has made the WTO a rigid rather than adaptive institution.

One of the biggest disappointments of the Agreement on Agriculture, especially for the Global South, was its failure to rein in spending on domestic support, particularly commodity-specific subsidies in the European Union and the United States. Over time, instead of seeing a fall in domestic support to maintain or increase production, new big-spenders have joined the EU and the United States—most notably, China, India and Indonesia. This perverse outcome of attempts to limit domestic spending on agricultural support through trade rules has fuelled decades of mistrust and failed negotiations (Greenville, 2017). Efforts focused on subsidy reform as the pathway to leveraging change in commodity production and markets (and to curb the resulting environmental damage) should thoroughly understand this history. A confused mix of truth and myth generates a narrative of rich developed country farmers who compete solely on the basis of deep funding from national treasuries. This narrative hides the active role of transnational agribusiness in shaping public spending on agriculture. These companies are important beneficiaries of public subsidies, both as purveyors of seeds, farm equipment, fertilizer and pesticides, and as buyers of commodities for processing whose prices hover below the cost of production (Murphy and Hansen-Kuhn, 2020).

The AoA also failed to address food security adequately. Even within the narrow definition of food security common in trade circles (see footnote 2), the agreement defines food security as a “non-trade concern” for governments to address without using trade measures. This ignores the important role that trade plays in the food supply of most low-income countries, and the vulnerability of those countries to the whims of global grain traders and the few countries that dominate exports. It also ignores the central importance of protecting a resilient domestic food system to protect people’s well-being and sovereignty.

The history, structure and characteristics of the international agricultural trade systems described above created the conditions for the high levels of value chain concentration that characterize global food systems.

7.4 Value chain concentration

Agricultural commodity trade is dominated by a few firms. The concentration of power in commodity trading is a trend across most commodities, with firms speculating in physical commodity trading as well as engaging in financial trading based on agricultural commodities (Isakson, 2014). For example, three firms dominate global cocoa purchase and processing: Barry Callebaut, Cargill and Olam (Brack, 2019). Four control soy: Archer Daniels Midland, Bunge, Cargill and Luis Dreyfus (Murphy et al., 2012). Meanwhile, JBS, a Brazilian-owned cattle business that operates in 17 countries, is said to control 25 percent of global beef and beef by-product sales (Winders and Ransom, 2019). These commodities are all in value chains that are responsible for a significant percentage of global deforestation (Pendrill et al., 2019). High levels of concentration in the agriculture sector undermine the assumptions of market functioning on which development economics rests, enabling both the exploitation of producers and an unfair distribution of costs and benefits from commodity production and trade.

Early in the 2000s, several international environmental organizations began to promote the idea that pressure on the (relatively few) corporations that dominated any given commodity value chain was the critical lever that could shift agricultural production systems to be less polluting. Jason Clay, a Vice President at World Wildlife Fund, set out the premise by demonstrating that a handful of commodities, each in a value chain dominated by a handful of firms (each often sourced from just a handful of countries), were responsible for an overwhelmingly share of the (significant) environmental harms associated with agricultural production (Clay, 2013). Clay’s argument was that governments (and civil society organizations) should focus their policy efforts on persuading the corporations responsible to clean up their businesses.

The resulting 15 years of initiatives have included the Consumer Goods Forum, an industry association of supply-chain companies (traders and consumer-facing brands and retailers), who agreed to work with its members toward ‘deforestation-free’ supply chains by 2020. In 2014, almost 40 governments and more than 55 of the world’s biggest companies signed the New York Declaration on Forests, committing to eliminate deforestation from the production of agricultural commodities by no later than 2020. A series of commodity roundtables was established, bringing together value chain stakeholders to discuss voluntary standards to reduce pollution. They involved banks, processing firms, traders and civil society organizations. The Roundtable for Responsible Palm Oil and the Roundtable for Responsible Soy were two prominent instances of these efforts, focused on two agricultural commodities whose production has had huge



Agricultural market,
Nicaragua

INTERNATIONAL CENTER FOR TROPICAL AGRICULTURE

negative effects on forest ecosystems. Yet these initiatives and roundtables have not produced the outcomes needed to effectively protect forests. They depend on the goodwill of the very actors responsible for driving deforestation and on mobilizing their money for forest protection. They relegate governments to the same level as the companies, or arguably even to a position of lesser power, presuming that it is the might of capital rather than the will of the people in a political process that should drive change. Not surprisingly, assessments suggest that the initiatives lack effective standards, enforceability mechanisms, credibility (especially with producers) and leadership (Cramb and McCarthy, 2016; Schouten et al., 2012).

Political economist Jennifer Clapp proposes a three-part framework to understand the spheres where concentrated firms exercise their power: shaping markets; shaping technology and innovation agendas; and shaping policy and governance frameworks (Clapp, 2025). The concentration of power in commodity markets is evident in multiple dimensions of agricultural value chains, from shaping domestic production, to influencing trade policy, to creating vertical and horizontal corporate integration throughout the value chain (Clapp, 2025). This system has far-reaching implications, with path dependencies in political, cultural and economic spheres.

There have been efforts to establish trade governance frameworks that address some of the social and environmental impacts of agricultural production directly. The European Union Deforestation Regulation is one of the most recent and most prominent, although its implementation remains in question. The regulation proposes to make production conditions a determinant of whether trade is permitted. The idea of some kind of floor on what can be traded is longstanding: for example, government bans on products produced under slavery and indentured labour date back to the early days of the International Labour Organization. Nevertheless, it has been frustratingly difficult to obtain agreement on bolder measures to raise the bar on trade standards, not least because of the deep inequalities and mistrust that exist between the Global North and the Global South on trade (Murphy, 2015). The EUDR represents a shift away from trying to get governments in producer countries to implement laws to focus instead on requiring importing companies to effect change. Rather than the voluntary approach of the sustainability roundtables, the EUDR proposes to impose new restrictions on what companies can sell in Europe. This puts the onus where it belongs, and with some enforcement power: if the regulation can be finally brought into effect, it would signal an end to 20 years of failed voluntary dialogues with a decisive move towards hard law. (It should be noted that EUDR implementation received a further setback in September 2025 with the announcement of another year of delay.)

Even were it to be implemented, the EUDR remains problematic in having no mechanism to hear from producers. Additional measures could help to ensure that forest communities and commodity farmers have a mechanism for their concerns to be heard. Making the companies the central focus of the legislation need not come at the expense of also protecting accountability in its implementation.

There are many challenges to linking trade and forest strategies effectively and fairly. They include the undifferentiated nature of commodities, making it expensive to establish a 'chain of command' in terms of origin. No one in the value chain wants to bear this cost. Second, both companies and governments need to cooperate for the regulation to work, yet their interests and capacities diverge. Third, existing trade rules, in particular the WTO Agreement on Agriculture, constrain the possible range of instruments that might be used. The WTO rules favour reducing government interventions to increase trade, effectively limiting the scope for protection. Yet healthy forests, food security and sustainable farming systems all need protection to thrive; they are not 'natural' outcomes of free markets. Fourth, the mismanagement of food security in the AoA is a major challenge, creating significant divides across the membership on an issue that ostensibly should be a chance to unite with common purpose

in the protection of the right to food. Fifth, multinational commodity corporations have remained singularly unwilling to take responsibility for the 'externalities' of their businesses, beyond voluntarily raising (some) standards with regard to food safety. This confirms the limited impact of consumer-facing attempts to shame companies into stronger compliance with environmental laws (IPES Food, 2024).

7.5 Food, commodities and the forest

Agriculture has two distinct faces. The first is turned towards provisioning and food. People have cultivated landscapes for food as a subsistence and a livelihood strategy for millennia, accumulating deep cultural, biological and geographical knowledge in the process. The second face is a product of modernity and the emergence of mechanized agriculture several centuries ago, which spurred an industrial revolution and, coupled with colonialism, eventually resulted in significant quantities of internationally traded commodities, including wheat, coffee, cocoa, rubber, etc. The commodification of agriculture contributed to the creation of a class of commodity traders and economies built on the wealth to be had not just from the sale of small amounts of expensive goods from faraway places, such as spices and precious gemstones, but on bulk sales of low-cost commodities, such as wheat and sugar to provide large numbers of people with the calories they need to survive, and industry with inputs such as rubber and cotton (Cooper, 2002; Cronon, 1991).

The two dimensions of agriculture are not equal. International trade relationships reinforce the policy advantage that commodity value chains have over food producers and food markets, despite the fundamental importance of food security to a state's well-being. Trade agreements attract investors and redirect public attention and public spending away from local markets and local food production. It is not uncommon to find domestic industries spun off from the export sector—for example, serving domestic demand for the product grown for export that never makes it out of the country for some reason (for example, failing to meet quality standards). But the focus of the investment and supporting policies build soft and hard infrastructure that moves the product from where it is grown to the ports, often bypassing local population centres.

There are no international markets for many foods; among food staples, wheat and maize are heavily traded, but the international rice market is less than 10 percent of production, while for other staples, such as millets and cassava, there is no international market to speak of (though some production does cross international borders). A large share of international trade in grains and

oilseeds is for animal feed. Markets distribute goods according to relative purchasing power. This limits access to food for those who live in poverty, a problem exacerbated by high and rising levels of economic inequality (Fuentes-Nieva and Galasso, 2014).

Not only does the production of agricultural commodities for industry contribute to deforestation, but forests are especially important for food security. Forests sustain the lives and livelihoods of an estimated 1 billion to 1.7 billion people, who are considered 'forest-dependent' (HLPE, 2017). In addition, there are vast economic networks rooted in these forest-dependent livelihoods. The 2017 Report of the High Level Panel of Experts of the Committee on World Food Security *Sustainable Forestry for Food Security and Nutrition* states that, while data inadequately reflect the complex and essential value of forests "In 2011, the formal forest sector employed an estimated 13.2 million people worldwide and represented 0.9 percent of the world gross domestic product" (HLPE, 2017).

The crucial role of forests in climate stabilization makes them important to all economic activity, including the stability of other systems on which food production depends (such as the hydrologic cycle). While at first glance, the contribution of forests to total global calorie consumption is relatively modest, experts consider that the published data are an undercount, given the challenges in accounting for informal food exchange and wild foods within Indigenous communities and subsistence economies (HLPE, 2017).

At UNFCCC COP28, held in 2023 in Dubai, governments adopted a declaration on sustainable agriculture, resilient food systems and climate change (UNFCCC, 2023b). The previous year, at COP27 in Egypt, governments adopted the Sharm el-Sheikh joint work on implementation of climate action on agriculture and food security (UNFCCC, 2025). These declarations and programmes include some language on food systems and even small-scale producers, but they are silent on the ways that industrial agriculture contributes to total GHG emissions and the urgency of regulating the most destructive aspects of commodity production. The problem is especially acute with regard to concentrated animal agriculture and the associated feed industry. Instead, agro-industries often seek to exempt the agriculture sector from climate commitments, and to invoke food security as the reason (GRAIN and IATP, 2018). Yet fundamentally, as a sector dependent on freshwater and favourable weather, agriculture is one of the sectors most vulnerable to climate change and most urgently in need of much faster and much more effective climate action from governments and companies alike.

The problems with food systems are well documented. Food insecurity has been rising since 2014 and deteriorated significantly during the COVID-19 pandemic (Ickowitz et al., 2022; SOFI,

2025). A disturbing amount of agricultural production continues to be lost due to waste (especially in more affluent countries, as well as inadequate storage and distribution systems). (HLPE, 2014). Markets do a poor job of pricing environmental and social costs and benefits. The two faces of agriculture—local food provisioning and global commodity markets—compete for the same agricultural lands and resources, and on very unequal terms. Commodity markets have the support of the global trade systems, leaving local food systems unprotected and vulnerable.

7.6 Pathways—possibilities and considerations

Given the destructive impact of agricultural commodities on forests, it matters that trade rules have failed to create or protect competition to do better. The attempt to use voluntary standards to change the behaviour of commodity corporations has largely failed; not only have these initiatives not slowed deforestation, they have also deepened public scepticism that companies are sincere in their promises to improve. It is undeniable that the challenges of seeking to align forest protection with Indigenous Peoples' rights, food security and national economic development ambitions are formidable. Right at the heart of these challenges is the unfitness of commonly used measures of success: indicators such as GDP, for example, which counts labour as a cost and environmental harms as an externality. In fact, the protection of natural capital, the imperative of GHG mitigation and the protection of social goods and services all count as costs in our economies. Trade restrictions that could raise quality standards in domestic markets are too often forbidden because they undermine principles such as 'national treatment' and 'least-trade restrictive'. Meanwhile, development economists continue to view agriculture, in particular peasant agriculture, as a backward, low-value sector that is labour-intensive and insufficiently productive. The contributions of small-scale producers to a range of ecological and social system services are not valued and remain invisible as a result.

Where does that leave us? The problems outlined in this chapter will not be resolved by small tweaks to the WTO Agreement on Agriculture. The world needs trade rules that centre food sovereignty, and high integrity ecosystems. Several initiatives are underway to rewrite global trade rules for agriculture. One comes from La Via Campesina, a global movement of peasant organizations that has campaigned since 1999 under the slogan: *WTO out of agriculture*. Today its members have developed a new framework proposal for agricultural trade that reclaims their right to be heard on this dominant dimension of agricultural markets (La Via Campesina, 2025). A summary of their proposals includes new foundational principles to prioritize the rights of people,

communities and ecosystems over profit; human rights law; the Nyéléni definition of food sovereignty; the clear protection of each country's right to define its own food and agricultural policies; a priority for regional trade and shorter value chains; fair markets for small-scale producers, including price supports, labour protections and transparent pricing mechanisms; a ban on dumping (sales abroad at less than the domestic cost of production prices), subsidies to corporate agribusiness, and on speculative trading; currency reform to limit developing countries' exposure to exchange value risks; protection of the commons, including land, water and biodiversity; and support for collective, Indigenous and agroecological farm management.

Another initiative, the Agreement on Agriculture Re-Imagined (Dommen, 2025), shares many of these concerns, principles and recommendations. This is a three-year project, led by the Centre for Development and Environment at the University of Bern, together with the Institute for Agriculture and Trade Policy and the International Institute for Sustainable Development. It brings together a dozen trade lawyers, civil society trade advocates and food system experts from around the world. This project, too, has published a series of new principles for trade (Dommen et al., 2025) and the expert group is now drafting a new treaty that firmly situates trade policy in the context of sustainable food systems—systems that ensure food sovereignty and the right to food, respect environmental and other multilateral obligations, and that also respect the need for sovereignty definitions to encompass rights and responsibilities beyond national borders. Among the new proposals are rules that would require signatories to curb restrictive business practices and ensure that competition rules protect both producer and consumer interests in diversified, decentralized and resilient food systems.

