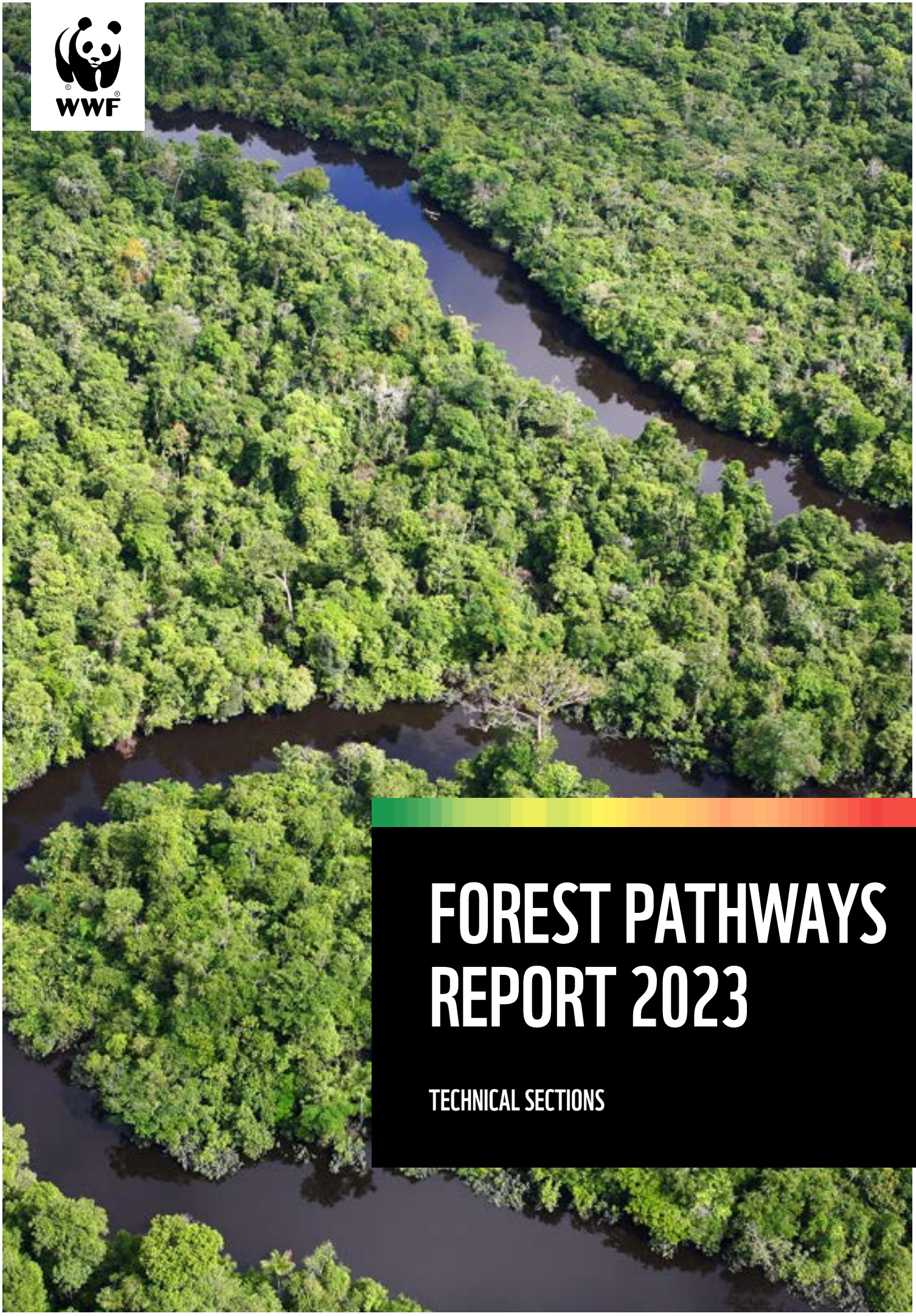

FOREST PATHWAYS REPORT 2023

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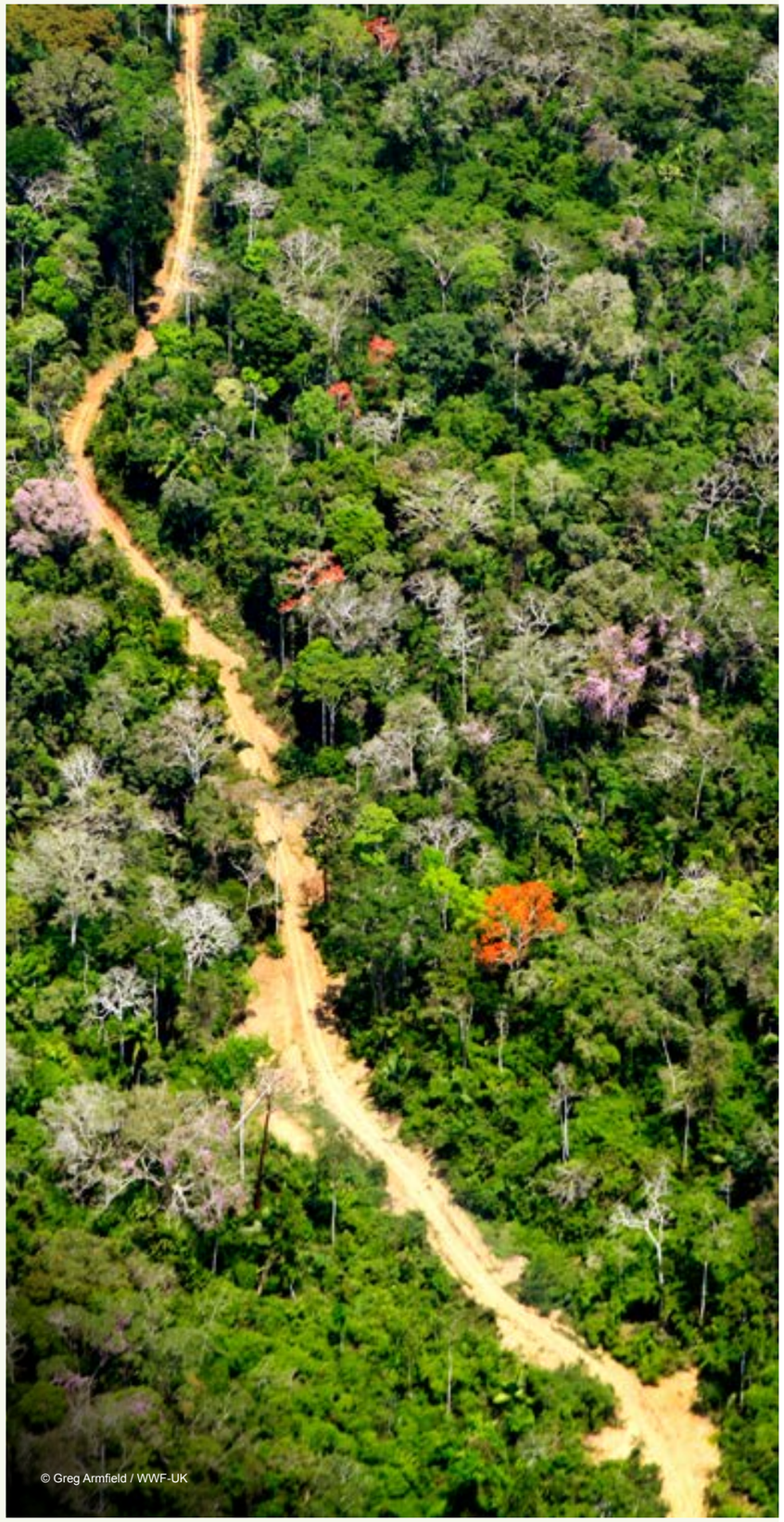
Facts correct as of October 18th 2023 and for Forest Declaration Assessment 2023 draft of that date.