The power of global commodity traders in global value chains is neither new nor unnoticed, yet it remains an underexplored topic in forest policy.

The AoA Re-Imagined project emphasizes the existing body of intergovernmental agreements into which trade rules should fit; the isolation of trade from other dimensions of international governance is considered a problem, not a feature, of trade. There is clearly potential for a more ambitious role for agriculture in countries' NDCs and NBSAPs. If countries were to make changes to agricultural practices to lower their environmental footprint, that in turn would require trade rules to support discrimination among goods according to production and processing methods, something that is expressly forbidden at the WTO today. Both projects also emphasize the need for a clearer articulation and protection of distinct local, regional and global markets, and an understanding of how each level of trade can be more supportive of other levels, where today international trade overshadows regional and local markets.

These initiatives include proposals for rules that would not eliminate subsidies altogether, but which would reorient public spending and investment in food and agriculture with the objective of supporting food sovereignty and ending the subsidization of social and environmental harms. Reoriented subsidies would complement efforts to limit corporate power, including initiatives to increase price transparency, challenges to agri-industry consolidation, stronger agricultural labour laws, and tighter conditions on finance and credit to commodity-focused corporations. A shift away from funding specific commodities, and towards supporting investment in landscapes that provide a diversity of services, foods and other benefits would also reduce the profitability of extractive commodity production.

Trade initiatives find support not just in national governments, but from local authorities and the broader public. Corporations have been successful in mobilizing politicians and the general public to see efforts aimed at changing food production and distribution to address climate change as a threat (for example, attempts to propose reduced meat consumption in countries where the average intake exceeds public health guidelines). Trade-based measures such as the EUDR risk being characterized as foreign meddling in producer countries. Efforts are needed to understand and work with local constraints (as well as with potential allies). One recent study recommended the inclusion in forest legislation of provisions for local market allocation, to

protect local food production and distribution (Bürgi Bonanomi et al., 2025). There are numerous pathways forward, and trade reform is an important one. But it will only work if the vision for trade is integrated into a larger vision of the role of agriculture to meet people's right to food, first, and distinct from the foreign exchange earning potential of commodity exports.

Finally, it is worth challenging the food security myths that reinforce a commodity export-based model of agricultural development. Thinking about food security as a support for forest protection, in contrast to commodity production, makes more sense. Where forests have been degraded, mixed use and agroforestry practices may have more to offer than tree plantations, both for nature and for communities. These measures could single out food sources (such as tree nuts) that create additional incentives for forest preservation and protection by addressing people's economic needs. Similarly, government policy can require that a certain percentage of farmed land be dedicated to tree cover. For example, this is stipulated by the Brazilian forest code. Additional rewards and support could be offered when these trees are also a source of food (Höhl et al., 2020; Ickowitz et al., 2022).

Trade rules have a long history from colonial times that has evolved but never properly shed the unequal Global North-South dynamics of that time, despite the emergence of a handful of Global South countries as major agricultural exporters. The combination of trade, investment and taxation laws of the past three decades have entrenched patterns of commodity trade that are extractive, destroying the natural resource base where the commodities are grown, impoverishing and displacing the communities that lived on the land that gets converted to production, and generating contradictions between short-term gains and the long-term economic viability of the sector. Yet few governments seem able or willing to acknowledge this reality. A radically different approach to food security, premised on decentralized, diverse and locally controlled food systems instead of imported grains—while tightening standards on commodity exports and rebalancing the distribution of costs and gains from commodity trade—would help to reset climate and forest politics. Such an approach would distinguish food sovereignty from the activities of the firms involved in global commodity chains.

CHAPTER 8

Recommendations

Today's economic model, the rules and financial flows that shape our societies, lock many countries, especially in the Global South, into a reliance on extractive industries to power their development. But it does not have to stay this way. The rules of our economy are not laws of nature: they were made by people, and people can change them. We must enable a transformation in the forest and land sectors away from systems of extraction, by identifying and disrupting the inter-related structural mechanisms and policies that keep extraction in place. Climate and biodiversity policies must consider and take an active role in shaping the reform of the global financial architecture to enable a transformative shift in forest governance towards biodiversity restoration and climate resilience.

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) has recommended the need for transformative change to tackle biodiversity loss by addressing its systemic, rather than just its direct drivers (O'Brien et al., 2025). This requires moving beyond incremental reforms towards fundamental shifts in institutions, economies, governance and societal values. The assessment calls for transforming the sectors that drive forest loss and degradation—such as agriculture, forestry, fisheries, mining and energy—and reorienting economic and financial systems to prioritize nature, equity and collective well-being over short-term private gain. Central to this transformation is upholding rights and equity, including secure land tenure, gender-inclusive governance and Indigenous-led approaches, which are shown to deliver lasting benefits for both people and nature.

Countries must be able to create new forms of economic sovereignty, whereby they have the necessary fiscal and monetary space to advance meaningful transformation plans and policies that prioritize ecological health and bring an end to harmful extraction. Building a new vision of transformational development, rooted in communities' rights and ecological stability, countries must align incentives and financial flows with climate goals. This requires more democratic institutions that value and recognize the voice and agency of the Global South. The narratives that dominate policymaking must shift to recognize the current failings, while also building a new narrative of possibility in transformation.



An old growth forest in Oregon

Land gap

- **Limit over-reliance on land-based carbon removal by prioritizing the phase-out of emissions from fossil fuels and ecosystem destruction.** Governments should prioritize immediate reductions in greenhouse gas emissions over long-term land-based carbon removal. Land-based strategies must supplement, not substitute, near-term decarbonization.
- **Ensure equitable and sustainable land-use policies.** Land-based carbon removal policies must safeguard biodiversity, food security and the rights of Indigenous Peoples and Local Communities. Responsible governance frameworks integrate social, biodiversity and climate mitigation goals into planning, including participatory governance and spatial management to prevent adverse social or ecological impacts.
- **Increase transparency and specificity in climate pledges.** National climate pledges should provide detailed, consistent reporting on the type, scale, timing and location of land-based carbon removal activities. Disaggregating afforestation, reforestation, restoration and other land uses will enable a robust assessment of feasibility, trade-offs and cumulative land demand.
- **Integrate land-use planning with climate and biodiversity goals.** Develop frameworks that align carbon removal, ecosystem restoration and conservation objectives. Incentives and monitoring should prioritize the restoration of degraded ecosystems and maintenance of ecosystem services, avoiding the large-scale conversion of existing productive or natural lands.

Forest gap

- **Establish a global forest accountability framework.** Develop comparable monitoring and reporting standards across the Rio Conventions to ensure equitable and transparent forest protection, recognising differing national and ecological contexts. Draw on the *UN System of Environmental-Economic Accounting—Ecosystem Accounts* for consistent frameworks, definitions, classifications, indicators, and capacity-building to produce standardized forest reporting for the Global Stocktake and national GHG inventories. These accounts should capture gross forest area change linked to ecosystem type and condition; carbon stock losses from deforestation and degradation; and gains from restoration.
- **Elevate forest degradation in policy and monitoring.** Recognize that degradation also occurs in northern hemisphere temperate and boreal forests and should be included in comprehensive forest policies, in addition to the current focus on tropical deforestation. Degradation is less visible than deforestation and must be systematically captured in national monitoring and reporting, including for FAO Forest Resource Assessment. Monitoring should cover the multiple characteristics, drivers and impacts of degradation for a comprehensive assessment of forest condition.
- **Integrate forest action into NDCs.** Highlight opportunities to reduce emissions and increase removals through halting deforestation and forest degradation and expanding restoration. All countries should ensure that domestic forest policies and actions are clearly reflected in their NDCs and other relevant reporting, including under the Enhanced Transparency Framework.
- **Expand transparency in results-based financing beyond tropical forests.** Current reporting and financing largely focus on the tropics, leaving boreal and temperate forests under-represented. Incentives should be tied to measurable biodiversity and climate-resilience outcomes, with targets defined in terms of gross anthropogenic changes in areas, ecosystem condition and carbon stocks in all forests supported by strengthened monitoring and transparency that includes forest degradation. Finance required is in addition to existing and future public finance.

Debt

- **Reduce or eliminate austerity conditionalities.**

When countries are seeking debt relief with the assistance of the IMF, austerity is counterproductive and likely to deepen commodity dependence and associated environmental degradation. The IMF should reduce or eliminate these requirements, or at the very least, include protections for the most vulnerable communities and the ecosystems that support them by targeting reductions in deforestation.

- **Equitable debt relief.** The G20 Common Framework for Debt Treatments currently excludes many middle-income countries, does not require all creditors to participate, and lacks enforcement tools to elicit accountability among bondholders and private creditors, as well as multilateral and bilateral ones. It should be expanded to create a fair and universally accessible debt relief mechanism.

- **Incentivize creditor participation.** Similarly, the Common Framework currently suffers from a slow and unclear process, yielding insufficient debt relief. It should embrace the urgency of the present moment and enact an expanded and streamlined process to create incentives for creditors to participate fully.

- **Limit debt-for-nature swaps.** While debt-for-nature swaps may have some value for raising funds for existing, community-centred conservation plans, they should not be the primary tool for discharging debt during a crisis or when developing new conservation plans. Debt crises require large movements of funds in a short period of time, whereas community-centred conservation plans require comparatively little funding, but long periods of participatory planning to succeed.

- **New forms of finance and financial instruments.**

Countries and their creditors should continue to experiment with new forms of finance that are less likely to create debt crises or exacerbate commodity dependence. For example, commodity price-linked bonds are structured to ease their repayments during price declines, reducing the pressure to expand commodity production during crises. Bonds with natural disaster clauses similarly allow capital mobilization without deepening long-term commodity dependence during short-term crises.

Tax

- **Develop in good faith a new global tax treaty.**

Governments should cooperate in good faith with negotiation of the UN Tax Convention on International Tax Cooperation, to deliver an inclusive, democratic and transparent system of international tax cooperation for sustainable development that is aligned with environmental and human rights goals and which takes into account the specific needs of and historic injustices faced by countries of the Global South.

- **Develop comprehensive, equitable and progressive rules.** The UN Tax Convention should include robust commitments to the automatic exchange of information, beneficial ownership transparency and public country-by-country reporting at both national and international levels, so as to decisively confront financial secrecy, illicit financial flows and corporate tax abuse. Furthermore, the UN Tax Convention should enable the redistribution of the rights to tax multinationals, based on the actual economic presence and activity of the company in that country. A 'polluting profits surtax' should be imposed on corporations profiting from deforestation to disincentivize harmful business activities and redirect business conduct towards sustainable livelihoods and forest protection. More broadly, progressive environmental taxes should be designed and implemented to simultaneously deter environmentally-harmful activities and redress socioeconomic inequalities at national and international levels. Furthermore, fiscal policies should be fully in line with environmental objectives, including the Paris Agreement, and human rights obligations, to guarantee equitable, climate-compatible development.

- **Enact new wealth taxes.** Robust wealth taxes should be designed and implemented to redress socioeconomic inequality—itsself a major driver of the climate crisis—at both national and international levels. This will in turn require that effective and transformative international financial transparency and tax measures are delivered through the UN Tax Convention process.

Trade

- **Align food and forest policymaking.** To effect better policies, advocates need to look more widely at the problems agriculture and forestry present for land use, deforestation and forest degradation, and to distinguish between food security and commodity export systems, while ensuring food sovereignty in national processes.
- **Vision for trade rooted in the right to food.** The vision for trade must be integrated into a larger vision of the role of agriculture in meeting people's right to food, first and distinct from the foreign exchange earning potential of commodity exports. It is important to separate food from agricultural commodity production to limit the potential for governments or industry to use food security as an excuse to block or weaken forest protection. A commitment to food sovereignty and the right to food is a precondition for economic development, as is the protection of resilient ecosystems, including forests. Agricultural trade rules need to build on, rather than compete with, those objectives. Trade rules must also address restrictive business practices that dominate agricultural markets.
- **Advance food sovereignty.** A radically different approach to food security, premised on decentralized, diverse and locally controlled food systems instead of imported grains—while tightening standards on commodity exports and rebalancing the distribution of costs and gains from commodity trade—would also help to reset climate and forest politics. Such an approach would distinguish food sovereignty from the activities of the firms involved in global commodity chains.
- **Challenge food security myths that undermine ambition.** The food security myths that reinforce a commodity export-based model of agricultural development must be challenged at national and international level. Prioritizing food security as a support for forest protection, in contrast to commodity production, offers practical policy pathways to combat the leading drivers of forest destruction. Where forests have been degraded, mixed use and agroforestry practices have more to offer than tree plantations, both for nature and for communities.

Subsidies

- **Phase out environmentally-harmful subsidies and tax incentives.** Industrial agriculture and logging practices continue to receive billions of dollars in public monies to subsidize their destructive practices. For example, funding schemes in Europe that promote intensive forestry and biomass under the Renewable Energy Directive and some productive or intensive forestry models under the CAPI and State Aid rules should be reformed to eliminate financial support for monoculture plantations, salvage logging with deadwood removal, and unsustainable biomass extraction.
- **Redirect funding from environmentally-harmful sources.** Reorienting subsidies with the objective of supporting food sovereignty and biodiversity-positive and climate-resilient forest management practices via public spending and investment in food and agriculture would complement efforts to limit corporate power, including initiatives to increase price transparency, challenges to agri-industry consolidation, stronger agricultural labour laws, and tighter conditions on finance and credit to commodity-focused corporations. A shift away from funding specific commodities, and towards supporting investment in landscapes that provide a diversity of services, foods and other benefits would reduce the profitability of extractive commodity production.
- **Increase support for smallholders and communities without losing sight of biodiversity and climate resilience objectives.** Considering smallholders and agroecology as a strategy for forest protection, it is important to simplify access to (beneficial) forest subsidies, reduce transaction costs and improve fairness in funding allocation for the benefit of private and communal forest owners and interested stakeholders.

Glossary

Agroecology

An approach that recognizes the interdependence of living systems and honours the principles of balance, diversity, harmony and respect. Agroecology creatively enables those involved in the food systems to connect with each other and solve problems specific to their unique situations.

Advanced economies

Countries with high income, developed industries and strong financial systems.