Cover photography: Aerial shot of the Amazon, Loreto region, Peru.
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The Forest Stripes, livingplanetindex.org/fsi. Population abundance of species that rely on forests, 79% average decline 1970 to 2018. The Forest Specialists Index measures the change in average population abundance of monitored species which strongly depend on forest habitats. The image shows the change in the index between 1970 and 2018, which gives an average decline in relative abundance of 79%, from 1,428 forest specialist populations monitored in 346 species. The Forest Stripes are a collaboration between WWF, the University of Reading, University of Derby and ZSL, the Zoological Society of London, part of the wider Climate Stripes family (biodiversitystripes.info / showyourstripes.info)

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TECHNICAL SECTIONS

TECHNICAL SECTION 1.1

HEADLINES: OUR FORESTS NOW

STATUS AND TRENDS

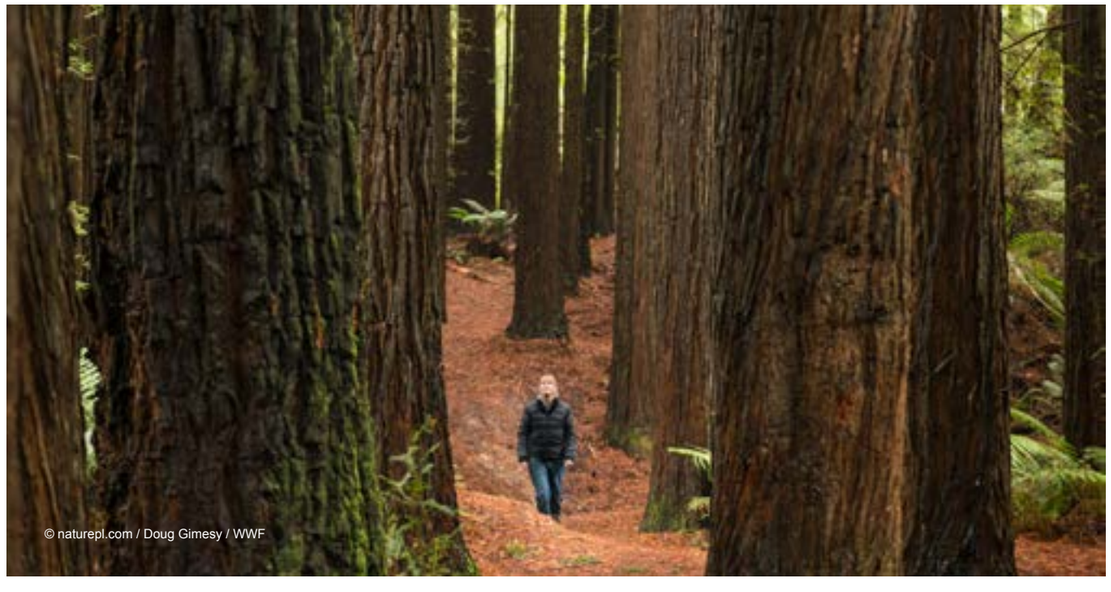
Progress on the twin 2030 goals of halting deforestation, conversion and restoring forests is severely lagging despite high-level political attention, while our remaining forests are degraded and under pressure from a warming and drying climate, unsustainable land use and intensifying wildfires.

We will not currently hit targets to halt deforestation and restore forests by 2030

In 2022 the world missed its deforestation reduction target by 21%, with total global forest loss 4% higher than in 2021. A total of 4.1 million hectares of primary tropical forest were lost.[1] Global forest loss rises and falls over time, with deforestation fronts[2] shifting across the globe in response to trade demands, geopolitical shifts and regional socio economic drivers in forested nations. However, recent trends have been towards worsening progress on halting deforestation with a trend towards leakage of conversion into other biomes, growing agricultural trade from forested nations unsustainably.[3] Many national, regional and international agents are implicated; for example, more than 120 countries around the world are to some extent actors in the loss of Amazon forests.[4] Forest losses impact biodiversity[5] and ecosystem services including carbon storage,[6] with the climate impacts of primary tropical forest loss alone equal to India's annual fossil fuel use.[7] If deforestation was a nation, it would be the third-highest greenhouse gas emitter on the planet.

Tropical forest basins are being impacted by both climate change and deforestation and degradation. The Amazon is losing resilience[8] under the combined pressures of climate change[9] and deforestation,[10] and could be approaching an irreversible tipping point[11] with huge implications for wildlife, food production, water supply, livelihoods,[12] cultural and spiritual significance[13] and the stability of the global climate system.[14]

Outside the tropics, threats to old-growth or primary forest are particularly concerning.[15] Natural old-growth forests are often replaced by commercial, often non-native, plantations with far less value for wildlife and ecosystem services.[16] In the UK, of the ancient woodland we have left, 40% of it has been cleared and replanted with non-native timber species.[17] Although forests are receiving more political attention than ever before, a lack of accountability makes tracking the impact of global pledges challenging.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Forests that remain are often damaged and unable to supply critical ecosystem services that are needed for people, nature and climate.

Many surviving forests are degraded, damaging ecology and reducing societal value

Forests are not lost only when their trees are removed. Degradation can be defined in multiple ways but always involves a loss of biodiversity, functionality and resilience,[18] often via some combination of edge effects, selective logging, fire and drought, habitat fragmentation, species removal and infrastructure development.[19] Data good enough to estimate degradation only exists for the tropics,[20] which is a concern as we are less able to track degradation in the temperate and boreal forests, despite evidence of increasing threats here too, from the continued felling of old-growth forest to increasing and intensifying wildfires,[21] as well as other climate impacts. Estimates of the area of degraded tropical forest range from around 100[22] to 500 million[23] hectares, but vary from source to source, with recent satellite studies finding more forest in tropical basins degraded than was previously estimated. A recent study found 40-60% more of the Amazon forest to be in a degraded state than previously estimated.[24] This means the area of degraded forest is similar to the area that has been removed entirely, equivalent to around 5% of the total remaining Amazon forest biome.[25] It is important to distinguish degraded forest from the secondary forest that regrows after disturbance, which can be of high conservation value and regenerative power[26] – although such areas are often not under protected area designation, leaving them susceptible to development. Loss, often via logging, is often argued to be "preparing the soil" for further degradation by fire and farming,[27] but there is probably a more complex lead-lag relationship between degradation and deforestation that varies between forests. While defining how much of the global forest has been degraded poses challenges, it is easier to define what is not degraded: about 20% of remaining tropical forests around the globe are defined as "intact".[28]

There are multiple causes of forest degradation

Logging natural forests has multiple negative impacts on species' distribution and survival.[29] Fragmentation isolates species, reducing their gene-pool and chances of survival.[30] Overhunting[31] creates "empty forests,"[32] threatening hundreds of species with extinction[33] (see Section 3.1 Empty Forests). Invasive pathogens and pests[34] are increasing; 15 non-native pests kill trees releasing 5.53 teragrams of carbon a year in the USA alone.[35] Air pollutants damage trees[36] and kill lichens and mosses,[37] while pesticide drifts far from source,[38] resulting in huge declines in vital tree-pollinating insects.[39,40]

Tree mortality is rising everywhere.[41] There have also been increasing trends in wildfires over the past 20 years,[42] with frequency, severity and fire season duration increasing in many regions.[43] Wildfire now burns about twice as much tree cover as it did two decades ago,[44] with hotter, more intense fires impacting major tropical forest areas that have little evolved adaptive fire resilience.[45] Impacts are cumulative; the loss of fire-resistant primary tropical forest[46] increases future fire risk within that forest.[47]

Temperate and boreal forests are generally adapted to regrow after fire, but recurrent hotter fires release huge carbon stores,are tipping forests from carbon sinks to sources[48] and hampering their ability to regenerate.[49] Forest ecosystem services for water and food security, disaster risk reduction and climate stabilization are all declining.[50] The structural dynamics of our forests are also climate change-impacted, showing a tendency to be smaller, less diverse, forced onto steeper lands and dominated by younger trees being replaced at faster rates by near constant disturbances.[51] Older-growth forests with more stable dynamics are being replaced by stands of younger trees with faster turnover rates,[52] as is being seen with the loss of ancient redwoods in the Pacific Northwest.[53] The combination of pressures undermines forests' ability to regenerate.

Drivers

Agriculture is the largest driver of tropical forest and ecosystem loss, followed by infrastructure, urbanization and mining. The loss of primary tropical forest in 2022 was 33% above target.[54]

Unsustainable food systems promote commodity growth that leads to the conversion of forest and other natural ecosystems to agricultural land uses in a system that uses subsidies to make forest and ecosystem conversion more financially viable than retention. Food consumption has risen twice as fast as the global population over 20 years;[55] some of this is due to increased nutrition among some of the poorest people.[56] Dietary shifts impacting forests and ecosystems are complex and increased levels of processed food, needing multiple and complex ingredients to process and preserve food, are involved, particularly around the increase in palm oil usage.[57] As a result, agriculture is the largest driver of forest loss in the tropics[58] and up to 80% of global deforestation and conversion has crops and livestock as a primary cause, often linked with logging and infrastructure.[59,60] Fire is used as a low-cost option to clear tropical forests for farming and provide quick soil fertilization.[61] However, the physical land clearance systems sit within more complex, locally and regionally specific, socio economic drivers that include land speculation and illegality.

There has been a switch, notably in South America, from small-scale farming to large ranches and plantations[62] (although this has reversed to some extent at least in Brazil),[63] while smallholders remain important in Africa[64] and Southeast Asia. Further information on the complexities of the palm oil global value chain and its intersection with economic growth and social and environmental sustainability in South East Asian can be found within a broad literature base[65]. Almost half of all global land conversion is estimated to be illegal.[66] Soy,[67] cattle and palm oil[68] are often quoted as the top three commodity drivers of forest and ecosystem loss,[69,70] but this varies regionally. A survey of 28 biodiversity-rich tropical forests found the largest drivers to be rice, rubber, cassava and maize.[71] More sustainable production systems and rehabilitation of degraded agricultural land, linked with dietary change and reduced food waste, are all needed to address hitherto intractable problems.[72] Additionally, infrastructure development, urbanization and mining are all important drivers of forest loss, with impacts varying regionally.[73] Some 84% of direct mining-related deforestation takes place in just 10 countries, although its indirect impacts are both larger and more widely distributed.[74]


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Climate change is the most serious threat to forests and ecosystems in the medium term, with impacts including changed wildfire systems, increased extreme climate events, hotter droughts, pests, diseases and sea-level rise

Climate change influences the distribution, life cycle, growth, reproduction and mortality of trees, and modifies disturbance regimes, altering ecosystems.[75] It increases fire frequency,[76] including in forests that do not usually burn,[77] and produces hotter fires[78] creating long-term damage even in fire-adapted forests.[79] It raises the length and severity of droughts,[80] inducing water stress[81] and killing trees.[82,83] Our changing climate is also linked with increased pest and disease attacks on trees.[84] Warming threatens forests and ecosystems with nowhere to migrate, such as mountain forests,[85] while mangroves are threatened by sea-level rise. A combination of climate-related stresses[86] means that many countries in the dry and wet tropics,[87] temperate[88] and boreal regions[89,90] are experiencing increased tree mortality and larger and more frequent regional-scale forest die-off events, e.g. as measured in Europe.[91]

RESPONSES

Over time, responses to deforestation have shifted from a focus on national laws and policies (e.g. log export bans and commodity moratoria) to a wider range of statutory and voluntary actions,[92] to, more recently, statutory actions which reach out into importing nations (e.g. the EU Deforestation Regulation).