Arm's length principle

The standard used in international taxation to determine how transactions between related parties (such as subsidiaries of a multinational corporation) should be priced. It requires that these transactions be conducted 'as if' the parties were independent and unrelated, each acting in their own best interest.

Austerity

Policies aimed at reducing government deficits through spending cuts or tax increases.

Balance of payments

A record of all financial transactions between a country and the rest of the world. The balance of payments consists of three primary components: the current account, the financial account and the capital account. The current account reflects a country's net income, while the financial account reflects the net change in ownership of national assets.

Beneficial ownership

The natural person(s) who ultimately owns, controls or benefits from a company or asset, even if it is held in another name.

Blue bonds

Bonds issued to finance marine and ocean-based projects that support sustainability.

Bond

A debt security issued by governments or companies to raise funds, promising repayment with interest.

Bond rating

An assessment of the creditworthiness of a bond issuer or bond by a rating agency.

Commodity dependence

Heavy reliance on exports of raw materials or primary goods for national income.

Commodity-linked bond

A bond whose payments are tied to the price of a specific commodity (such as oil, gold or agricultural products), so returns vary with market prices.

Commodity

A basic good or raw material that is interchangeable (fungible) with other goods of the same type. Commodities are usually used as inputs in the production of other goods or services.

Credit rating agency

An independent organization that evaluates the creditworthiness of governments, companies or financial instruments by assigning ratings that indicate risk of default.

Debt distress

A situation where a country struggles to meet its debt obligations and risks default.

Deforestation

The conversion of forest to other land uses, such as agriculture or settlements, and involves a permanent reduction in tree cover below the canopy cover threshold defined as a forest. The loss of trees may result from human activities, impacts of disturbance, overutilization, or changing environmental conditions such that tree cover cannot be sustained (FAO-FRA, 2020).

Ecosystem integrity

The system's capacity to maintain composition, structure, autonomous functioning and self-organization over time using processes and elements characteristic of the ecoregion and within a natural range of variability. The system has the capacity for self-regeneration and adaptation by maintaining a diversity of organisms and their inter-relationships to allow evolutionary processes for the ecosystem to persist over time at the landscape scale. Ecosystem integrity encompasses the continuity and full character of a complex system (Keith et al., 2020).

Extractive industries

The extraction or removal of natural resources as raw materials for commodity production. Types of industries include mining for minerals and metals, oil and gas extraction for energy, agricultural products, forestry for timber, fishing and aquaculture. The processes of extraction often negatively impact the environment.

Extractivism

A concept articulated by anti-colonial struggle in the Americas, which refers to a form of economic activity and organization that is based on unsustainable natural resource exploitation for export, with benefits largely accumulating far from the sites of extraction.

Fiscal balance

The difference between government revenue and spending in a given period.

Fiscal loosening

Increasing government spending or cutting taxes to stimulate the economy.

Fiscal policy

The use of government spending and taxation to influence a country's economic activity, growth and stability. Fiscal policy tools are often used to support broad social, environmental or development policy outcomes.

Fiscal tightening

Reducing budget deficits by cutting spending or raising taxes.

Food sovereignty

The right of people to define their own food, agriculture, livestock and fisheries systems and policies.

Food security

A term defined by FAO to describe when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life.

Forests

Forests are defined by structural characteristics of woody vegetation. FAO-FRA (2025) definition of forest is trees higher than 5 m and a canopy cover of more than 10 percent, or trees able to reach these thresholds *in situ* and in an area of more than 0.5 ha and where the land use is for growing trees. The UNFCCC definition of a 'forest' is an area of land of at least 0.05–1 ha and a minimum tree-crown cover of 10–30 percent, with trees that reach, or could reach, a minimum height of 2–5 m at maturity (UNFCCC, 2002).

Forest degradation

The reduction in the ecosystem integrity of the forest, attributable to the impacts of human land-use activities, including forest management for commodity production. The composition, structure, function and productivity of the ecosystem is impacted by these land uses, resulting in reduced capacity to deliver the full suite of ecosystem goods and services. The impacts are long-term and persistent. Degradation includes impacts from human activities, severe climate events, fire, pests, diseases and other disturbances. Description of degradation involves the ecosystem characteristics, magnitude and scale of impacts. Degradation involves species loss, reduced structural complexity, reduced age distribution, particularly in the case of old trees, decreased carbon stocks, as well as reductions in many other characteristics of ecosystem condition. Degradation of forest ecosystems reduces the provision of goods and services, as well as biodiversity values, productivity and health, and may negatively affect other land uses and cause emissions of greenhouse gases.

Formulary apportionment

For the purpose of determining the tax base in a specific country, a method of allocating the total profits of a multinational corporation across different tax jurisdictions using a predetermined formula, rather than relying on the company's reported intra-group transactions. The formula can consider factors such as: sales (where products are sold), assets (where physical capital is located), payroll or employment (where workers are located).

Global North

A term used to describe the wealthier, industrialized countries, mainly in North America, Europe and parts of East Asia.

Global South

A term for lower- and middle-income countries, often in Latin America, Africa, Asia and Oceania, typically with less wealth and political influence than the Global North.

Illicit financial flows

Financial flows that are illicit in origin, transfer or use, that reflect an exchange of value and that cross country borders; the flow can be legally generated, transferred or used, but it must be illicit in at least one of these aspects.

Industrial agricultural production

A large-scale, high-input and highly capitalized farming system characterized by mechanization, monocultures, heavy use of synthetic fertilizers and pesticides, intensive livestock operations and concentrated markets.

Intact ecosystem

A natural system that remains largely undisturbed and continues to function with a high degree of integrity of ecological processes.

Land-use change

Refers to the transformation in how land is used over time, involving the conversion of one land use to another—for example, from forest to agriculture, pasture, or urban areas. Temporary changes, such as logging where the forest is expected to regenerate, are excluded from this definition.

Monetary policy

The process by which a country's central bank manages the supply of money and interest rates to influence inflation, employment and overall economic growth.

Paris Club

An informal group of creditor countries that coordinates solutions for debtor nations facing payment difficulties.

Primary forests

Naturally regenerating forests of native species, whose composition, structure and function are dominated by natural ecological and evolutionary processes, including natural disturbance regimes (FAO-FRA, 2020; IUCN, 2020; Mackey et al., 2020). These forests are not subject to modern industrial land use, but most are the customary lands and territories of IPs and LCs. Primary forests have irreplaceable value for their biodiversity, carbon storage, other ecosystem functions, including cultural and heritage values, and for sustaining the livelihoods and culture of IPs and LCs (FAO, 2020).

Profit shifting

A practice used by multinational companies to reduce their tax payments by artificially moving profits from high-tax jurisdictions to effectively low-tax (or no-tax) jurisdictions, with the objective of minimizing the overall amount of corporate tax paid globally.

Secondary forests

Woody vegetation that has regrown on land that was cleared, mainly or partially, of its original tree cover and commonly regenerates naturally (FAO, 2011).

Sovereign debt

Money borrowed by a national government, usually through issuing bonds, that must be repaid with interest.

Special Drawing Right

An international reserve asset created by the IMF to supplement member countries' official reserves. Its value is based on a basket of major currencies (currently the US dollar, the euro, Chinese renminbi, Japanese yen and British pound) and it can be exchanged among governments for freely usable currencies.

Subsidies

Financial assistance or support provided by governments to individuals, businesses or sectors to promote certain activities or reduce costs.

Sustainability-linked bond

A bond with financial terms tied to the issuer's achievement of specific environmental or social goals.

Unitary taxation

A method of taxing multinational corporations in which the company is treated as a single global entity, rather than a collection of separate subsidiaries. Profits are then apportioned to different jurisdictions based on factors such as sales, assets and employment.

References

- Abdul-Salam, Y., 2024. Examining the effect of the UK oil and gas windfall tax on the economics of new fields in the UKCS province. *Resources Policy* 88, 104447.
- Acker, K., Brautigam, D., Huang, Y., 2020. Debt Relief with Chinese Characteristics. China Africa Research Initiative, School of Advanced International Studies, Johns Hopkins University, Washington, DC.
- African Development Bank, 2006. Cameroon: Completion Point Document HIPC Framework. African Development Bank Group.
- African Union, 2023. African Group Chair speaks to the press on Framework Convention on International Tax, tabled for vote this week at the UN. <https://au.int/en/pressreleases/20231119/african-group-chair-speaks-press-framework-convention-international-tax>
- Alami, I., 2024. Racial capitalism, uneven development, and the abstractive powers of race and money. *Environ. Plan. A* 56, 1304–1310.
- Almeida, E., Lagoa, D., Vasudhevan, T., 2024. Hidden harms: the economic and financial consequences of deforestation and its underlying drivers. CETEX. <https://cetex.org/wp-content/uploads/2024/10/Hidden-harms-the-economic-and-financial-consequences-of-deforestation-and-its-underlying-drivers.pdf#expand>
- Althouse, J., Svartzman, R., 2022. Bringing subordinated financialisation down to earth: the political ecology of finance-dominated capitalism. *Camb. J. Econ.* 46, 679–702.
- Althouse, J., Svartzman, R., 2024. Prospects and roadblocks to a “sustainable” international monetary and financial system, in: Jäger, J., Dziwok, E. (Eds.), *Understanding Green Finance*. Edward Elgar Publishing, pp. 182–198.
- Arifah, K.F., Kim, J., 2022. The Importance of Agricultural Export Performance on the Economic Growth of Indonesia: The Impact of the COVID-19 Pandemic. *Sustainability* 14, 16534.
- Arneth, A., Sith, S., Pongratz, J., Stocker, B.D., Ciais, P., Poulter, B., et al. 2017. Historical carbon dioxide emissions caused by land-use changes are possibly larger than assumed. *Nature. Geosci.* 10, 79–84.
- Arthur, W.B., 2013. Complexity Economics: A Different Framework for Economic Thought. Santa Fe Institute. <https://sfi-edu.s3.amazonaws.com/sfi-edu/production/uploads/sfi-com/dev/uploads/filer/a1/3e/a13e8ad4-cd39-4422-8cc3-86c543699f6d/13-04-012.pdf>
- Asian Infrastructure Investment Bank, 2023. Nature as Infrastructure: Bridging Concepts for a Sustainable Future. <https://www.aiib.org/en/news-events/media-center/blog/2024/embracing-nature-as-infrastructure-bridging-concepts-for-a-sustainable-future.html>
- Asner, G.P., Knapp, D.E., Broadbent, E.N., Oliveira, P.J.C., Keller, M., Silva, J.N., 2005. Selective logging in the Brazilian Amazon. *Science* 310, 480–482.
- Austin, K.G., Heilmayr, R., Benedict, J.J., Burns, D.N., Eggen, M., Grantham, H., et al., 2021. Mapping and monitoring zero-deforestation commitments. *BioScience* 71, 1079–1090.
- Avilés, W., 2018. The Wayúu tragedy: death, water and the imperatives of global capitalism. *Third World Quarterly* 40(9).
- Baccini, A., Walker, W., Carvalho, L., Farina, M., Sulla-Menashe, D., Houghton, R.A., 2017. Tropical forests are a net carbon source based on aboveground measurements of gain and loss. *Science* 358, 230–234.
- Banbury Morgan, R., Jucker, T., 2025. A unifying framework for understanding how edge effects reshape the structure, composition and function of forests. *New Phytologist* 248, 529–541.
- Barber, C.V., Petersen, R., Young, V., Mackey, B., Kormos, C., 2020. The Nexus Report: Nature-based Solutions to the Biodiversity and Climate Crisis. F20 Foundations, Campaign for Nature and SEE Foundation. <https://research-repository.griffith.edu.au/server/api/core/bitstreams/dbee95d5-d6d5-4111-a286-02201159e4cb/content>
- Barni, P.E., Rego, A.C.M., Silva, F.D.C.F., Lopes, R.A.S., Xaud, H.A.M., Xaud, M.R., et al., 2021. Logging Amazon forest increased the severity and spread of fires during the 2015–2016 El Niño. *For. Ecol. Manag.* 500, 119652.
- Barrett, C.B., Reardon, T., Swinnen, J., Zilberman, D., 2019. Structural Transformation and Economic Development: Insights from the Agri-food Value Chain Revolution (Working paper). Dyson School of Applied Economics and Management, Cornell University.
- Beer, S., Devlin, D., 2021. Is there Money on the Table? Evidence on the Magnitude of Profit Shifting in the Extractive Industries (IMF Working Paper, WP21/9).
- Beghin, B., 2024. Strengthening Progressive, Inclusive, and Participatory Tax Systems Toward Just Climate Finance. Instituto de Estudos Socioeconômicos (INESC).
- BEPS Monitoring Group, 2023. Taxing Multinationals: The BEPS Proposals and Alternatives. The South Centre. <https://www.southcentre.int/wp-content/uploads/2023/08/TheBEPSProposalsandAlternatives.pdf>
- Berman, N., Couttenier, M., Leblois, A., Soubeyran, R., 2023. Crop prices and deforestation in the tropics. *J. Environ. Econ. Manag.* 119.
- Betts, M.G., Yang, Z., Hadley, A.S., Hightower, J., Hua, F., Lindenmayer, D., et al., 2024. Quantifying forest degradation requires a long-term, landscape-scale approach. *Nat. Ecol. Evol.* 8, 1054–1057.
- Blanchard, L., Haya, B.K., Anderson, C., Badgley, G., Cullenward, D., Gao, P., et al., 2024. Funding forests’ climate potential without carbon offsets. *One Earth* 7, 1147–1150.
- Blanchard, O.J., Leigh, D., 2013. Growth Forecast Errors and Fiscal Multipliers. *Am. Ec. Rev.* 103, 117–120.
- Booth, M., Brooks, C.M., 2023. Financing marine conservation from restructured debt: a case study of the Seychelles. *Front. Marin. Sci.* 10.
- Bourgoin, C., Ceccherini, G., Girardello, M., Vancutsem, C., Avitabile, V., Beck, P.S.A., et al., 2024. Human degradation of tropical moist forests is greater than previously estimated. *Nature* 631, 570–576.
- Brack, D., 2019. Towards Sustainable Cocoa Supply Chains: Regulatory Options for the EU. Fern, Tropenbos International, Fairtrade International and the Fair trade Advocacy Office. <https://www.fern.org/fileadmin/uploads/fern/Documents/2019/Fern-sustainable-cocoa-supply-chains-report.pdf>
- Bradley, C.M., Hanson, C.T., DellaSala, D.A., 2016. Does increased forest protection correspond to higher fire severity in frequent-fire forests of the western United States? *Ecosphere* 7, e01492.
- Braun, J., Werner, C., Gerten, D., Stenzel, F., Schaphoff, S., Lucht, W., 2025. Multiple planetary boundaries preclude biomass crops for carbon capture and storage outside of agricultural areas. *Commun. Earth. Environ.* 6, 102.
- Brautigam, D., Huang, Y., 2023. Integrating China into Multilateral Debt Relief: Progress and Problems in the G20 DSSI. China Africa Research Initiative, School of Advanced International Studies, Johns Hopkins University, Washington, DC.
- Briant, G., Gond, V., Laurance, S.G.W., 2010. Habitat fragmentation and the desiccation of forest canopies: A case study from Eastern Amazonia. *Biol. Conserv.* 143, 2763–2769.

REFERENCES

- Bryan, K., 2023. 'Sustainable' debt pioneer ditches controversial 'blue bond' label. Financial Times.
- Bulte, E., Damania, R., 2008. Resources for Sale: Corruption, Democracy and the Natural Resource Curse. The B.E. J. Econ. Anal. Pol. 8.
- Bürgi Bonanomi, E., Zabel, A., Afriyie, L., Eckert, S., Bantider, A., Musselli, I., et al., 2025. Time for change: Recommendations for action during the proposed EUDR postponement. Ambio 54.
- Business in Cameroon, 2025. Cameroon Offers 20% Export Cut for Deforestation-Free Goods. Business in Cameroon. <https://www.businessincameroon.com/agriculture/1001-14422-cameroon-offers-20-export-cut-for-deforestation-free-goods>
- CAFI-Cameroon, 2024. Signature de la Lettre d'Intention entre le Cameroun et CAFI. <https://cafi-cameroon.cm/lettre-dintention-cameroun-cafi-hamburg/>.
- CBD, 2006. Indicative definitions taken from the Report of the Ad Hoc Technical Expert Group on Forest Biological Diversity. <https://www.cbd.int/forest/definitions.shtml>
- CBD, 2024. Decision adopted by the Conference of the Parties to the Convention on Biological Diversity on 27 February 2025, Decision 16/34/26. Convention on Biological Diversity.
- CBD, 2025. Kunming-Montreal Global Biodiversity Framework 2030 Targets (with Guidance Notes). Convention on Biological Diversity.
- Ceccherini, G., Duveiller, G., Grassi, G., Lemoine, G., Avitabile, V., Pilli, R., et al., 2020. Abrupt increase in harvested forest area over Europe after 2015. Nature 583, 72–77.
- Ceccherini, G., Duveiller, G., Grassi, G., Lemoine, G., Avitabile, V., Pilli, R., et al., 2021. Reply to Wernick, I. K. et al.; Palahí, M. et al. Nature 592, E18–E23.
- Chamon, M., Klok, E., Thakoor, V., Zettelmeyer, J., 2022. Debt-for-Climate Swaps: Analysis, Design, and Implementation. International Monetary Fund, Washington, DC.
- Chang, H.-J., 2011. Institutions and economic development: theory, policy and history. JOIE 7, 473–498.
- Chaparro-Hernandez, S., 2025. Trump's walkout fumble is a golden window to push ahead with a UN tax convention. Tax Justice Network.
- Chatterjee, R., 2024. Fossil fuel phase-out in developing countries requires new economic order. Third World Resurgence 358, 25–27.
- Chee, Y.L., 2011. The Rio Declaration on Environment and Development: An Assessment. <https://twm.my/title/end/end12.htm>
- Chen, J., Saunders, S.C., Crow, T.R., Naiman, R.J., Brosofske, K.D., Mroz, G.D., et al., 1999. Microclimate in Forest Ecosystem and Landscape Ecology. BioScience 49, 288–297.
- Christian Aid, 2022. Profit Before People and Planet: How Economic Policies and Corporate Profit Maximisation Perpetuate the Unsustainable Exploitation of the Brazilian Amazon and its People. Christian Aid, Financial Transparency Coalition, Latindadd. <https://twm.my/title/end/end12.htm>
- Clapp, J., 2023. Concentration and crises: exploring the deep roots of vulnerability in the global industrial food system. J. Peasant Stud. 50, 1–25.
- Clapp, J., 2025. Titans of industrial agriculture: How a few giant corporations came to dominate the farm sector and why it matters. MIT Press.
- Clay, J., 2013. World Agriculture and the Environment: A Commodity-by-Commodity Guide to Impacts and Practices. Island Press.
- Climate Resource 2025. Pre-COP30: How are Temperatures Tracking on the Latest Climate Targets? Climate Resource. https://www.climate-resource.com/reports/ndcs/2025-10-23_pre-COP30_How%20are%20temps%20tracking_CR.pdf
- Cobham, A., 2020. US Blows up Global Project to Tax Multinational Corporations. What Now? Tax Justice Network.
- Cooper, F., 2002. Africa since 1940: The Past of the Present, 1st edition. Cambridge University Press.
- Cornia, G.A., Stewart, F., 2014. Towards Human Development: New Approaches To Macroeconomics And Inequality. OUP Oxford.
- Cramb, R., McCarthy, J.F., 2016. The Oil Palm Complex: Smallholders, Agribusiness and the State in Indonesia and Malaysia. NUS Press.
- Cronon, W., 1991. Nature's Metropolis: Chicago and the Great West, 1st edition. ed. W. W. Norton, New York.
- Crowther, T.W., Glick, H.B., Covey, K.R., Bettigole, C., Maynard, D.S., Thomas, S.M., et al., 2015. Mapping tree density at a global scale. Nature 525, 201–205.
- Csillik, O., Keller, M., Longo, M., Ferraz, A., Rangel Pinagé, E., Görgens, E.B., et al., 2024. A large net carbon loss attributed to anthropogenic and natural disturbances in the Amazon Arc of Deforestation. PNAS 121, e2310157121.
- Curtis, P.G., Slay, C.M., Harris, N.L., Tyukavina, A., Hansen, M.C., 2018. Classifying drivers of global forest loss. Science 361, 1108–1111.
- Dallas, M.P., Ponte, S., Sturgeon, T.J., 2019. Power in global value chains. RIPE 26, 666–694.
- Daniels, A., Kohonen, M., Reis, T., Corvaro, B., 2025. [Forthcoming]. Financial Secrets of the Forests: How secrecy fuels forest loss in Brazil and Cameroon. Financial Transparency Coalition, Fundacion SES; PALU.
- Dean, S., A., 2023. Fear of a Black Planet: Africa's Decolonisation and the Transformation of the International Tax Regime, in: Taxing People: The Next One Hundred Years. Cambridge University Press.
- Defo, L., 2023. Six years of industrial logging in Ngoyla (East-Cameroon): what have been the outcomes for local populations? Int. Forest. Rev. 25, 91–112.
- Delabre, I., Boyd, E., Brockhaus, M., Carton, W., Krause, T., Newell, P., et al., 2020. Unearthing the myths of global sustainable forest governance. Glob. Sustain. 3, e16.
- Dempsey, J., Irvine-Broque, Gaster, T., Steichen, L., Bigger, P., Duque, A.C., et al., 2024. Exporting Extinction: How the international financial system constrains biodiverse futures. The Centre for Climate Justice, Climate and Community Institute, and Third World Network. <https://climatejustice.ubc.ca/news/exporting-extinction-how-the-international-financial-system-constrains-biodiverse-futures/>
- Deprez, A., Leadley, P., Dooley, K., Williamson, P., Cramer, W., Gattuso, J.-P., et al., 2024. Sustainability limits needed for CO2 removal. Science 383, 484–486.
- Deutsche Welle, 2022. Germany's Dirty Colombian Coal. Die Deutsche Welle. <https://www.dw.com/en/germanys-dirty-colombian-coal/a-61935515https://www.dw.com/en/germanys-dirty-colombian-coal/a-61935515>
- Di Sacco, A., Hardwick, K.A., Blakesley, D., Brancalion, P.H.S., Breman, E., Cecilio Rebola, L., et al., 2021. Ten golden rules for reforestation to optimize carbon sequestration, biodiversity recovery and livelihood benefits. Glob. Change Biol. 27, 1328–1348.
- Dommen, C., 2025. Agreement on Agriculture Re-imagined: Underlying Principles (Working Paper No. AoA-Rel-WP01-2025). Centre for Development and Environment, University of Bern.
- Dommen, C., Manduna, C., Murphy, S., Bürgi Bonanomi, E., Coutinho, C.R., Dhar, B., et al., 2025. Agreement on Agriculture Re-Imagined: Making the Case for New Trade Rules (Background Paper 2025 No. AOA-REI-BP-2025). Centre for Development and Environment, University of Bern.
- Donald, P.F., 2004. Biodiversity impacts of some agricultural commodity production systems. Conservation Biology 18, 17–38.
- Dooley, K., Kartha, S., 2018. Land-based negative emissions: risks for climate mitigation and impacts on sustainable development. Int. Environ. Agreements 18, 79–98.
- Dooley, K., Christiansen, K.L., Lund, J.F., Carton, W., Self, A., 2024. Over-reliance on land for carbon dioxide removal in net-zero climate pledges. Nat. Commun. 15, 9118.

REFERENCES

- Dooley, K., Keith, H., Larson, A., Catacora-Vargas, G., Carton, W., Christiansen, K.L., et al., 2022. The Land Gap Report 2022. University of Melbourne. https://landgap.org/downloads/2022/Land-Gap-Report_FINAL.pdf
- Dorninger, C., Hornborg, A., Abson, D.J., Von Wehrden, H., Schaffartzik, A., Giljum, S., et al., 2021. Global patterns of ecologically unequal exchange: Implications for sustainability in the 21st century. *Ecol. Econ.* 179, 106824.
- Dow Goldman, E., Weisse, M., Harris, N., Schneider, M., 2020. Estimating the Role of Seven Commodities in Agriculture-Linked Deforestation: Oil Palm, Soy, Cattle, Wood Fiber, Cocoa, Coffee, and Rubber (Technical Note). World Resources Institute. <https://files.wri.org/d8/s3fs-public/estimating-role-seven-commodities-agriculture-linked-deforestation.pdf>
- Driscoll, D., 2023. Populism and carbon tax justice: The yellow vest movement in France. *Social Problems* 70, 143–163.
- Dröge, S., Verbist, B., Maertens, M., Muys, B., 2024. Do voluntary sustainability standards reduce primary forest loss? A global analysis for food commodities. *Agric. Ecosyst. Environ.* 374, 109158.
- Dubash, N.K., Mitchell, C., Boasson, E.L., Borbor-Cordova, M.J., 2022. Chapter 13: National and sub-national policies and institutions, in: IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press.
- Dudley, N., Alexander, S., 2017. Agriculture and biodiversity: A review. *Biodiversity* 18, 45–49.
- Duku, C., Hein, L., 2021. The impact of deforestation on rainfall in Africa: a data-driven assessment. *Environ. Res. Lett.* 16, 064044.
- Earth4All, 2024. Tax the Rich, say a Majority of Adults Across 17 G20 Countries surveyed. <https://earth4all.life/news/tax-the-rich-say-g20-citizens/>
- El-Erian, M.A., 2023. Fragmented Globalization. Project Syndicate. <https://www.project-syndicate.org/commentary/globalization-not-ending-but-becoming-more-fragmented-by-mohamed-a-el-erian-2023-03>
- Epule, E.T., Peng, C., Lepage, L., Chen, Z., 2014. Policy options towards deforestation reduction in Cameroon: An analysis based on a systematic approach. *Land Use Policy* 36, 405–415.
- Erb, K.-H., Kastner, T., Plutzer, C., Bais, A.L.S., Carvalhais, N., Fetzel, T., et al., 2018. Unexpectedly large impact of forest management and grazing on global vegetation biomass. *Nature* 553, 73–76.
- Esquivel-Muelbert, A., Baker, T.R., Dexter, K.G., Lewis, S.L., Brien, R.J.W., Feldpausch, T.R., et al., 2019. Compositional response of Amazon forests to climate change. *Glob. Chang. Biol.* 25, 39–56.
- Essers, D., Cassimon, D., Prowse, M., 2021. Debt-for-climate swaps: Killing two birds with one stone? *Glob. Environ. Chang.* 71, 102407.
- Eurodad, 2024. Financing Development? An Assessment of Domestic Resource Mobilisation, Illicit Financial Flows and Debt Management. https://assets.nationbuilder.com/eurodad/pages/3533/attachments/original/1716387245/01_DRM-report-EN-digital.pdf?1716387245
- EEA, 2019. Annual European Union Greenhouse Gas Inventory 1990–2017 and Inventory Report 2019. European Environment Agency. <https://unfccc.int/documents/194921>
- EEA, 2020. State of Nature in the EU. Results from Reporting Under the Nature Directives 2013–2018. European Environment Agency. <https://www.eea.europa.eu/en/analysis/publications/state-of-nature-in-the-eu-2020>
- EEA, 2023. How are European Forest Ecosystems Doing? Briefing no. 04/2023. European Environment Agency. <https://www.eea.europa.eu/en/analysis/publications/how-are-european-forest-ecosystems-doing>
- ESABCC, 2024. Towards EU climate neutrality. Progress, Policy Gaps and Opportunities. Assessment Report 2024. European Scientific Advisory Board on Climate Change. Luxembourg: Publications Office of the European Union.
- Ewane, B.E., 2022. How much deforestation in the Congo Basin can cause the hydrological cycle to degrade to a tipping point? *Acad. Lett.*
- FACTI Panel, 2021. Financial Integrity for Sustainable Development. Report of the High Level Panel on International Financial Accountability, Transparency and Integrity for Achieving the 2030 Agenda. https://factipanel.org/docpdfs/FACTI_Panel_Report.pdf
- Fajardy, M., Mac Dowell, N., 2018. The energy return on investment of BECCS: is BECCS a threat to energy security? *Energy Environ. Sci.* 11, 1581–1594.
- FAO and UNEP, 2020. The State of the World's Forests 2020. Forests, Biodiversity and People. Food and Agriculture Organization of the United Nations, Rome.
- FAO, 2006. Trade Reform and Food Security. Country Case Studies and Synthesis. Food and Agriculture Organization of the United Nations, Rome.
- FAO, 2011. Assessing Forest Degradation: Towards the Development of Globally Applicable Guidelines (Forest Resources Assessment Working Paper No. 177). Food and Agriculture Organization of the United Nations, Rome.
- FAO, 2019. Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security. Food and Agriculture Organization of the United Nations, Rome.
- FAO. 2024. The State of the World's Forests 2024—Forest-sector innovations towards a more sustainable future. Food and Agriculture Organization of the United Nations, Rome.
- FAO, 2024. The State of Agricultural Commodity Markets 2024. Food and Agriculture Organization of the United Nations, Rome.
- FAO, 2025a. Terms and Definitions FRA 2025 (Forest Resources Assessment working paper no. 194). Food and Agriculture Organization of the United Nations, Rome.
- FAO, 2025b. FAOSTAT Statistical Database. Fao.org/faostat/en/
- FAO-FRA, 2020. Global Forest Resources Assessment 2020. Main report. Food and Agriculture Organization of the United Nations, Rome.
- FAO-FRA, 2025. Global Forest Resources Assessment 2025. Food and Agriculture Organization of the United Nations, Rome.
- FATF, 2021. Money Laundering from Environmental Crime. Financial Action Task Force.
- FCLP, 2025. Forest Finance: Roadmap for Action. Forest and Climate Leaders' Partnership. <https://forestclimateleaders.org/2025/09/23/34-governments-the-forest-finance-roadmap-for-action/>
- FDAP, 2025. Forest Declaration Assessment 2025: Tracking progress on 2030 forest goals, The Forest Declaration Assessment, October 2025. Forest Declaration Assessment Partners and Climate Focus.
- FLII, 2025. Forest Landscape Integrity Index. <https://www.forestintegrity.com/>
- Fleischman, F., Coleman, E., Fischer, H., Kashwan, P., Pfeifer, M., Ramprasad, V., Rodriguez Solorzano, C., Veldman, J.W., 2022. Restoration prioritization must be informed by marginalized people. *Nature* 607, E5–E6.
- Forster, T., Bhandary, R.R., Gallagher, K.P., 2024. The International Monetary Fund and Deforestation: Analyzing the Environmental Consequences of Conditional Lending. Boston University Global Development Policy Center, Boston. <https://www.bu.edu/gdp/files/2024/10/TF-WP-014-FIN.pdf>
- FODECC, 2020. FODECC. <https://www.fodecc.cm>
- Forest Tenure Funders Group (2024). Indigenous Peoples and Local Communities Forest Tenure Pledge: Annual Report 2023–2024 <https://forestclimateleaders.org/wp-content/uploads/2025/01/FTTG-Annual-Report-2023-2024-EN.pdf>