A new push for increased protection highlights different actors and approaches

Protected and conserved areas, and moratoria, remain the dominant intervention methodologies for tackling deforestation, particularly in relation to the impacts of agriculture and timber. Moratoria have had mixed successes, and have predominantly been used in forested nations of the Global South. The emergence of moratoria from Global North nations to intervene in commodity-related deforestation (e.g. EUDR) is potentially positive, depending on how the details are implemented. However, while international moratria are a positive development, significant land amounts are actually taken out of protected area designation each year: one recent analysis showed approximately 1 million km^2 of land and sea area was removed from the global protected area estate each year between 2006 and 2018.[93]

Protected and conserved areas provide refuge for forest species and safeguard multiple ecosystem services. Legally protected areas cover 700 million hectares,[94] with another large area under traditional sustainable management.[95] The CBD's Global Biodiversity Framework (GBF) radically boosts targets for protected and conserved areas – 30% by 2030 (30x30) – without explicitly naming forests,[96] and calls for increasing management effectiveness. The GBF target includes "other effective area-based conservation measures"[97] (OECMs), and there is pressure to include managed forests in OECMs, but controversy about which management types qualify. Importantly, the GBF also supports bottom-up approaches with Indigenous Peoples and local communities, potentially changing the balance of power and influence in many places.[98]

Political changes reduce some problems but create others

There are both encouraging and disappointing signs from a global political perspective, and many countries are balanced narrowly between parties with very different views about the priority given to conservation. After President Lula succeeded Jair Bolsonaro in Brazil he made encouraging statements and policy changes towards the Amazon; it is too early to see if he can deliver,[99] although deforestation has already decreased[100] - while Cerrado conversion increased dramatically in the same period[101] - and subnational efforts on reducing deforestation are growing (e.g www.gcftf.org). But elsewhere conditions have deteriorated, for example where timber and forest conservation have been impacted by war, and where policy changes are threatening important old-growth forests (e.g Białowieża Forest in Europe).[102] In parts of the Congo Basin rates of deforestation have risen sharply.[103] Broadly speaking, socioeconomic and geopolitical landscapes combine to place us temporarily on track on tropical forest loss reduction targets in Southeast Asia, and significantly off track in South America and Africa.[104] There have been multiple statements, pledges and strategies involving global government and business partnerships, however the global deforestation rate continues to rise[105]. Furthermore, the gap between the limited finance provided to forests (see Section 1.3) and the funding that goes to environmentally harmful subsidies (see Deep Dive on Subsidies) is so large that forest conversion continues to be made to appear financially favorable. We note these global pacts necessarily intersect with the political and administrative systems of nations, and that instruments tailored to national conditions, such as FLEGT.

Statutory and voluntary trade policies have had mixed impacts on forest loss

New EU policies focus on tackling global deforestation and forest degradation driven by EU consumption.[106] The development of importer country led market regulating legislation is ground breaking and means that products placed in, or exported from, EU markets must be deforestation-free, forest degradation-free (in relation to wood products), legal according to country of production, and be accompanied by a due diligence statement from the company involved. Similar initiatives are taking place in Australia, the UK and the US. These important advances also need strong implementation, such as the designation of "competent authorities" responsible for implementing and

enforcing regulations, what the "legality" definitions are in the country of origin, whether or not we pivot to implement effective systems to combat illegality around forests, how the regulations impact smallholders, and how spillover to impacts in non-forest biomes continues to develop. Regulations also risk displacement, with products from deforestation being sold to countries without such controls.[107]

Company commitments to deforestation and conversion-free supply chains (along with voluntary schemes such as the Accountability Framework Initiative) have reduced deforestation and conversion in some areas, and have increased monitoring and traceability, but without bending the curve significantly overall.[108,109] Some voluntary schemes help to cut forest loss, such as the soy industry zero deforestation supply chain commitments in the Amazon, which reduced deforestation for soy by an estimated 57% from 2006-2015.[110] But analysis of the soy, palm oil and cocoa sectors suggest that voluntary certified sustainability standards such as the RSPO have done little to halt land-use change overall, due to uneven market uptake, loopholes and poor enforcement.[111] Such standards can also sometimes lead to "leakage" with non-certified companies coming into more vulnerable areas, with knock-on effects for communities in these areas. Forest certification schemes have improved management particularly in temperate regions, but have had limited uptake in the deforestation fronts where most forest loss occurs.[112]

Carbon finance has not delivered at the scale expected and have distracted attention from educing fossil fuel emissions

Progress on internationally regulated carbon market/emission trading schemes under a UNFCCC system is slow. Even before recent exposés of poorly monitored carbon finance schemes[113] there was concern that voluntary carbon mechanisms were not proving to be the conservation funding model that had been hoped.[114] There is a widely acknowledged need for a reboot,[115] with a shift towards a contributions approach and investments at a carbon price that recognizes both demand- and supply-side views, and the true costs of nature-based solutions. Critical enabling conditions include high-quality jurisdictional approaches that contribute to national commitments, with conservative baselines and robust equitable benefit-sharing mechanisms.[116] See Deep Dive on Voluntary Carbon Mechanisms.

Forest expansion is mainly through natural regeneration but tree planting has also increased, with mixed results

Positive trends are detected in the tropics but monitoring is hampered by data challenges and the lack of a regularly updated, global data tracking system for monitoring forest regrowth, something restoration projects would welcome and the Forest Declaration Assessment recommend.[117]

Much forest expansion is via natural regeneration, which occurred across over 50 million hectares from 2000-2015.[118] This is usually the best option for both ecology and cost-effectiveness, as long as the drivers causing forest loss are removed. But assisted restoration or reforestation also has an important and increasing role globally. Some planting (44% between 2002-2020)[119] is as non-native monocrop plantations, which now cover 3% of total forest area.[120] Plantations supply timber, pulp and fuelwood but support less biodiversity[121] and fewer ecosystem services,[122] while being more fire-prone than native forests.[123,124] Planting trees in semi-arid grassland can increase degradation[125,126] and release carbon,[127] while planting on peat can also release large amounts of stored carbon.[128] Additionally, some plantations are sited on natural grassland[129] and savannah,[130] e.g. in Brazil,[131] China,[132] and the Congo,[133] damaging biodiversity.[134]

As neither a global data set on forest cover gain, or a (annually updated, and verified) global dataset of the area under active restoration is available, it is not currently possible to define global area the area under active restoration[135]

Forest restoration is critical but needs to be planned carefully and at landscape scale, through forest landscape restoration[136] or similar approaches. The UN Decade on Ecosystem Restoration,[137] the UNCCD Land Degradation Neutrality target,[138] the EU's Nature Restoration Law[139] and results-based payments (e.g. voluntary carbon markets)[140] all offer chances to boost restoration, but if any is poorly implemented it could increase a tendency to focus on quantity rather than quality of trees.[141] It is worrying that 45% of pledges made by governments to the Bonn Challenge for forest restoration are for monoculture plantations.[142] See Section 3.4: Returning Forests, for further discussion on forest restoration.

Forest conservation has a higher profile than ever, but there is also a certain weariness as repeated efforts have failed to stop the rate of loss – keeping momentum going will be critical. As noted, the plethora of commitments to date have had only limited success; on some metrics, achievements in 2022 were less than in 2021.[143] The global deforestation target for 2022 was missed by 21%.[144] Every year that we miss our forest targets they become harder to reach in time, and less likely to be achieved with voluntary action alone.

WWF nevertheless sees room for hope. A gradual move from voluntary to legally binding commitments, the emergence of new and more powerful alliances like the Glasgow Leaders' Declaration and the Forests and Climate Leaders' Partnership, the new EU law on deforestation, and the reactions of global leaders at events such as the G7 meeting (2022), Amazon Summit (2023) and Three Basins Summit (2023) all point to a gear shift in the seriousness with which forest loss is being tackled. The growing influence of Indigenous Peoples and local communities, as forest guardians, at the table in debates on climate and forest conservation, marks a positive step towards a just transition to protected, restored and sustainably managed forests. However, this progress is out of step with the woeful state of global progress, making it clear that action on the drivers of forest loss and degradation needs to dramatically increase in pace of meaningful implementation. We need to start meeting our global targets on forest finance – ending forest-harming systems of finance and subsidy, and developing forest finance models that account for the true, multiple values that forests have to those who depend on them both within their ecosystem boundaries and beyond – if we are going to halt deforestation and restore what has been lost.