REFERENCES

- RRI, 2018. A Global Baseline of Carbon Storage in Collective Lands: Indigenous and Local Community Contributions to Climate Change Mitigation. Rights and Resources Initiative, September 2018 Report.
- Friedlingstein, P., O'Sullivan, M., Jones, M.W., Andrew, R.M., Hauck, J., Landschützer, P., et al., 2025. Global Carbon Budget 2024. *Earth Syst. Sci. Data* 17, 965–1039.
- Fuentes-Nieva, R., Galasso, N., 2014. Working for the Few: Political Capture and Economic Inequality. Oxfam. <https://policy-practice.oxfam.org/resources/working-for-the-few-political-capture-and-economic-inequality-311312/>
- G20, 2013. Tax Annex to the St. Petersburg G20 Leaders' Declaration. Group of Twenty. <https://obamawhitehouse.archives.gov/sites/default/files/image/files/g-20taxannex.pdf>
- G24, 2022. Comments of the G-24 on the progress report on Amount A of Pillar One. <https://g24.org/comments-of-the-g-24-on-the-progress-report-on-amount-a-of-pillar-one/>
- Gabor, D., 2021. The Wall Street Consensus. *Development and Change* 52, 429–459.
- Gallagher, K.P., Zucker-Marques, M., Bhandary, R.R., Marins, N., 2024. Energizing MDB financing capacity identifying and filling gaps to raise ambition for the 2030 agenda and beyond. Boston University Global Development Policy Center, Boston, MA.
- Garcia, B., Morgan, E.A., Aruch, M., Ferreira, I.R., Jerolimski, A., Mackey, B., et al., 2024. Large-scale forest protection: the successful case of the Kayapo people in the Brazilian Amazon. *Reg. Environ. Chang.* 24, 148.
- Garnett, S.T., Burgess, N.D., Fa, J.E., et al. 2018. A spatial overview of the global importance of Indigenous lands for conservation. *Nat. Sustain.*, 1, 369–374.
- Gatti, L.V., Cunha, C.L., Marani, L., Cassol, H.L.G., Messias, C.G., Arai, E., et al., 2023. Increased Amazon carbon emissions mainly from decline in law enforcement. *Nature* 621, 318–323.
- Gaveau, D.L.A., Linkie, M., Suyadi, Levang, P., Leader-Williams, N., 2009. Three decades of deforestation in southwest Sumatra: Effects of coffee prices, law enforcement and rural poverty. *Biol. Conserv.* 142, 597–605.
- Gayle, D., 2025. Six big US banks quit net zero alliance before Trump inauguration. *The Guardian*.
- Geitzenauer, M., Blondet, M., de Koning, J., Ferranti, F., Sotirov, M., Weiss, G., et al., 2017. The challenge of financing the implementation of Natura 2000 - empirical evidence from Six European Union Member States. *Forest Policy Econ.* 82, 3–13.
- Gerasimchuk, I., Do, N., Laan, T., Darby, M., Jones, N., 2024. The cost of fossil fuel reliance: Governments provided USD 1.5 trillion from public coffers in 2023. Institute for Sustainable Development (IISD). <https://www.iisd.org/articles/insight/cost-fossil-fuel-reliance-governments-provided-15-trillion-2023>
- GFW, 2025. Global Forest Watch dataset. Interactive map. <https://www.globalforestwatch.org/dashboards/global/>
- Ghazoul, J., Burivalova, Z., Garcia-Ulloa, J., King, L.A., 2015. Conceptualizing forest degradation. *Trends Ecol. Evol.* 30, 622–632.
- Giles C., 2022. US and France agree deal on digital tax. *The Financial Times*.
- Glasgow Leaders' Declaration on Forests and Land Use, 2021. <https://webarchive.nationalarchives.gov.uk/ukgwa/20230418175226/https://ukcop26.org/glasgow-leaders-declaration-on-forests-and-land-use/>
- Global Witness, 2024. Missing voices: The violent erasure of land and environmental defenders. <https://globalwitness.org/en/campaigns/land-and-environmental-defenders/missing-voices/>
- Glück, P., 1998. Die Dienstleistungen des Waldes als sozioökonomische Kategorie. In: P. Glück, E. Nießlein, (Hrsg.): Wer zahlt für die gesellschaftlichen Leistungen des Waldes? Schriftenreihe des Instituts für Soziökonomik der Forst- und Holzwirtschaft, Wien (1998) 5–16.
- González-González, A., Clerici, N., Quesada, B., 2021. Growing mining contribution to Colombian deforestation. *Environ. Res. Lett.* 16, 064046.
- Gou, Y., Balling, J., De Sy, V., Herold, M., De Keersmaecker, W., Slagter, B., et al., 2022. Intra-annual relationship between precipitation and forest disturbance in the African rainforest. *Environ. Res. Lett.* 17, 044044.
- Goyal, M., Hickel, J., Jha, P., 2025. Increasing inequality in agri-food value chains: global trends from 1995–2020. *Global Food Security* 46, 100883.
- GRAIN and IATP, 2018. Emissions impossible: How big meat and dairy are heating up the planet. Grain and Institute for Agriculture and Trade Policy. <https://www.iatp.org/blog/emissions-impossible>
- Grantham, H.S., Duncan, A., Evans, T.D., Jones, K.R., Beyer, H.L., Schuster, R., et al., 2020. Anthropogenic modification of forests means only 40% of remaining forests have high ecosystem integrity. *Nat. Commun.* 11, 5978.
- Greenville, J., 2017. Domestic support to agriculture and trade: Implications for multilateral reform. International Centre for Trade and Sustainable Development.
- Grogan, K., Pflugmacher, D., Hostert, P., Mertz, O., Fensholt, R., 2019. Unravelling the link between global rubber price and tropical deforestation in Cambodia. *Nature Plants* 5, 47–53.
- Gross, D., 2023. The global tax rate is now a tax haven rewards programme, and Switzerland wants in first. *Tax Justice Network*.
- Grynspan, R., Razo, C., 2024. A World of Debt: A Growing Burden to Global Prosperity. UN Trade and Development. https://unctad.org/system/files/official-document/osgtinf2024d1_en.pdf
- Gunderson, L.H., Holling, C.S., 2002. *Panarchy: Understanding Transformations in Human and Natural Systems*. Island Press, Washington, DC.
- Guzman, M., Ocampo, J.A., Stiglitz, J.E. eds., 2016. *Too little, too Late: The Quest to Resolve Sovereign Debt Crises*. Columbia University Press.
- Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., et al., 2015. Habitat fragmentation and its lasting impact on Earth's ecosystems. *Sci. Adv.* 1, e1500052.
- Haeler, E., Bolte, A., Buchacher, H., Hänninen, R., Jandl, R., Juutinen, A., et al., 2023. Forest subsidy distribution in five European countries. *Forest Policy Econ.* 146, 102882.
- Hall, A., Antonopoulos, G.A., Atkinson, R., Wyatt, T., 2023. Duty free: Turning the criminological spotlight on special economic zones. *Br. J. Criminol.* 63, 265–282.
- Hansen, M.C., Potapov, P.V., Moore, R., Hancher, M., Turubanova, S.A., Tyukavina, A., et al., 2013. High-Resolution Global Maps of 21st-Century Forest Cover Change. *Science* 342, 850–853.
- Hansen, M.C., Wang, L., Song, X.-P., Tyukavina, A., Turubanova, S., Potapov, P.V., et al., 2020. The fate of tropical forest fragments. *Sci. Adv.* 6, eaax8574.
- Harper, A.B., Powell, T., Cox, P.M., House, J., Huntingford, C., Lenton, T.M., et al., 2018. Land-use emissions play a critical role in land-based mitigation for Paris climate targets. *Nat. Commun.* 9.
- Harris, N., Rose, M., 2025. World's Forest Carbon Sink Shrank to its Lowest Point in at Least 2 Decades, Due to Fires and Persistent Deforestation. World Resources Institute <https://www.wri.org/insights/forest-carbon-sink-shrinking-fires-deforestation>
- Hartley, D. S., and Han, H.-S., 2007. Effects of alternative silvicultural treatments on cable harvesting productivity and cost in Western Washington. *West. J. Appl. For.* 22, 213–219.
- Hawkes, S., Plahe, J.K., 2013. Worlds apart: The WTO's Agreement on Agriculture and the right to food in developing countries. *IPSR.* 34, 21–38.
- Hickel, J., Sullivan, D., Zoomkawala, H., 2021. Plunder in the Post-Colonial Era: Quantifying Drain from the Global South Through Unequal Exchange, 1960–2018 NPE. 26, 1030–1047.