TECHNICAL SECTION 1.2

COMPARING GLOBAL FOREST GOALS

Today there is a convergence of commitments around halting deforestation and supporting forest restoration, with statements from international bodies, regional initiatives, companies and others. However, on closer examination these commitments are in many cases both less concrete and less comparable than we need.

NO DEFORESTATION

There are a cluster of global commitments to end "deforestation" by 2030 from key parties to the UN Framework Convention on Climate Change (although not yet as official UNFCCC policy), the UN Forum on Forests, the hybrid New York Declaration on Forests (NYDF) and from the private sector in the Glasgow Financial Alliance for Net Zero. The Sustainable Development Goals and the private sector Consumer Goods Forum had a 2020 deadline for no deforestation. The SDGs are expected to be updated to a 2030 deadline, although at the time of writing this has not yet happened.[145] Targets from the UN Convention to Combat Desertification on Land Degradation Neutrality *imply* the same target without stating it explicitly.[146] It is notable that the new UN CBD Global Biodiversity Framework has a less ambitious (although probably better-thought-through) target than many of the previous ones, of bringing losses of "ecosystems of high ecological integrity" *close to* zero by 2030 (our italics). At a regional level, the EU has introduced commitments to address imported deforestation on certain products,[147] while the Amsterdam Declaration is an informal collaboration between selected European countries in support of the NYDF and of Deforestation and Conversion-free (DCF) commitments by a number of industry bodies focusing on a range of products including beef, leather, cocoa, coffee, palm oil, rubber, soya and wood products.[148,149]

However, the details of what is included in "deforestation" differ. Some simply refer to *deforestation*, others to *net deforestation*, *natural forest loss* or *areas of high biodiversity importance* (see table below). Nor is "deforestation" usually defined. Global statistics differ; those from the World Resources Institute include impacts of fire,[150] which in much of the world is temporary unless used for land conservation. Conversely, the Food and Agriculture Organization of the UN (FAO) counts a "forest" as any area where the *intention* is to have forest and where regeneration or replanting is expected to have started within five years (young trees, clear-cut areas, areas cleared by natural disaster, and abandoned shifting cultivation land).[151] Confusion is further compounded by multiple definitions of the word "forest".[152]

The forest industry argues that felling old-growth forest and leaving it to regenerate is not "deforestation" because the forest will return, a position supported by the FAO definition. So for example the FAO definition of deforestation "specifically excludes areas where the trees have been removed as a result of harvesting or logging, where the forest is expected to regenerate naturally or with the aid of silvicultural measures"[153] (which includes plantation establishment). Within this context old-growth forest felling can be considered as forest conversion or degradation, but not deforestation, a definition that may conform to forestry norms but challenges the biodiversity understanding of what old growth forests do for nature, people and climate. We further explore these problematic intersections below.

The circumboreal loss of old growth forest to harvesting having been a source of concern for decades[154]. The removal of forests in North America, Europe, and non-tropical Asia is estimated to lead to an increase in global temperatures of approximately 0.49 degrees Celsius.[155]

A clear and agreed definition of deforestation is needed in our global forest goals. Many exist[156], with most relating broadly to deliberate, permanent clearance of forests on a large scale. According to FAO, deforestation is the *conversion of forest to another land use or the long-term reduction of tree canopy cover below the 10% threshold.*[157] The AFI (which WWF supports) defines deforestation as *"Loss of natural forest as a result of: i) conversion to agriculture or other non-forest land use; ii) conversion to a tree plantation; or iii) severe and sustained degradation."*[158] Similarly, the AFI defines conversion as the loss of natural ecosystems (also defined) to other land uses, and severe sustained degradation, making clear that deforestation is a form of conversion.

HALTING DEGRADATION

Significantly, several goals also refer to halting forest degradation, a state that has even less agreement about definitions, baseline data or acknowledgement of the steps needed for implementation. Some aspects of degradation are well known, e.g. fragmentation, species loss and impacts of invasive species. Other apparent disturbance factors would not usually be regarded as "degradation," such as natural fire or sustainable collection of non-timber forest products (similar to, for example, sustainable use within protected areas in IUCN protected area management category VI). But to an even greater extent than deforestation, a clear definition and indicators are needed. WWF has defined forest degradation as: "*Changes within the forest that negatively affect the structure or function of the stand or site, and thereby lower the capacity to supply products and/or ecosystem services*,"[159] a definition that drew on one used by FAO in 2000.[160] But more than 50 definitions are known,[161] and significantly by 2020 FAO was advising governments to draw up their own definition of "degraded forests,"[162] suggesting opinions had widened over the previous two decades.

Ecologists tend to define degradation as the reduction or loss of biological complexity in forests and other natural ecosystems, and thus regard clear-cutting a natural forest (as opposed to a plantation) as degradation.[163] From the perspectives of both climate and biodiversity, felling an ancient natural forest has a completely different impact from felling a young managed forest, even if both are replanted or allowed to regenerate.

In addition, none of the goals listed include very clear monitoring systems, baselines or processes for measuring change. Without a starting point or an agreed way of measuring progress, it will be impossible to determine success or failure.

FOREST RESTORATION

There have also been a growing number of commitments to rebuilding forest cover around the world, notably in Target 2 of the Global Biodiversity Framework. Some of the most quantitative targets come from hybrid agreements and the private sector: the Bonn Challenge and the New York Declaration on Forests both aim to bring 350 million hectares of degraded and deforested landscapes into restoration by 2030, and the World Economic Forum has a 1 trillion trees target. NGOs including WWF have a similar vision, supporting high-quality restoration initiatives such as the Global Partnership for Forest Landscape Restoration. There is some debate about whether restoration under the Bonn Challenge necessarily always refers to the return of *forest,* because agroforestry and improved fallow management are also included.[164] Similarly the WEF target also refers to "conservation" and it is not clear what proportion of the 1 trillion are to be restored. The CBD's Global Biodiversity Framework aims to bring at least 30% of degraded land into restoration by 2030 (the UN says up to 40% of the planet is degraded). The UN Forum on Forests aims to increase forests by 3% or 120 million hectares, little more than a third of the Bonn Challenge target, and without stating whether this is native forest restoration or afforestation by plantations. Other international frameworks – like the UNCCD and the Sustainable Development Goals – have only vague statements without quantitative goals.

As with deforestation, these restoration targets are further hampered by a lack of definitions. Without a firm baseline, or even agreement on what is included in the term "degraded", setting meaningful targets on a national scale and measuring progress on any targets will be challenging. The UNCCD, in defining the parameters of land degradation neutrality, currently has the most experience to offer.[165] The experience with the Bonn Challenge, which was set up with some carefully set parameters for what did and did not count as forest landscape restoration yet has nevertheless run into considerable controversy,[166] suggests that further work is needed to define a workable process for achievement. With global momentum for ecosystem restoration being mobilized through the UN Decade on Ecosystem Restoration and building to support these goals, clarity and consensus is critical.

The main commitments are summarized in Table 1 below and in two graphics on the following pages.

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WWF'S GLOBAL ACTION PLAN FOR DEFORESTATION AND CONVERSION-FREE

Agricultural and forest plantation expansion is the primary cause of this conversion and deforestation, and therefore also drives biodiversity loss, habitat and ecosystem degradation, and greenhouse gas emissions (GHG). Agriculture and related forest land-use change generate one-quarter of the world's GHG emissions, and this will triple if we continue to produce food in a business-as-usual (BAU) model, through expansion of land. Conversion and degradation will only continue if we do not shift the current production practices, using policy, finance, and supply chain levers, incentivizing DCF production and fomenting alternative livelihood opportunities within a supporting enabling context. For sustained change, these changes must occur at the landscape, jurisdictional and global levels and have to be supported and substantiated through clear and accessible data and impact metrics.

As a response to this urgent global issue, WWF has developed a Global Action Plan for Deforestation and Conversion-Free, with over 30 offices across the network (and in all continents) that have been participating over the past year in defining priorities and scope.

The five objectives (with a 2025 target) of WWF's DCF Global Action Plan focus on:

- Smallholders, producers, ranchers, and growers are incentivized to transition to DCF
- Soft-commodity traders, aggregators, meatpackers have committed to and implemented DCF
- Policies that enable DCF in key countries are being implemented and enforced
- A critical mass of financial institutions de-link investments and capital allocation from deforestation and conversion
- Conditions that enable sustained impact for DCF within a priority landscape/jurisdiction are established – including credible and accessible data, impact monitoring systems, long-term funding, adequate institutional arrangements, and internal capacity

For more details and resources on WWF's work on DCF, please visit our DCF webpage

Table 1: Main commitments on halting deforestation and on forest restoration

INSTITUTION	GOAL	NOTES
DEFORESTATION		
UN Sustainable Development Goals	Halt deforestation by 2020	Part of Target 15.2. Expected to be revised to meet the target of the CBD Global Biodiversity Framework
UN Framework Convention on Climate Change	Implied - Halt deforestation and conversion by 2030	"Halt and reverse forest loss and land degradation" – Glasgow Leaders' Declaration by a subset of Parties, subsequent COP decisions appear to lend support to this but it is not yet official UNFCCC policy
UN Forum on Forests	Halt deforestation by 2030	"halt deforestation and forest degradation"
CBD Global Biodiversity Framework	Bring loss of ecosystems of high ecological integrity close to zero by 2030	Target 1 of the GBF
New York Declaration on Forests	Halt deforestation by 2030	"the end of natural forest loss"
Consumer Goods Forum	Halt deforestation by 2020	"achieving zero net deforestation in key commodity supply chains by 2020"
European Union	Halt import of products that cause deforestation by 2025 and all placing of the products on the EU market - including both internal consumption & exports	Imports of palm oil, beef, soy, coffee, cocoa and wood should, rubber not be produced with recent deforestation, introduced May 2023 with 18-month implementation period
Amsterdam Declaration	Commitment to eliminate deforestation and conversion in agricultural commodity production by 2020, now updated to 2025	Commitment by most major European importers of cattle, cocoa, coffee, palm oil, rubber, soya and wood products
RESTORATION		
Bonn Challenge	350 million hectares of degraded and deforested landscapes into restoraton by 2030	Forest and landscape restoration, may include e.g. agroforestry and improved fallow management
New York Declaration on Forests	350 million hectares by 2030	
UN Forum on Forests	3% worldwide, 120 million hectares worldwide	
World Economic Forum	1 trillion trees	"Grow, restore and conserve" so covers more than restoration
CBD Global Biodiversity Framework	30% of degraded land	To date there is no definition of "degraded" and no baseline, we note that the responsibility lies with countries to identify baselines and report targets through their NBSAPs as currently under negotiation (Sept 2023)

Table 2: Deforestation targets

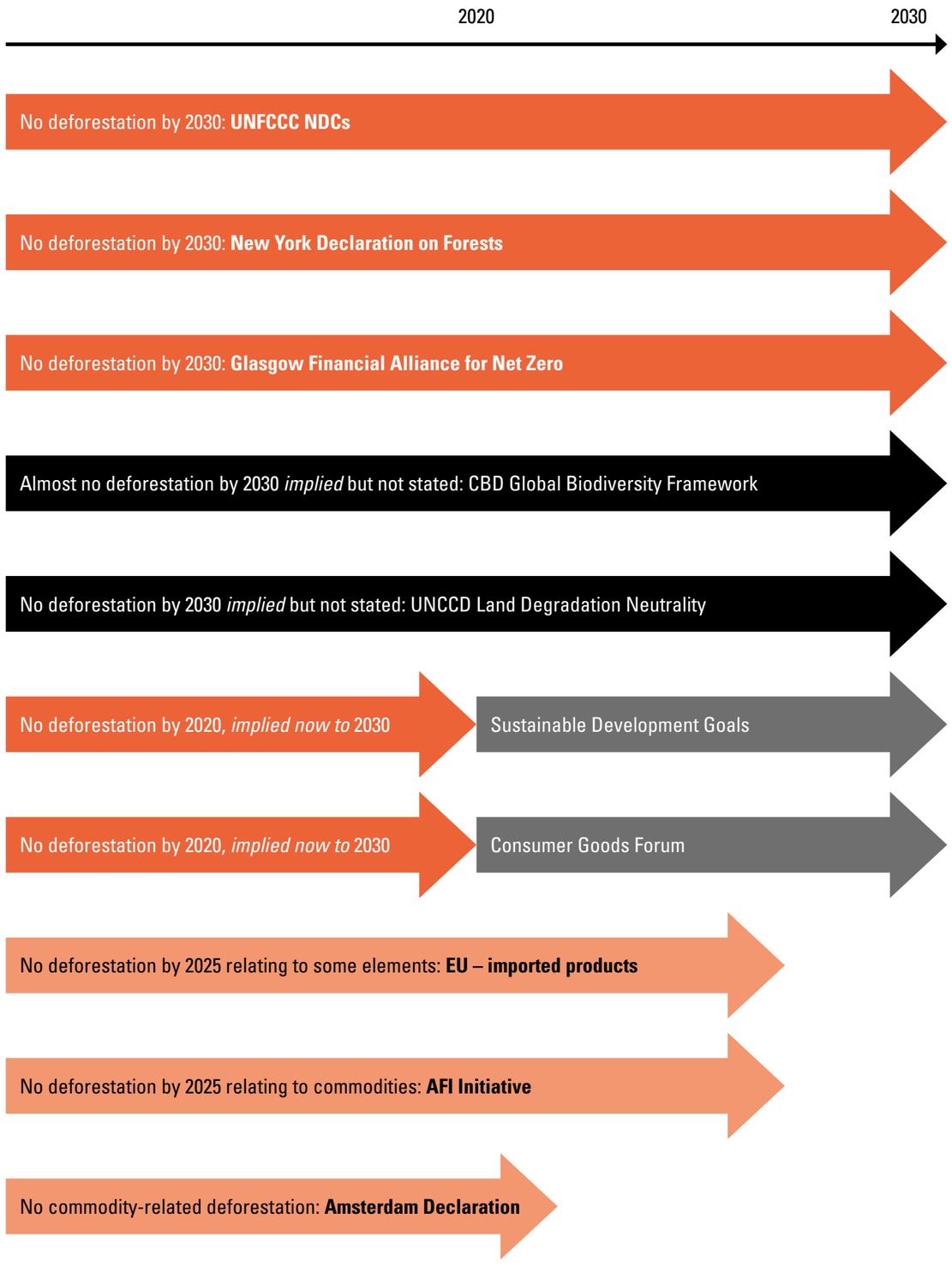
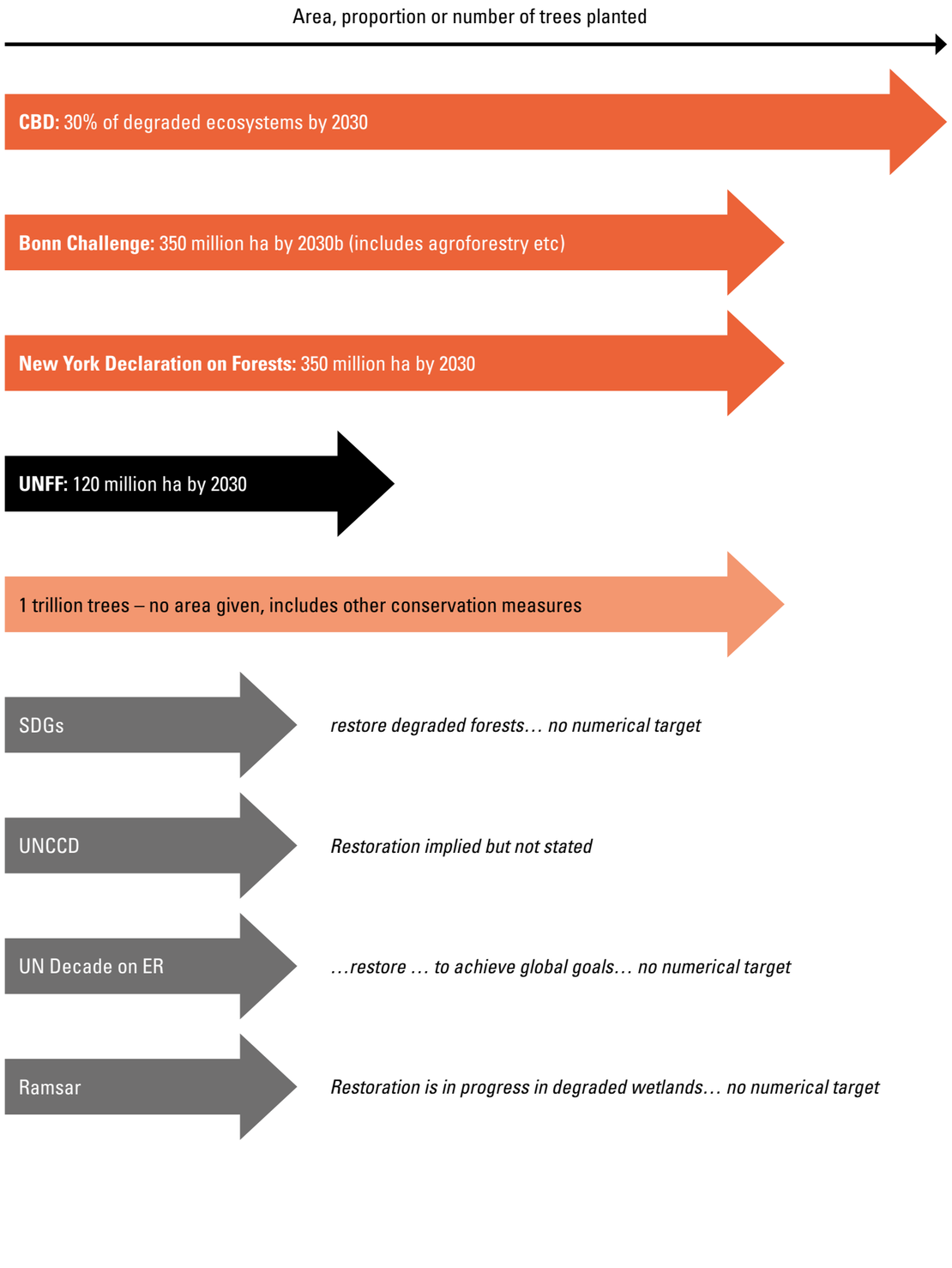


Table 3: Restoration targets



COULD LANGUAGE ON GLOBAL FOREST GOALS BE CONSOLIDATED?