REFERENCES

- High-Level Advisory Board on Effective Multilateralism (HLAB), 2023. A Breakthrough for People and Planet. United Nations University, New York. https://unu.edu/sites/default/files/2025-03/highleveladvisoryboard_breakthrough_fullreport.pdf
- HLPE, 2014. Food Losses and Waste in the Context of Sustainable Food Systems. <https://openknowledge.fao.org/server/api/core/bitstreams/b1949fae-23d4-473c-8b87-8c4359b74d6c/content>
- HLPE, 2017. Sustainable Forestry for Food Security and Nutrition. <https://openknowledge.fao.org/server/api/core/bitstreams/b147442c-3abd-4674-95c9-b787a740e608/content>
- Ho, S.-J., Fontana, S., 2021. Sovereign debt evolution: The natural disaster clause 17, Pratt's J. Bankr. L. 17, 246.
- Höhl, M., Ahimbisibwe, V., Stanturf, J.A., Elsasser, P., Kleine, M., Bolte, A., 2020. Forest Landscape Restoration—What Generates Failure and Success? *Forests* 11, 938.
- Holden, C., 2017. Graduated sovereignty and global governance gaps: Special economic zones and the illicit trade in tobacco products. *Pol. Geog.*, 72–81.
- Hosonuma, N., Herold, M., De Sy, V., De Fries, R.S., Brockhaus, M., Verchot, L., et al., 2012. An assessment of deforestation and forest degradation drivers in developing countries. *Environ. Res. Lett.* 7, 044009.
- Howard, P.H., 2021. Concentration and Power in the Food System: Who Controls What We Eat? Bloomsbury, London.
- Huang, K., Wu, X., Zhang, L., Geng, H., Qu, Y., 2025. Increasing risk of global forest loss from extreme wildfires under climate change. *Int. J. Digit. Earth.* 18, 2483982.
- Huang, M., Asner, G.P., 2010. Long-term carbon loss and recovery following selective logging in Amazon forests. *Global Biogeochem. Cy.* 24.
- Hyacinthe, N.K.J., Nagar, A., 2000. Cameroon Oil and Gas Industry. *Int. J. Adv. Eng. Manag.* 2, 698–702.
- Ibisch, P.L., Hoffmann, M.T., Kreft, S., Pe'er, G., Kati, V., Biber-Freudenberger, L., et al., 2016. A global map of roadless areas and their conservation status. *Science* 354, 1423–1427.
- Ickowitz, A., McMullin, S., Rosenstock, T., Dawson, I., Rowland, D., Powell, B., et al., 2022. Transforming food systems with trees and forests. *Lancet Planet. Health.* 6, e632–e639.
- IIED, 2024. World's least developed countries spend twice as much servicing debts as they receive in climate finance. International Institute for Environment and Development. <https://www.iied.org/worlds-least-developed-countries-spend-twice-much-servicing-debts-they-receive-climate-finance>
- IMF, 2017. Cameroon: Request for a Three-Year Arrangement Under the Extended Credit Facility—Press Release; Staff Report; and Statement by the Executive Director for Cameroon. International Monetary Fund. <https://www.imf.org/en/Publications/CR/Issues/2017/07/05/Cameroon-Request-for-a-Three-Year-Arrangement-Under-the-Extended-Credit-Facility-Press-45038>.
- IMF, 2021. Cameroon: Requests for Three-Year Arrangements Under the Extended Credit Facility and the Extended Fund Facility: Press Release. International Monetary Fund. <https://www.imf.org/en/Publications/CR/Issues/2021/08/10/Cameroon-Requests-for-Three-Year-Arrangements-Under-the-Extended-Credit-Facility-and-the-463635>
- IMF, 2025. World Economic Outlook. International Monetary Fund. <https://data.imf.org/en/datasets/IMF.RES.WEO>
- IMF Independent Evaluation Office, 2025. IMF Engagement on Debt Issues in Low-Income Countries. International Monetary Fund Independent Evaluation Office, Washington, DC.
- Indermit, G., 2024. For developing economies, the finance landscape has become a wasteland. World Bank Blogs. <https://blogs.worldbank.org/en/voices/for-developing-economies-the-finance-landscape-has-become-a-wasteland>.
- Infante-Amate, J., Urrego-Mesa, A., Piñero, P., Tello, E., 2022. The open veins of Latin America: Long-term physical trade flows (1900–2016). *Glob. Environ. Change* 76, 102579.
- Inter-American Commission on Human Rights, 2017. Ruling: Precautionary Measures: Ampliación de beneficiarios a favor de las mujeres gestantes y lactantes de la Comunidad Indígena Wayúu en los municipios de Manaure, Riohacha y Uribía respecto de Colombia.
- International Court of Justice (ICJ), 2025. Obligations of States in respect of climate change. <https://www.icj-cij.org/sites/default/files/case-related/187/187-20250723-pre-01-00-en.pdf>
- International Energy Agency, n.d. Cameroon. <https://www.iea.org/countries/cameroon/oil>
- IPBES, 2019. Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. eds. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo. IPBES secretariat, Bonn, Germany.
- IPCC, 2019. Climate Change and Land. An IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems. eds. P.R. Shukla, J. Skea, E. Calvo Buendía, V. Masson-Delmotte, H.-O. Portner, D. C. Roberts, et al. IPCC, Geneva.
- IPCC. Summary for Policymakers. In Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, 2022.
- IPES Food, 2023. Who's Tipping the Scales? The growing influence of corporations on the governance of food systems, and how to counter it. <https://ipes-food.org/report/whos-tipping-the-scales/>
- IPES Food, 2024. Food from somewhere: Building food security and resilience. <https://ipes-food.org/report/food-from-somewhere/>
- INTERPOL, 2021. Forestry Crime Fact Sheet. <https://www.interpol.int/Crimes/Environmental-crime/Forestry-crime>
- Isakson, S.R., 2014. Food and finance: the financial transformation of agro-food supply chains. *J. Peasant. Stud.* 41, 749–775.
- Jiang, X., Cao, H., 2024. Implementing the debt-for-nature swaps for marine protected areas: case studies from Seychelles and Belize. *Humanit. Soc. Sci. Commun.* 11, 1–9.
- Johns Hopkins University China-Africa Research Initiative, 2021. Global Debt Relief Dashboard. Global Debt Relief Dashboard. <http://www.sais-cari.org/debt-relief>
- Kassouri, Y., 2024. The Rise of Transnational Financial Crimes and Tropical Deforestation. *Environ. Resource Econ.* 87, 2795–2831.
- Keith, H., Czúcz, B., Jackson, B., Driver, A., Nicholson, E., Maes, J., 2020. A conceptual framework and practical structure for implementing ecosystem condition accounts. *OE* 5, e58216.
- Keith, H., Kun, Z., Hugh, S., Svoboda, M., Mikoláš, M., Adam, D., et al., 2024. Carbon carrying capacity in primary forests shows potential for mitigation achieving the European Green Deal 2030 target. *Commun. Earth. Environ.* 5, 256.
- Keith, H., Mackey, B., Kun, Z., Mikoláš, M., Svitok, M., Svoboda, M., 2022. Evaluating the mitigation effectiveness of forests managed for conservation versus commodity production using an Australian example. *Conservation Letters* 15, e12878.
- Keith, H., Vardon, M., Obst, C., Young, V., Houghton, R.A., Mackey, B., 2021. Evaluating nature-based solutions for climate mitigation and conservation requires comprehensive carbon accounting. *Sci. Total. Environ.* 769, 144341.
- Keith, H., Vardon, M., Stein, J.A., Stein, J.L., Lindenmayer, D., 2017. Ecosystem accounts define explicit and spatial trade-offs for managing natural resources. *Nat. Ecol. Evol.* 1, 1683–1692.
- Kentikelenis, A., Stubbs, T., 2023. A Thousand Cuts: Social Protection in the Age of Austerity. Oxford University Press, Oxford, New York.

REFERENCES

- Kharas, H., Rivard, C., 2022. Debt, Creditworthiness, and Climate: A New Development Dilemma. Brookings Institution, Washington, DC.
- Knobel, A., Steuermann, E., Cañas, M., 2025. Taxpayers' Rights and the UN Tax Convention: Addressing the Weaponisation of Privacy and Confidentiality to Reinstate Tax Transparency in Favour of Tax Justice. <https://gi-escr.org/en/resources/publications/taxpayers-rights-under-international-human-rights-law-addressing-the-weaponisation-of-privacy-and-confidentiality-to-reinstate-tax-transparency-in-favour-of-tax-justice>
- Kozul-Wright, R., 2025. UNCTAD (International Organization, 1964–Present), in: The New Palgrave Dictionary of Economics. Palgrave Macmillan, London, pp. 1–7.
- Korosuo, A., Vizzarri, M., Pilli, R., Fiorese, G., Colditz, R., Abad Viñas, R., et al., 2021. Forest Reference Levels Under Regulation (EU) 2018/841 for the period 2021–2025, EUR 30403 EN, Publications Office of the European Union, Luxembourg.
- Krott, M., 2005. Forest Policy Analysis. Springer Dordrecht.
- Laitila, J., Niemistö, P and Väättäin, K., 2016. Productivity of multi-tree cutting in thinnings and clear cuttings of young downy birch (*Betula pubescens*) dominated stands in the integrated harvesting of pulpwood and energy wood. *Baltic Forestry* 22, 116–131.
- La Via Campesina, 2025. Building Momentum for an Alternative Global Trade Framework Grounded in Food Sovereignty. La Via Campesina - EN. <https://viacampesina.org/en/2025/08/building-momentum-for-an-alternative-global-trade-framework-grounded-in-food-sovereignty/>.
- Lambin, E.F., Furumo, P.R., 2023. Deforestation-free commodity supply chains: Myth or reality? *Annu. Rev. Environ. Resour.* 48, 237–261.
- Larson, B.A., Bromely, D.W., 1991. Natural resources prices, export policies, and deforestation: The case of Sudan. *World Development* 19, 1289–1297.
- Lassourd, T., Scurfield, T., 2019. Should the OECD's Proposal for a "Unified Approach" on Corporate Taxation Exclude Extractive Industries? Natural Resource Governance Institute. <https://resourcegovernance.org/articles/should-oecd-proposal-unified-approach-corporate-taxation-exclude-extractive-industries>.
- Lazarus, M., van Asselt, H., 2018. Fossil fuel supply and climate policy: exploring the road less taken. *Climatic Change* 150, 1–13.
- Li, W., Ciais, P., Stehfest, E., Van Vuuren, D., Popp, A., Arneth, A., et al., 2020. Mapping the yields of lignocellulosic bioenergy crops from observations at the global scale. *Earth Syst. Sci. Data.* 12, no. 2: 789–804.
- Li, W.Y., 2023. Regulatory capture's third face of power. *Socioecon. Rev.* 21, 1217–1245.
- Lovejoy, T.E., Nobre, C., 2018. Amazon tipping point. *Sci. Adv.* 4, eaat2340.
- Mackey, B., Kormos, C.F., Keith, H., Moomaw, W.R., Houghton, R.A., Mittermeier, R.A., et al., 2020. Understanding the importance of primary tropical forest protection as a mitigation strategy. *Mitig. Adapt. Strateg. Glob. Change.* 25, 763–787.
- Maeda, E.E., Abera, T.A., Siljander, M., Aragão, L.E.O.C., de Moura, Y.M., Heiskanen, J., 2021. Large-scale commodity agriculture exacerbates the climatic impacts of Amazonian deforestation. *PNAS* 118, 1–10.
- Maes, J., Bruzón, A.G., Barredo, J.I., Vallecillo, S., Vogt, P., Rivero, I.M., et al., 2023. Accounting for forest condition in Europe based on an international statistical standard. *Nat. Commun.* 14, 3723.
- Maes, J., Teller, A., Erhard, M., Conde, S., Vallecillo Rodríguez, S., Barredo Cano, J.I., et al., 2020. Mapping and Assessment of Ecosystems and their Services: An EU ecosystem assessment. EUR 30161 EN, Publications Office of the European Union, Luxembourg.
- Mager, F., Meinzer, M., Millán, L., 2024. How Corporate Tax Incentives Undermine Climate Justice. Tax Justice Network.
- Mager, F., Schultz, A., 2024. Climate betrayal - How "greenlaundering" Conceals the Full Scale of Fossil Fuel Financing. Tax Justice Network.
- MapBiomas, n.d. MapBiomas Brasil. <https://brasil.mapbiomas.org/en/project>
- Mariotti, C., Kozul-Wright, R., Bhandary, R.R., Gallagher, K.P., 2025. Blending from the Ground Up: Multilateral and National Development Bank Collaboration to Scale Climate Finance. Boston University Global Development Policy Center, Boston, MA.
- Masiya, M., Hall, S., Murray, S., Etter-Phoya, R., Hannah, E., O'Hare, B. Tax Expenditures and Progress to the Sustainable Development Goals. *Sus. Dev.* 32, 6: 6144–62.
- Mataveli, G., De Oliveira, G., Silva-Junior, C.H.L., Stark, S.C., Carvalho, N., Anderson, L.O., et al., 2022. Record-breaking fires in the Brazilian Amazon associated with uncontrolled deforestation. *Nat. Ecol. Evol.* 6, 1792–1793.
- Matricardi, E.A.T., Skole, D.L., Costa, O.B., Pedlowski, M.A., Samek, J.H., Miguel, E.P., 2020. Long-term forest degradation surpasses deforestation in the Brazilian Amazon. *Science* 369, 1378–1382.
- Maxwell, S.L., Evans, T., Watson, J.E.M., Morel, A., Grantham, H., Duncan, A., et al., 2019. Degradation and forgone removals increase the carbon impact of intact forest loss by 626%. *Sci. Adv.* 5, eaax2546.
- Mayer, M., Prescott, C.E., Abaker, W.E.A., Augusto, L., Cécillon, L., Ferreira, G.W.D., et al., 2020. Tamm Review: Influence of forest management activities on soil organic carbon stocks: A knowledge synthesis. *For. Ecol. Manage.* 466, 118127.
- Meinzer, M., ndajiwo, M., Etter-Phoya, R., Diakite, M., 2019. Comparing Tax Incentives across Jurisdictions: A Pilot Study. Tax Justice Network.
- McLaren, D., and Markusson, N., 2020. The co-evolution of technological promises, modelling, policies and climate change targets. *Nat. Clim. Change*, 10:392–397.
- Ministerio de Energía, Chile, 2021. Energía 2060: Política Energética de Chile.
- Mizuniwa, Y., Nakahata, C., Aruga, K., 2016. Comparative analyses on the cycle time, productivity, and cost between commercial thinning and clear-cutting operations in Nasumachi Forest Owners' Co-operative, Tochigi Prefecture, Japan.
- Moreira-Dantas, I.R., Söder, M., 2022. Global deforestation revisited: The role of weak institutions. *Land Use Policy* 122, 106383.
- Muchhala, B., 2022. The structural power of the state-finance nexus: Systemic delinking for the right to development. *Development* 65, 124–135.
- Murphy, S., 2008. Globalization and corporate concentration in the food and agriculture sector. *Development (Society for International Development)* 51, 527–533.
- Murphy, S., 2015. GFT - Food security and international trade: Risk, trust and rules. *Canadian Food Studies / La Revue canadienne des études sur l'alimentation* 2, 88–96.
- Murphy, S., Burch, D., Clapp, J., 2012. Cereal Secrets: The world's largest grain traders and global agriculture. Oxfam Research Reports.
- Murphy, S., Hansen-Kuhn, K., 2020. The true costs of US agricultural dumping. *Renew. Agric. Food Syst.* 35, 376–390.
- Musselli, I., 2024. WTO law and environmental processes and production methods (PPMs): a deconstruction. *The indian j. Int'l. Econ. Law* 15, 91–125.
- Muttaqin, M.Z., Alviya, I., Lugina, M., Hamdani, F.A.U., Indartik, 2019. Developing community-based forest ecosystem service management to reduce emissions from deforestation and forest degradation. *Forest Policy Econ.* 108, 101938.
- Nasi, R., 2025. Cool forests: Nature's air conditioning system. CIFOR-ICRAF Forests News. <https://forestsnews.cifor.org/91559/cool-forests-natures-air-conditioning-system?fnl=>
- Ndikumana, L., 2025. Capital Flight from Natural Resource- Dependent African Countries: Updated Estimates and Analysis for the Cases of Cameroon, Ghana, and Zambia, 1970–2022 (Peri Working Paper No. 582).