Global forest goals, set by governments, urgently need ambitious and consistent definitions as well as accountability and clarity on implementation mechanisms. Agreement on definitions will ultimately result in much needed clarity of actions. Consolidation of all forest-related international goals and targets holds strong potential to improve and accelerate impact through streamlining of actions.

A consolidated understanding, through agreed definitions and indicators of global forest goals and commitments, would lead to more effective and efficient actions and reinforce cooperation on forest-related action across the different UN Conventions, Frameworks and Leadership groups, such as the FCLP (Forest and Climate Leaders Partnership), amongst others. It would also help to provide a clear picture of accountability, progress, comparability and stock taking on forests.

The Accountability Framework Initiative (AFI), a framework of companies and organizations in the agricultural and forestry sectors who are encouraged to achieve responsible, deforestation- and conversion-free supply chains, offers an important opportunity to align around shared definitions, reduce confusion and define ambition.[167]

However, this important framework sits alongside global targets which are all too loosely defined to be easily applied or measured, at national levels. We explore here where the foundations provided by the AFI might be expanded to develop a strong and consistent set of definitions and targets that would provide governments and businesses with more complete guidance, and at the same time hold institutions to account and avoid slippage through misunderstandings or vague wording. In the following pages, some consolidated targets and accompanying definitions are suggested, as a starting point for discussion.

We discuss in the tables below the derivation of our proposed consolidated target language, which builds on the AFI's definitions.

PHRASE	EXPLANATION[168]	ADDITIONAL POINTS
Proposed language – 1) No deforestation or conversion of natural forests by 2025 and 2) No degradation of natural forests by 2030		
Natural forests and other natural terrestrial ecosystems, and especially primary, intact and old-growth forests and ecosystems, have higher value for biodiversity, ecosystem services (including carbon), landscape and culture than recent secondary forests, degraded ecosystems or plantations. The no deforestation and conversion target recognizes that these many functions and characteristics of natural forests and ecosystems cannot be replaced by plantations or recent secondary forests or degraded ecosystems that have not yet attained much of the species composition, structure, and ecological function of prior or other contemporary natural ecosystems. This target would not seek to halt the felling of native forests – which would be hard for forest-rich and resource-poor countries – but it is saying that in seven years' time natural forest and ecosystem degradation should have halted. Efforts also need to also go beyond tropical forests, as commodity expansion pressures are increasing on the already highly threatened pristine natural grasslands (such as the Great Plains) and savannas (like the Cerrado), as well as on their populations and traditional livelihoods.		
No deforestation	No gross loss of natural forest as a result of: i) conversion to agriculture or other non-forest land use; ii) conversion to a tree plantation; or iii) severe and sustained degradation.	Felling such a forest and leaving it to regrow will create a serious biodiversity loss and temporary soil carbon emissions.
…or degradation…	Degradation is defined as changes within a natural ecosystem that significantly and negatively affect its species composition, structure, and/or function and reduce the ecosystem's capacity to supply products, support biodiversity, and/or deliver ecosystem services.	Disturbance such as frequent and intensive (unsustainable) logging, mining and other disruptive operations that impact biodiversity and ecosystem services and reduce resilience. Sustainable management practices such as Forest Stewardship Council (FSC) certification and Reduced Impact Logging limit degradation. Definitions are complicated however (see box discussion above).
…natural forests	Natural forests possess many or most of the characteristics of a forest native to the given site, including species composition, structure, and ecological function. Natural forests include: • Primary forests that have not been subject to major human impacts in recent history • Regenerated forests that were subject to major impacts in the past (for instance by agriculture, livestock raising, tree plantations, or intensive logging) but where the main causes of impact have ceased or greatly diminished and the ecosystem has attained much of the species composition, structure, and ecological function of prior or other contemporary natural ecosystems.	Includes but is not limited to primary, intact or old-growth forests. There are very few forests that have never been disturbed by humans: the key concept of "naturalness" here is based on a forest's structure, composition and functioning.
…natural forests (continued)	This includes managed natural forests where much of the ecosystem's composition, structure, and ecological function exist in the presence of activities such as: • Harvesting of timber or other forest products, including management to promote high-value species • Low-intensity, small-scale cultivation within the forest, such as less-intensive forms of swidden agriculture in a forest mosaic • Forests that have been partially degraded by anthropogenic or natural causes (e.g. harvesting, fire, climate change, invasive species etc.) but where the land has not been converted and where degradation has not been catastrophic to ecological function or local biodiversity.	
…natural ecosystems	Natural ecosystems that substantially possess the characteristics — in terms of species composition, structure, and ecological function — that are or would be found in a given area in the absence of major human impacts. This includes human-managed ecosystems where much of the natural species composition, structure, and ecological function are present. Natural ecosystems include: • Largely 'pristine' natural ecosystems that have not been subject to major human impacts in recent history • Regenerated natural ecosystems that were subject to major impacts in the past (for instance by agriculture, livestock raising, tree plantations, or intensive logging) but where the main causes of impact have ceased or greatly diminished and the ecosystem has attained species composition, structure, and ecological function similar to prior or other contemporary natural ecosystems • Managed natural ecosystems (including many ecosystems that could be referred to as 'semi-natural') where much of the ecosystem's composition, structure, and ecological function are present; this includes managed natural forests as well as • Native grasslands or rangelands that are, or have historically been, grazed by livestock • Natural ecosystems that have been partially degraded by anthropogenic or natural causes (e.g., harvesting, fire, climate change, invasive species, or others) but where the land has not been converted to another use and where much of the ecosystem's composition, structure, and ecological function remain present or are expected to regenerate naturally or by management for ecological restoration.	Includes but is not limited to primary, intact or old-growth grasslands, wetlands, scrublands and savannahs. There are very few terrestrial ecosystems that have never been disturbed by humans: the key concept of "naturalness" here is based on an ecosystem's structure, composition and functioning.
By 2030	The target mirrors those of the CBD and the SDGs, among many others.	Most deforestation and conversion due to globally traded commodities should be eliminated by 2025.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CONSOLIDATED TARGETS FOR RESTORATION

Phrase – deliver 350 million hectares of high-quality sustainable forest restoration, grounded in the Forest and Landscape Restoration and UN Decade on Ecosystem Restoration principles

PHRASE	EXPLANATION
Forest landscape restoration	A planned process that aims to regain ecological integrity and enhance human well-being in deforested and degraded landscapes.[169]
Ecological restoration	The process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed. It is an intentional activity that initiates or accelerates ecosystem recovery with respect to its health (functional processes), integrity (species composition and community structure), and sustainability (resistance to disturbance and resilience).[170]
Degradation	Forest degradation occurs when forest ecosystems lose their capacity to provide important goods and services to people and nature.[171]
Grounded in…principles	Ecologically founded restoration principles were proposed two decades ago to restore ecosystems, not just timber resource potential.[172] These principles underpin the UN Decade on Ecosystem Restoration and the Global Partnership for FLR, and should be brought into target definitions in the global commitment.

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WWF FOREST PROGRAMME PATHWAYS

Two of WWF's major forest programmes are highlighted in this report, see Case Studies on Bringing Forests Forward and Financing The Transition to Sustainable Forest Conservation

Forests Forward is a programme for corporate action in support of nature, climate, and people. It helps companies unlock the power of forests to achieve ambitious sustainability, social impact, and business goals. Forests Forward works in partnership with leading global companies, who have impacts and dependencies on forests, to halt and reverse forest loss. Our current programme partners include HP, IKEA, SIG, Costco Wholesale, International Paper and many more. Our programme unlocks private sector commitment, action and collaboration in three forest action areas: i) Sustainable forest management; ii) Responsible sourcing and; iii) Investment into flagship forest landscapes. For more information explorer.land/p/page/wwf-forests-forward/about

Trillion Trees is a joint venture to accelerate forest protection and restoration in globally critical landscapes. Trillion Trees brings together BirdLife International, the Wildlife Conservation Society and WWF to identify effective pathways to deliver and scale interventions that conserve and restore forests, preserve and increase biodiversity, and tackle the causes of deforestation. Trillion Trees partners work to support rights-holders, Indigenous groups, governments and other key stakeholders to build sustainable and equitable solutions that will deliver the benefits of forests to people, nature and the climate. For more information see trilliontrees.org

TECHNICAL SECTION 1.3

PLEDGES FOR FOREST FINANCE

Recent forest finance pledges amount to over USD 28.9 billion between 2021-2025. However, as of 2023, half of these pledges report on-track progress, but the remainder are not on track, or no progress reports are available, whilst gray public finance still far outweighs green. (FDA, 2023)[250]

INTRODUCTION

Efforts on deforestation are driven by a range of ambitious global goals. In its annual tracker, the Forest Declaration Assessment finds that ambitious finance plans under recent pledges are not hitting the ground with the pace, scale and transparency needed to report on progress towards the pledge [173].

Here we explore global finance pledged and secured on forests, comparing pledges in an attempt to identify where double counting may be occurring, and propose some improvements that might create more clarity on forest finances.

We ask what has been raised in total, what is still needed, and what is going towards potentially harmful activities for forests (so called “gray finance”).

METHODS

Forest finance is complex as it includes different sources and different financial instruments, all implemented over different timescales and usually as part of larger packages that do not focus solely on forests (e.g. climate finance, ODA). There is no one database or set of databases that provides comprehensive tracking. Moreover, the methodology needs to be repeatable, annually. It therefore cannot rely solely on existing syntheses of forest finance, as they may not be repeated at the same frequency.

Where a forest goal includes an official finance monitoring and reporting system, that information was used directly. Where no official finance monitoring and reporting system exists, and for finance not directly associated with a forest goal, key reports were used. Pathways reports on public (international and domestic), private and blended financial pledges that are part of the delivery mechanism of major commitments (e.g. Land Degradation Neutrality and the Glasgow Leaders Declaration). Achievements-related payments (e.g. Payment for Ecosystem Services, PES) are not included in depth here, but are considered in other parts of the report (see Deep Dive: Seeing More Than Wood In Trees).

Finally, the finance that has been pledged and delivered for the forest goals was compared with estimates of the quantity of finance needed to protect and restore forests, and the quantity of finance that is available for activities that contribute to the degradation and conversion of forests.

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PROGRESS ON GLOBAL PLEDGES

Of the nine global goals that focus on the protection, sustainable management or restoration of forests, only a few have official aligned funds: the UNFCCC Glasgow World Leaders Declaration on Forests and Land Use has the Global Forest Finance Pledge and UNCCD has the Land Degradation Neutrality Fund (LDN Fund). Meanwhile the UN Forum on Forests’ Strategic Plan for Forests by comparison has a much lower profile. Neither the LDN Fund nor the Global Forest Finance Pledge has an endogenous tracking website monitoring and reporting on funding and impact. A simple but impactful pivot would be for the three main UN-led initiatives to align and report on funding coherently and systematically over time.

The New York Declaration on Forests (NYDF) was initially established as a goal to end natural forest loss and restore at least 350 million hectares of degraded lands and forestlands by 2030 – it is not a fund-raising goal. The associated Forest Declaration Assessment (FDA) took on the form of an independent, civil society-led initiative (which includes WWF as a partner) to assess progress toward the global goals of halting deforestation and restoring 350 million hectares of degraded land by 2030 as set out in the NYDF and GLD.

The FDA now tracks, among other metrics, global finances for forests that are being entered into other goals (e.g. the LDN Fund and the Global Forest Finance Pledge), via the Forest Declaration Platform’s Forest Finance (Theme 3) Assessment.[174] Its 2023 findings are that we are not on track to achieve any of the forest goals.

Recommendations to improve transparency and accountability

To ensure full transparency ideally all funds would have dedicated transparent mechanisms tracking the forest finance, or a single independent body would be responsible for tracking finance for forests and ecosystems.

Tracking international financial flows is not a new challenge, and there are existing working models that can be adapted for forest finance. For example, the OECD DAC provides a coordinated mechanism for development assistance, which includes the standards that should apply to overseas development assistance (i.e. what counts as ODA) and coordinates reporting of the flows.[175] An alternative and less formal approach is to invest in a body that compiles and reports the data independently, such as the Climate Policy Initiative’s Global Landscape of Climate Finance.[176] The key outcome is that forest finance should be robustly monitored and transparently and publicly available, reporting:

The target sums

- How much has been pledged so far (in total and a year-by-year breakdown)
- Who has pledged what (a pledge breakdown)
- Allocation and disbursement of funds: how much has been put in the bank so far and by whom (in total and a year-by-year breakdown)
- Disbursed actualities: what has been paid and to which beneficiaries
- Beneficiary or locality impacts in halting deforestation or addressing the drivers, forest protection, sustainable management and restoration of forests

To avoid double counting, pledgers should not state that they have pledged any financing to non-fund-aligned goals. Likewise, goals that do not have an aligned fund should not claim to be raising funds. Donors should also provide information on additionality of finance pledged, i.e. if this is new finance or related to existing/previous finance pledges. Reporting should be as near to real time as is feasible, so that the delivery of pledged funds can be readily assessed. Again, the OECD DAC criteria[177] and the International Aid Transparency Standard (IATI)[178] provide guidelines for the provision of information on international financial flows – and its effectiveness[179] – that could readily be adapted for forest finance.

None of the goals or reports track the flow of finance as described above. This means that there is limited transparency around double counting of finance, and limited accountability for what has actually been contributed.

We currently do not know how much money has been delivered to achieve all of the global goals on forests, we merely have partial estimates.

What is and isn’t being reported

The profiles below provide some oversight on what metrics are currently being reported on. However, without one centralized tracker, comparing the data across the funds in this way is incomplete, these profiles all use different language and timeframes and are likely to overlap significantly. We have included the profiles of these funds here only as a means for comparing the data that is currently being collected to indicate where the gaps are.

Table 4: Fund profiles

GLASGOW WORLD LEADERS DECLARATION ON FORESTS AND LAND USE

Aligned fund: The global forest finance pledge (no website, official reporting or online tracker).

Fund target: N/A.

Total pledged: US$12 billion (2021-2025).

Total secured: US$5 billion end of 2022. However, available data does not yet show an increase in funding corresponding to pledges made at COP26 in November 2021.

Individual entity breakdown: By 2022 end, it was not yet possible to directly assess progress because most entities have yet to publicly disclose on their implementation efforts.

NEW YORK DECLARATION ON FORESTS (NYDF)

Although in some ways now covered by the Glasgow Leaders Declaration, the NYDF was endorsed by more than 200 entities (national governments, subnational governments, NGOs, IPs' organizations etc.) while the Glasgow Leaders Declaration has been signed by 145 national governments. The NYDF progress assessment became FDA (see above), but the NYDF pledge still stands and the secretariat for the NYDF Global Platform is separate from the FDA secretariat.

Aligned fund: NYDF is not officially a fund or a fund raising body so there is no aligned fund for NYDF.

Fund target: N/A.

Total pledged: N/A.

Total secured: N/A.

Individual entity breakdown: N/A.

UNCCD: LAND DEGRADATION NEUTRALITY

Aligned fund: The LDN fund is the endogenous financing system. LDN fund is an investment vehicle leveraging public money to raise private capital for sustainable land projects. But there is no official reporting or online tracker of funds, nor is this funding intended for forest protection or restoration – instead it targets human uses such as farming, forestry and agroforestry.

Fund target: First closing: US$100 million, final closing: US$300 million.[180]

Total pledged: US$100 million.

Total secured: It is not clear what has actually been given so far.

Individual entity breakdown: No breakdown is provided.

LOWERING EMISSIONS BY ACCELERATING FOREST FINANCE (LEAF) COALITION

Aligned fund: LEAF seems to essentially function as a fund.

Fund target: No clear target.

Total pledged or secured: In 2021 the Coalition "mobilized" US$1 billion in financing, making a commitment to pay for performance down the line, but no financing has actually flowed to forest nations through LEAF to date.[181]

Individual entity breakdown: No breakdown is provided.

OTHER GLOBAL, INTERGOVERNMENTAL OR PUBLIC-PRIVATE GOALS:

Bonn Challenge: Not fund-raising, pledges are measured in hectares.

World Economic Forum 1 Trillion Trees: Pledges are measured in trees.

UN Forum on Forests: UN Strategic Plan for Forests: Not fundraising.

UN Forest Financing Clearing House: More of a match-making site to connect projects to finance.

CBD GBF's GEF Fund: Fundraising but not forest-specifi.

SDG 15: Not fundraising, not forest-specific.

Glasgow Financial Alliance for Net Zero: Isn't specifically raising funds for forest.s

Consumer Goods Forum zero net deforestation by 2020: Not fundraising.

INDIGENOUS PEOPLES AND LOCAL COMMUNITIES' FOREST TENURE PLEDGE

It is a commitment from 22 bilateral and philanthropic donors, known as the Forest Tenure Funders Group (FTFG), in recognition of the vital role of forest communities in mitigating climate change, protecting ecosystems and biodiversity, and preventing deforestation.

Aligned fund: The IP&LC pledge is linked to the Glasgow Declaration on Forest and Land Use.

Fund target: N/A.

Total pledged: US$ 1.7 billion (2021-2025).

Total secured: USD 322M has been disbursed during the first year (January to December 2021), as reported in the first Annual Report on donor spending. Early 2023, FTFG committed a study on how to improve the impact of this investment (see the report here). Second annual report will be launched in UNFCCC COP28.

Individual entity breakdown: N/A.

HOW MUCH FINANCE IS GOING TOWARDS FORESTS?