REFERENCES

- Nedopil Wang, C., Yue, M., 2021. Debt-For-Nature Swaps: A Triple-Win Solution for Debt Sustainability and Biodiversity Finance in the Belt and Road Initiative. IIGF Green BRI Center, Beijing.
- Ngono, R., Olinga, A., 2023. Strengthening Indigenous Land Rights in Cameroon. International Institute for Environment and Development, London, UK.
- Ngouhouo-Poufoun, J., Chaupain-Guillot, S., Ndiaye, Y., Sonwa, D.J., Njabo, K.Y., Delacote, P., 2024. Cocoa, livelihoods, and deforestation within the Tridom landscape in the Congo Basin: A spatial analysis. *PLOS One* 19, e0302598.
- Noormets, A., Epron, D., Domec, J.C., McNulty, S.G., Fox, T., Sun, G., et al., 2015. Effects of forest management on productivity and carbon sequestration: A review and hypothesis. *For. Ecol. Manage.* 355, 124–140.
- Norman, P., Mackey, B., 2023. Priority areas for conserving greater gliders in Queensland, Australia. *Pacific Conserv. Biol.* 30.
- Norris, D., Michalski, F., Gibbs, J.P., 2018. Community involvement works where enforcement fails: Conservation success through community-based management of Amazon River turtle nests. *PeerJ* 6, e4856.
- Notre Dame Environmental Change Initiative, 2025. Notre Dame Global Adaptation Initiative.
- O'Brien, K., Garibaldi, L.A., Agrawal, A., Bennett, E., Biggs, R., Calderón Contreras, R., et al., 2025. IPBES Transformative Change Assessment: Summary for Policymakers.
- Ochialli, G., 2023. Just Environmental Taxation in Africa: How Tax Policy Can Curb Environmental Damage, far beyond Just Carbon Taxes. Tax Justice Network.
- OECD, 2017a. Preventing Policy Capture: Integrity in Public Decision Making. OECD Public Governance Reviews. Organisation for Economic Cooperation and Development.
- OECD, 2017b. The Future of Global Value Chains: Business as Usual or "a New Normal"? OECD Science, Technology and Industry Policy Papers No. 41. Organisation for Economic Cooperation and Development.
- OECD, 2019. OECD Recommendation on Countering Illicit Trade: Enhancing Transparency in Free Trade Zones. Organisation for Economic Cooperation and Development.
- OECD, 2020. Global Value Chains in Agriculture and Food: A Synthesis of OECD Analysis. OECD Food, Agriculture and Fisheries Papers No. 139. Organisation for Economic Cooperation and Development.
- OECD, 2021. Statement on a Two-Pillar Solution to Address the Tax Challenges Arising from the Digitalisation of the Economy. Organisation for Economic Cooperation and Development.
- OECD, 2023a. Brazil: Agricultural Policy Monitoring and Evaluation 2023. Organisation for Economic Cooperation and Development.
- OECD, 2023b. How Does Corporate Taxation Affect Business Investment?: Evidence from Aggregate and Firm-Level Data. OECD Economics Department Working Papers No. 1765. Organisation for Economic Cooperation and Development.
- Oestreicher, J.S., Benessaiah, K., Ruiz-Jaen, M.C., Sloan, S., Turner, K., Pelletier, J., et al., 2009. Avoiding deforestation in Panamanian protected areas: An analysis of protection effectiveness and implications for reducing emissions from deforestation and forest degradation. *Glob. Environ. Change* 19, 279–291.
- Olson, J., 2022. Newly released documents reveal international funding trail preceding the murder of Berta Cáceres. *The Intercept*.
- Ostrom, E. 1990. *Governing the Commons*. Cambridge University Press.
- Oxfam International, 2023. Climate Finance Shadow Report 2023: Assessing the Delivery of the \$100 Billion Commitment. <https://policy-practice.oxfam.org/resources/climate-finance-shadow-report-2023-621500/>.
- Oxfam International, 2024. Nearly Three Quarters of Millionaires Polled in G20 Countries Support Higher Taxes on Wealth, Over Half Think Extreme Wealth is a "Threat to Democracy". Oxfam International. <https://www.oxfam.org/en/press-releases/nearly-three-quarters-millionaires-polled-g20-countries-support-higher-taxes-wealth>.
- Padilla, A., 2020. Use and Abuse of Tax Breaks, How Tax Incentives Become Harmful. Financial Transparency Institution.
- Palanský, M., Schultz, A., 2025. Taxing Extreme Wealth: What Countries Around the World Could Gain from Progressive Wealth Taxes. Tax Justice Network.
- Pan, Y., Birdsey, R.A., Phillips, O.L., Houghton, R.A., Fang, J., Kauppi, P.E., et al., 2024. The enduring world forest carbon sink. *Nature* 631, 563–569.
- Pardo-Herrera, C., 2021. The International Links of Peruvian Illegal Timber: A Trade Discrepancy Analysis. Terrorism, Transnational Crime and Corruption Center (TraCCC), George Mason University, Arlington, Virginia.
- Paris Club, 2021. The Republic of Cameroon Benefits from the Extension of the DSSI. <https://clubdeparis.org/en/communications/press-release/the-republic-of-cameroon-benefits-from-the-extension-of-the-dssi-18-03>.
- Patacca, M., et al., 2023. Significant increase in natural disturbance impacts on European forests since 1950. *Glob. Chang. Biol.* 29(5), 1359–1376.
- Paul, M., Moe, L., 2023. An Economist's Case for Restrictive Supply Side Policies: Ten Policies to Manage the Fossil Fuel Transition. Climate and Community Project. <https://climateandcommunity.org/research/economists-case-end-fossil-fuels/>.
- Pauw, W.P., Castro, P., Pickering, J., Bhasin, S., 2020. Conditional nationally determined contributions in the Paris Agreement: foothold for equity or Achilles heel? *Climate Policy* 20, 468–484.
- Pearson, T.R.H., Brown, S., Murray, L., Sidman, G., 2017. Greenhouse gas emissions from tropical forest degradation: an underestimated source. *Carbon Balance Manag.* 12, 3.
- Pendrill, F., Gardner, T.A., Meyfroidt, P., Persson, U.M., Adams, J., Azevedo, T., et al., 2022. Disentangling the numbers behind agriculture-driven tropical deforestation. *Science* 377, eabm9267.
- Pendrill, F., Persson, U.M., Godar, J., Kastner, T., Moran, D., Schmidt, S., et al., 2019. Agricultural and forestry trade drives large share of tropical deforestation emissions. *Glob. Environ. Change* 56, 1–10.
- Picciotto, S., 2012. Towards Unitary Taxation. Tax Justice Network.
- Picciotto, S., 2016. Taxing Multinational Enterprises as Unitary Firms (report). The Institute of Development Studies and Partner Organisations.
- Picciotto, S., 2025. A Fresh Start: Searching for Consensus in International Tax Reform. Tax notes international 117.
- Piketty, T., 2014. *Capital in the Twenty-First Century*. Harvard University Press.
- Plant, R., 2010. *The neo-liberal state*. Oxford University Press, Oxford.
- Ponte, S., Sturgeon, T., Dallas, M.P., 2019. Governance and power in global value chains, in: *Handbook on Global Value Chains*. Edward Elgar Publishing, United Kingdom, pp. 120–137.
- Potapov, P., Hansen, M.C., Laestadius, L., Turubanova, S., Yaroshenko, A., Thies, C., et al., 2017. The last frontiers of wilderness: Tracking loss of intact forest landscapes from 2000 to 2013. *Sci. Adv.* 3, e1600821.
- Potapov, P., Tyukavina, A., Turubanova, S., Hansen, M.C., Giglio, L., Hernandez-Serna, A., et al., 2025. Unprecedentedly high global forest disturbance due to fire in 2023 and 2024. *PNAS* 122, e2505418122.
- Puettmann, K.J., Wilson, S.M., Baker, S.C., Donoso, P.J., Drössler, L., Amente, G., et al., 2015. Silvicultural alternatives to conventional even-aged forest management - what limits global adoption? *For. Ecosyst.* 2, 8.
- Pukkala, T. 2016. Which type of forest management provides most ecosystem services? *For. Ecosyst.* 3, 9.

REFERENCES

- Qian, Y., 2021. Brady Bonds and the Potential for Debt Restructuring in the Post-Pandemic Era. Boston University Global Development Policy Center, Boston, MA.
- Qian, Y., Wang, Y., 2022. Reflections on Sovereign Debt Restructuring in Low-Income Countries and the 'Shanghai Model'. Boston University Global Development Policy Center.
- Qin, Y., Wang, D., Ziegler, A.D., Fu, B., Zeng, Z., 2025. Impact of Amazonian deforestation on precipitation reverses between seasons. *Nature* 639, 102–108.
- Qin, Y., Xiao, X., Wigneron, J.-P., Ciais, P., Brandt, M., Fan, L., Li, X., et al., 2021. Carbon loss from forest degradation exceeds that from deforestation in the Brazilian Amazon. *Nat. Clim. Chang.* 11, 442–448.
- Quiroga, S., Suarez, C., Ficko, A., Feliciano, D., Bouriaud, L., Brahic, E., et al., 2019. What influences European private forest owners' affinity for subsidies? *For. Pol. Econ.* 99, 136–144.
- Rajan, R.G., 2022. The Gospel of Deglobalization. *Foreign Affairs* 102.
- Rasolofoson, R.A., Ferraro, P.J., Jenkins, C.N., Jones, J.P.G., 2015. Effectiveness of Community Forest Management at reducing deforestation in Madagascar. *Biological Conservation* 184, 271–277.
- Ray, R., Gallagher, K.P., Kring, W., 2022. "Keep the Receipts:" The Political Economy of IMF Austerity During and After the Crisis Years of 2009 and 2020. *J. Glob. Dev.* 13, 31–59.
- Ray, R., Simmons, B.A., 2024. Now or Never: Mobilizing Capital for Climate and Conservation in a Debt-Constrained World. Boston University Global Development Policy Center, Boston, MA.
- Red Latinoamericana por Justicia Económica y Social – Latindadd, 2024. Deuda, Crisis Climática y Extractivismo. Red Latinoamericana por Justicia Económica y Social – Latindadd.
- Regulation on Deforestation-free Products, 2023. https://environment.ec.europa.eu/topics/forests/deforestation/regulation-deforestation-free-products_en
- Reinsberg, B., Kentikelenis, A., Stubbs, T., 2021. Creating crony capitalism: neoliberal globalization and the fuelling of corruption. *Socioecon Rev* 19, 607–634.
- Renzie, C., Han, H., & Resources, W. 2008. Harvesting Productivity and Cost of Clearcut and Partial Cut in Interior British Columbia, Canada. *J. For. Environ. Sci.*, 24, 1–14.
- Riahi, K., Schaeffer, R., Arango, J., Calvin, K., Guivarch, C., Hasegawa, T., et al., 2022. Mitigation pathways compatible with long-term goals. IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.
- Ribot, J.C., Lund, J.F., Treue, T., 2010. Democratic decentralization in sub-Saharan Africa: its contribution to forest management, livelihoods, and enfranchisement. *Environmental Conservation* 37, 35–44.
- Richards, P.D., Myers, R.J., Swinton, S.M., Walker, R.T., 2012. Exchange rates, soybean supply response, and deforestation in South America. *Glob. Environ. Change* 22, 454–462.
- Robinson, J., 2024. In Cameroon, community-led restoration efforts are paying off. <https://www.unep.org/news-and-stories/story/cameroon-community-led-restoration-efforts-are-paying>.
- Rodrik, D., 2001. The Global Governance of Trade: As if Development Really Mattered. UNDP, New York.
- Roe, S., Streck, C., Beach, R., Busch, J., Chapman, M., Daigoglou, V., et al., 2021. Land-based measures to mitigate climate change: Potential and feasibility by country. *Global Change Biology* 27, 6025–6058.
- Roman-Cuesta, R.M., Den Elzen, M., Araujo-Gutierrez, Z., Forsell, N., Lamb, W.F., McGlynn, E., et al., 2025. Land remains a blind spot in tracking progress under the Paris Agreement due to lack of data comparability. *Commun. Earth. Environ.* 6, 598.
- Roux, J.L., Pülzl, H., Sotirov, M., Winkel, G. 2025. Understanding EU forest policy governance through a cultural theory lens. *Pol. Sci.* 58, 111–144 (2025).
- RRI and RFN, 2024. Mid-year Update: Charting the Path to Scale. Rights and Resources Initiative & Rainforest Foundation Norway. <https://dashboard.pathtoscale.org/blog/mid-year-update-2024>
- Ryding, T.M., Voorhoeve, A., 2022. Is the Organisation for Economic Co-operation and Development's 2021 Tax Deal Fair'. London School of Economics, Public Policy Review.
- S&P Global, 2022. Cameroon Credit Rating. <https://disclosure.spglobal.com/ratings/en/regulatory/org-details/sectorCode/SOV/entityId/373904>
- Saez, E., Zucman, G., 2019. The Triumph of Injustice: How the Rich Dodge Taxes and How to Make Them Pay. W. W. Norton & Company.
- Sarvašová, Z., Ali, T., Đorđević, I., Lukmine, D., Quiroga, S., Suárez, C., et al., 2019. Natura 2000 payments for private forest owners in Rural Development Programmes 2007 - 2013 - a comparative view. *Forest Policy Econ.* 99, 123–135.
- Schlegl, M., Trebesch, C., Wright, M.L.J., 2019. The Seniority Structure of Sovereign Debt (Working Paper Series). National Bureau of Economic Research.
- Schouten, G., Leroy, P., Glasbergen, P., 2012. On the deliberative capacity of private multi-stakeholder governance: The Roundtables on Responsible Soy and Sustainable Palm Oil. *Ecological Economics* 83, 42–50.
- Searchinger, T.D., Beringer, T., Holtsmark, B., Kammen, D.M., Lambin, E.F., Lucht, W., et al., 2018. Europe's renewable energy directive poised to harm global forests. *Nat. Com.* 9, p. 3741
- Searchinger, T.D., Wiersma, S., Beringer, T. et al., 2018. Assessing the efficiency of changes in land use for mitigating climate change. *Nature* 564, 249–253.
- Seidl, R., Senf, C. 2024. Changes in planned and unplanned canopy openings are linked in Europe's forests. *Nat. Com.* 15, 4741.
- Serhan, C., Jalles, J.T., 2021. Why Climate Change Vulnerability Is Bad for Sovereign Credit Ratings. International Monetary Fund.
- Seymour, F., Forwand, E., 2010. Governing sustainable forest management in the new climate regime. *WIREs Climate Change* 1, 803–810.
- Seymour, F., Wolosin, M., Gray, E., 2022. Not Just Carbon: Capturing All the Benefits of Forests for Stabilizing the Climate from Local to Global Scales. World Resources Institute.
- Sharma, C., Mishra, R.K., 2022. On the good and bad of natural resource, corruption, and economic growth nexus. *Environ. Resource Econ.* 82, 889–922.
- Shenai, N., Bolhuis, M.A., 2023. How the Brady Plan Delivered on Debt Relief: Lessons and Implications. IMF Working Papers 2023.
- Shestakova, T.A., Mackey, B., Hugh, S., Dean, J., Kukavskaya, E.A., Laflamme, J., et al., 2022. Mapping Forest Stability within Major Biomes Using Canopy Indices Derived from MODIS Time Series. *Remote Sensing* 14, 3813.
- Silva Junior, C.H.L., Aragão, L.E.O.C., Anderson, L.O., Fonseca, M.G., Shimabukuro, Y.E., Vancutsem, C., et al., 2020. Persistent collapse of biomass in Amazonian forest edges following deforestation leads to unaccounted carbon losses. *Sci. Adv.* 6, eaaz8360.
- Sims, M., Stanimirova, R., Raichuk, A., Neumann, M., Richter, J., Follett, F., et al., 2025. Global drivers of forest loss at 1 km resolution. *Environ. Res. Lett.* 20.
- Smith, P., Martino, D., Cai, Z., O'Mara, F., Rice, C., Scholes, B., et al., 2007. Agriculture. In *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*.
- SOFI, 2025. The State of Food Security and Nutrition in the World 2025. FAO; IFAD; UNICEF; WFP; WHO.

REFERENCES

- Songwe, V., Kraemer, M., 2025. Healthy Debt on a Healthy Planet: Towards a virtuous circle of sovereign debt, nature and climate resilience. Independent Expert Group on Debt, Nature and Climate.
- Songwe, V., Kraemer, M., 2024. Tackling the Vicious Cycle: The Interim Report of the Independent Expert Group on Debt, Nature and Climate. Independent Expert Group on Debt, Nature and Climate.
- Sotirov, M., Winkel, G., Eckerberg, K. 2021. The coalitional politics of the European Union's environmental forest policy: Biodiversity conservation, timber legality, and climate protection. *AMBIO* 12, 2153-2167.
- Sotirov, M., Meier-Landsberg, E. Wippel, B. 2022. Regulating Clear Cutting in European Forests: Policy Options and Socio-Economic Analysis. University of Freiburg.
- Sotirov, M., Fleckenstein, S., Cordova, D., 2025. Policy Maps of National Forest Biodiversity Conservation and Restoration Related Policy and Implementation in Europe. BIOCONSENT Project: 28.
- Sotirov, 2025. Funding resilient forests. Rethinking EU and state subsidies. Fern, Brussels.
- Spracklen, D.V., Baker, J.C.A., Garcia-Carreras, L., Marsham, J.H., 2018. The Effects of Tropical Vegetation on Rainfall. *Annu. Rev. Environ. Resour.* 43, 193–218.
- Stenzel, F., Ben Uri, L., Braun, J., Breier, J., Erb, K., Gerten, D., et al., 2025. Breaching planetary boundaries: Over half of global land area suffers critical losses in functional biosphere integrity. *One Earth* 8, 101393.
- Sullivan, M.J.P., Lewis, S.L., Affum-Baffoe, K., Castilho, C., Costa, F., Sanchez, A.C., et al., 2020. Long-term thermal sensitivity of Earth's tropical forests. *Science* 368, 869–874.
- Summers, L., Singh, N.K., 2024. The World Is Still on Fire. Project Syndicate. <https://www.project-syndicate.org/commentary/imf-world-bank-spring-meetings-need-to-get-four-things-right-by-lawrence-h-summers-and-n-k-singh-2024-04>.
- Tafoya, K.A., Brondizio, E.S., Johnson, C.E., Beck, P., Wallace, M., Quirós, R., Wasserman, M.D., 2020. Effectiveness of Costa Rica's conservation portfolio to lower deforestation, protect primates, and increase community participation. *Front. Environ. Sci.* 8.
- Task Force on Climate, Development and the IMF, 2023. The International Monetary Fund, Climate Change and Development: A Preliminary Assessment. Boston University Global Development Policy Center, Boston University.
- Taylor, C., McCarthy, M.A., Lindenmayer, D.B., 2014. Nonlinear Effects of Stand Age on Fire Severity. *Conservation Letters* 7, 355–370.
- Taylor, R., Streck, C., 2018. The Elusive Impact of the Deforestation-Free Supply Chain Movement Ending Tropical Deforestation: A Stock-Take Of Progress And Challenge (Working Paper). World Resources Institute and Climate Focus.
- Tegegne, Y.T., Lindner, M., Fobissie, K., Kanninen, M., 2016. Evolution of drivers of deforestation and forest degradation in the Congo Basin forests: Exploring possible policy options to address forest loss. *Land Use Policy* 51, 312–324.
- TJNA, 2024. Assessing the Fiscal Aspects of Extractive Industry Contracts. Tax Justice Network Africa. <https://taxjusticeafrica.net/resources/publications/assessing-fiscal-aspects-extractive-industry-contracts>.
- TJN, 2019. OECD Reform Weak on Corporate Tax Havens, Harsh on Poorer Countries. Tax Justice Network.E <https://taxjustice.net/press/oecd-reform-weak-on-corporate-tax-havens-harsh-on-poorer-countries/>.
- TJN, 2020a. Automatic Exchange of Information. Tax Justice Network. <https://taxjustice.net/topics/automatic-exchange-of-information/>.
- TJN, 2020b. Beneficial Ownership. Tax Justice Network. <https://taxjustice.net/topics/beneficial-ownership/>.
- TJN, 2020c. Country by Country Reporting. Tax Justice Network. <https://taxjustice.net/topics/country-by-country-reporting/>.
- TJN, 2024a. Litany of Failure: The OECD's Stewardship of International Taxation. Tax Justice Network, Center for Economic and Social Rights, Centro de Estudios Legales y Sociales (CELS), the Economic Policy Working Group at ESCR-Net, the Global Network of Movement Lawyers at Movement Law Lab, the Government Revenue and Development Estimations Project (University of St Andrews/ University of Leicester). <https://taxjustice.net/reports/litany-of-failure-the-oecd-s-stewardship-of-international-taxation/>.
- TJN, 2024b. The State of Tax Justice 2024. Tax Justice Network. <https://taxjustice.net/reports/the-state-of-tax-justice-2024/>.
- TJN, 2025. Negotiating Tax at the United Nations. An introductory factsheet from an EU perspective. Tax Justice Network. <https://taxjustice.net/reports/negotiating-tax-at-the-united-nations-an-introductory-factsheet-from-an-eu-perspective/>.
- TNC, 2022. Case Study: Belize Bonds for Ocean Conservation. The Nature Conservancy. <https://www.nature.org/content/dam/tnc/nature/en/documents/TNC-Belize-Debt-Conversion-Case-Study.pdf>
- Tooze, A., 2022. Welcome to the world of the polycrisis. *Financial Times*.
- Tubiello, F., Pekkarinen, A., Branthomme, A., Piccoli, M., Obli-Laryea, G., Ramadan, N., et al., 2025. New FAOSTAT Forest Emissions and Removals Estimates: 1990-2025. Food and Agriculture Organisation of the United Nations.
- UNCTAD, 2025a. A world of debt 2025: It is time for reform. United Nations Conference on Trade and Development, Geneva.
- UNCTAD, 2025b. The State of Commodity Dependence 2025. United Nations Conference on Trade and Development, Geneva.
- UNCTAD, 2022. Treaty-Based Investor-State Dispute Settlement Cases and Climate Action. IIA Issues Note. United Nations Conference on Trade and Development, Geneva.
- UNDESA, 2024. United Nations Handbook on Selected Issues for Taxation of the Extractive Industries by Developing Countries 2021. United Nations Department of Economic and Social Affairs.
- UNDESA, 2025. Sevilla Commitment (Draft resolution submitted by the President of the Conference No. A/CONF.227/2025/L.1). United Nations Department of Economic and Social Affairs, Fourth International Conference on Financing for Development Sevilla, Spain.
- UNEP, 2025. Unlocking the Sustainable Transition for Agribusiness. United Nations Environment Programme.
- UNFCCC, 2002. The Marrakesh Accords (No. FCCC/CP/2001/13/Add.1). United Nations Framework Convention on Climate Change.
- UNFCCC, 2015. Paris Agreement. United Nations Framework Convention on Climate Change.
- UNFCCC, 2021. Biennial Assessment and Overview of Climate Finance Flows. United Nations Framework Convention on Climate Change.
- UNFCCC, 2023a. Outcome of the First Global Stocktake (No. 1/CMA.5). UNFCCC. Conference of the Parties Serving as the Meeting of the Parties to the Paris Agreement (CMA).
- UNFCCC, 2023b. COP28 Declaration on Food and Agriculture. United Nations Framework Convention on Climate Change. <https://www.cop28.com/en/food-and-agriculture>
- UNFCCC, 2025. Issues Related to Agriculture and Food Security | UNFCCC <https://unfccc.int/topics/land-use/workstreams/agriculture>.
- UNFF, 2024. Declaration of the High-Level Segment of the Nineteenth Session of the United Nations Forum on Forests (No. E/2024/42-E/CN.18/2024/9). United Nations Forum on Forests, Economic and Social Council Official Records, 2024 Supplement No. 22.
- UNGA, 2025a. Terms of reference for a United Nations Framework Convention on International Tax Cooperation (No. Document A/AC.298/2). United Nations General Assembly.

REFERENCES

- UNGA, 2025b. Report of the Intergovernmental Negotiating Committee on the United Nations Framework Convention on International Tax Cooperation on its Organizational Session (No. Document A/AC.298/3). United Nations General Assembly.
- United Nations, 1992. United Nations Conference on Environment and Development. Rio de Janeiro, Brazil.
- United Nations, 2025. Comtrade Database. <https://comtrade.un.org/>.
- UNODC, UNCTAD, 2020. Conceptual Framework for the Statistical Measurement of Illicit Financial Flows. United Nations Office on Drugs and Crime.
- UNODC, 2024. The Nexus Between Drugs And Crimes That Affect The Environment And Convergent Crime in the Amazon Basin. United Nations Office on Drugs and Crime.
- Vancutsem, C., Achard, F., Pekel, J.-F., Vieilledent, G., Carboni, S., Simonetti, D., et al., 2021. Long-term (1990–2019) monitoring of forest cover changes in the humid tropics. *Sci. Adv.* 7, eabe1603.
- Verburg, R., Filho, S.R., Lindoso, D., Debortoli, N., Litre, G., Bursztyn, M., 2014. The impact of commodity price and conservation policy scenarios on deforestation and agricultural land use in a frontier area within the Amazon. *Land Use Policy* 37, 14–26.
- Volz, U., Lo, Y., Mishra, V., 2024. Scaling Up Green Investment in the Global South: Strengthening Domestic Financial Resource Mobilisation and Attracting Patient International Capital. SOAS Centre for Sustainable Finance.
- Wang, Y., Zhu, Y., Cook-Patton, S.C., Sun, W., Zhang, W., Ciais, P., et al., 2025. Land availability and policy commitments limit global climate mitigation from forestation. *Science* 389, 931–934.
- Wanzala, R.W., Obokoh, L.O., 2024. Sustainability Implications of Commodity Price Shocks and Commodity Dependence in Selected Sub-Saharan Countries. *Sustainability* 16, 8928.
- Watson, R.T., Baste, I.A., Larigauderie, A., Leadley, P., Pascual, U., Baptiste, B., et al., 2019. Summary for Policymakers of the Global Assessment Report on Biodiversity and Ecosystem Services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. IPBES 56.
- Wedl, I., Fricke, T., 2025. A Positive Approach to Climate Policy: What are Preliminary lessons learnt from the US Inflation Reduction Act? Forum New Economy Basic Papers.
- Weiss, G., Sarvašová, Z., Hermoso, V., Brotons, L., Sotirov, M., 2017. Funding of Natura 2000 in forests. In Sotirov (ed.) 2017: Natura 2000 and Forests – Assessing the State of Implementation and Effectiveness. What Science Can Tell Us. European Forest Institute.
- Willmer, J.N.G., Püttker, T., Prevedello, J.A., 2022. Global impacts of edge effects on species richness. *Biological Conservation* 272, 109654.
- Wily, L.A., 2011. Whose Land Is It? The Status of Customary Land Tenure in Cameroon. Centre for Environment and Development, FERN UK, Rainforest Foundation, Yaundé and London.
- Winders, W., Ransom, E., 2019. Global Meat: Social and Environmental Consequences of the Expanding Meat Industry, 1st ed, Food, Health, and the Environment. The MIT Press, Cambridge.
- Winkel, G., Sotirov, M., 2016. Whose integration is this? European forest policy between the gospel of coordination, institutional competition, and a new spirit of integration. *Environ. and Plann. C Gov. Policy* 34 (3), 496–514.
- Wong, F., Tucker, T.N., 2023. A Tale of Two Industrial Policies. *Foreign Affairs*.
- World Bank, 2022. Cameroon Country Climate and Development Report. <https://openknowledge.worldbank.org/entities/publication/d600ba78-86f8-5e3a-a894-217b51253734>.
- World Bank, 2025a. International Debt Statistics. <https://www.worldbank.org/en/programs/debt-statistics/ids>.
- World Bank, 2025b. World Development Indicators. <https://databank.worldbank.org/source/world-development-indicators>.
- WTO, 2025. Who We Are. World Trade Organisation. <https://www.wto.org>.
- Yu, L., Fan, L., Ciais, P., Xiao, J., Frappart, F., Sitch, S., et al., 2024. Forest degradation contributes more to carbon loss than forest cover loss in North American boreal forests. *Int. J. Appl. Earth Obs. Geoinf.* 128, 103729.
- Yu, V.P., 2025. Shaping a Proactive Trade, Climate Change and Sustainable Development Agenda for the Global South, TWN Climate Change Series. Third World Network.
- Ziegler, A.D., Phelps, J., Yuen, J.Q., Webb, E.L., Lawrence, D., Fox, J.M., et al., 2012. Carbon outcomes of major land-cover transitions in SE Asia: great uncertainties and REDD + policy implications. *Glob. Change Biol.* 18, 3087–3099.
- Zucker-Marques, M., D’Orsi, R., Ramburuth, K., Njororge, P., Gallagher, K.P., 2025. Diverting Development Prospects: The G20 and External Debt Service Burden in Africa. Boston University Global Development Policy Center and Institute for Economic Justice, Boston and Johannesburg.
- Zucker-Marques, M., Gallagher, K.P., Volz, U., Shamshad, A., Espinosa, M.F., Haas, J., et al., 2024. Defaulting on Development and Climate—Debt Sustainability and the Race for the 2030 Agenda and Paris Agreement. Boston University Global Development Policy Center; Centre for Sustainable Finance, SOAS, University of London; Heinrich Böll Foundation, Boston, London, Berlin.
- Zucker-Marques, M., Ulrich Volz, Gallagher, K.P., 2023. Debt Relief by Multilateral Lenders – Why, How and How Much? Boston University Global Development Policy Center; Centre for Sustainable Finance, SOAS, University of London; Heinrich-Böll-Stiftung, Boston, London, Berlin.
- Zucman, G., 2016. The Hidden Wealth of Nations: The Scourge of Tax Havens. University of Chicago Press, Chicago, IL.
- Zucman, G., 2024. A Blueprint for a Coordinated Minimum Effective Taxation Standard for Ultra-High-Net-Worth Individuals. EU Tax Observatory.
- Zylstra, P.J., 2018. Flammability dynamics in the Australian Alps. *Austral. Ecology* 43, 578–591.