While challenging to define, the estimated $2.2 Billon per year that goes into public forest positive finance is less than 1% of that which goes into potentially environmentally harmful finance, which is between $378 Billion and 1 Trillion dollars per year.[259]

Given conflicting and incomparable figures, it is impossible to say definitively how much domestic and international finance is currently flowing to sustainable forest management, forest restoration and halting deforestation.

Domestic and international finance to end deforestation (i.e. which could align with global goals to halt deforestation) is estimated to average between **US$1.3 billion**[182] and **US$2.2 billion a year**.[183,184] An estimated **US$124-143 billion** was spent on all biodiversity conservation globally in 2019, which is presumed to include the above as well as money spent on activities that relate to global goals on degradation and reforestation (e.g. sustainable forest management, forest protection, afforestation etc.) along with non-forest biodiversity conservation.[185]

Flows to forests increased during the 2010s, with a significant period of growth between 2016-19. During this peak decade, governments committed US$25.3 billion of domestic and international public funding to conserve forests (financing committed with a stated forest objective, or under REDD+ strategies).[186] In 2020, however, finance **flows fell by almost half**, likely due to countries' changing budget priorities in the COVID-19 pandemic.[187]

For comparison, total finance for climate, from both public and private sources, reached **US$632 billion** in 2019-20,[188] but only **US$14 billion** (just over 2%) of climate financing goes to "land use" each year – some of which will be for afforestation, reforestation or forest protection etc.[189] And yet, estimates suggest the value of voluntary carbon credits jumped from around US$350 million in 2020 to around **US$1.2 billion in 2022**,[190] and the volume of carbon credits traded in the voluntary carbon markets (VCM) grew by 89% in 2021, with 45% of all credits issued coming from forestry and land-use projects.[191] Figures for how much is being traded on the VCM for forests are conflicting; REDD+ reports that between 2020 and 2021, trading credits from forestry and land-use projects in the VCM reached almost US$1.7 billion.[192] In contrast, Audino et al. (2023) reports the total value of the VCM market in 2022 was only US$1.2 billion. Again, it is critical to increase transparency and standardize reporting for such figures.

Another major issue is the price of forest carbon credits. In 2021 the price averaged at between US$4.7 and US$15 per tonne of CO_2, well below the price needed to meet the Paris Agreement's target of limiting global warming to 1.5°C.[193] In other words, while the credits are available and the demand seems relatively high with nature-based credits selling for a premium,[194] the price of the credits is too low. A price of US$75[195] to US$100[196] per tonne is required. In addition, future demand for and supply of carbon credits remains uncertain.[197] Growth will depend on credible delivery, standards, accreditation and markets.

How much funding is needed?

The FDA estimates that we need up to **US$460 billion** per year to protect, restore and enhance forests on a global scale.[198] Preventing deforestation in the most at-risk tropical forests alone requires at least **US$130 billion**[199] a year by the end of the decade, which is the estimated cost of eliminating the economic incentives to destroy forests for cattle ranching, agriculture and other uses.[200]

When rolled up into the gap in biodiversity funding, we need between **US$722-967 billion** each year over the next 10 years. That puts the biodiversity financing gap at an average of **US$711 billion** (or between US$598-824 billion) per year.[201]

IPs and local communities, who can be the most effective stewards and guardians of their forest territories, receive far less funding than their estimated finance needs for securing tenure rights and preserving forest ecosystems. Only 7% of funds delivered so far to fulfill the US$1.7 billion UNFCCC pledge to support the tenure rights and forest guardianship of IPs and local communities have gone directly to those groups.[202] Only 1.4% of total public climate finance in 2019-20 was targeted toward IPs and local communities, and only 3% of the financial need for transformational tenure reform is being met annually.[203]


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How much funding goes to activities that harm forests?

Given conflicting and incomparable figures, it is impossible to say definitively how much public domestic and international finance is currently flowing to sustainable forest management, forest restoration and halting deforestation.

The finance to end deforestation is not clear. The FDA estimate that climate related public mitigation finance for the forest sector (i.e. which could align with global goals to halt deforestation) could be between **US$2.21.3 billion** and **US$2.22 billion a year**, with private finance not assessed.[204]

An estimated **US$124-143 billion** was spent on all biodiversity conservation globally in 2019, which is presumed to include the above as well as money spent on activities that relate to global goals on degradation and reforestation (e.g. sustainable forest management, forest protection, afforestation etc.) along with non-forest biodiversity conservation.

Globally, environmentally harmful subsidies spent on sectors contributing to the destruction of ecosystems and species extinctions has reached US$1.8 trillion a year, equivalent to 2% of the world's GDP.[205] Recent examples of environmentally harmful expenditure, subsides and incentives have included handing out public land to settlers, building infrastructure to enable agroindustrial production, keeping taxes on agricultural inputs low, and price incentives (e.g., import tariffs and export subsidies for specific crops).

It is extremely difficult to accurately break these estimates down into specific annual investments in potentially harmful agricultural and forest incentives, the so called 'gray' as opposed to 'green' finance that impact forests, because the beneficiaries of investments and subsidies may or may not use them to fund environmental harm. Different estimates also include different financial flows (e.g., they may include all agricultural subsidies, or only those incentives for the production of specific commodities), whilst subsidies to other sectors that indirectly lead to forest harm through climate change (such as subsidies for fossil fuels that drive climate change) are not included. The first of these factors leads to an overestimation of the true value of forest-harming subsidies and the second to an underestimation.

With these caveats in mind, we define here estimates of the investment in potentially harmful agricultural and forest sector incentives, subsidies, and gray finance, to range between $378 bn and $1 trillion per year[206]. In other words, investments in forests (c. US$2.2 billion per year[207]) are, at most, significantly less than 1% of the investments and subsidies in activities that could pose a risk to forests.

Taking a broader view of finance for conservation (i.e. including but not limited to forests), the US$124-143 billion of finance in 2019 is still only around a quarter of that flowing into agricultural, forestry and fisheries subsidies that contribute to the degradation of nature.[208] Moreover, none of these gray finance figures include subsidies for fossil fuels.

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WHAT NEEDS TO CHANGE?

The financing around protecting, restoring and sustainably managing the world's forests is opaque, and is an order of magnitude less than both the finance subsidizing activities that degrade and destroy forests and the best estimates of what is required to protect and restore forests. The commitments made and financing that has been raised have not been enough to stem deforestation and degradation.

Ultimately there needs to be a dialogue on a global finance facility for forests, to channel enough funding, rigorously tracked and accounted for and delivered via innovative finance mechanisms, alongside global finance reforms such as those outlined in the Bridgetown agenda. This should ideally be integrated into the GEF and GBF fund. We start this conversation via our Deep Dive "A Global Nature Bank" and Section 2.1: Financing forests in the Congo Basin.

The pledges associated with forest goals overlap, duplicating effort and making it difficult to track progress. There isn't a single one that meets every element of best practice, including:

- An **aligned fund** for impact
- A dedicated tracking system
- Clear **target sum**
- A real-time pledge record of what has been pledged and by whom and when (to help identify double counting)
- **Allocation:** how much has been allocated, by whom and when (so how much has been put in the bank so far can be tracked, and pledgers can be held accountable)
- **Disbursement:** what has been paid and to which beneficiaries
- Beneficiary or locality **impacts** in forest protection and restoration
- Transparency separating finances from other commitments (e.g. restoring legacy deforestation)
- Evaluation mechanisms must be put in place to enable donors and communities to assess the impacts of disbursed finance and allow for necessary adjustments

What can we do differently?

The development of the FCLP and its implementation mechanism, the FCLP Country Packages, provides an immediate opportunity to engage practically with some of the structural and process problems with forest finance that this section has highlighted.

There has been a decades-long debate about how we pivot forest-harmful finance for forest-positive. Fifteen years ago the Eliasch Review[209] recommended that an international forest finance deal was needed to achieve four things: reduce carbon emissions, benefit the economic development of nations, support the reduction of poverty, and support biodiversity and nature services. But these are recommendations that we are still having to reiterate today because they have not been achieved. One of the key recommendations of that report was that carbon markets could be used as the central pillar of financing. We are now in the position of realizing that reliance on a voluntary system has had very limited success to date, and will not get us where we need to be on finances.

Our recommendations point to the need not only for increases in the amount of finance available for forests, but for more smartness in how it is delivered to where it is needed. The FCLP Country Packages have the potential to make a valuable contribution to this pivot by making forest finance better connected to the needs of forested nations and less donor-priority-dominated than it might be currently perceived by some countries in the Global South.

The impactfulness of the Country Packages, however, will hinge on them sitting in a broader ecosystem of significant and permanent progress on:

- Successful structural changes on deforestation and conversion-free commodities;
- Repurposing harmful subsidies globally;
- Reforming carbon markets practices, transitioning carbon finance to a focus on impact with an accompanying impact definition framework that balances forested and donor nation perspectives;
- Forest goals becoming transparently and quantitatively tracked in terms of pledged cash and delivered cash.

We need 50 times as much funding for forests than we have right now, while at least 100 times more cash currently goes into harmful funds than positive ones. Section 2.1 gives examples of where we are making progress on positive and impactful forest finance systems.

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WHAT IS THE FOREST DECLARATION ASSESSMENT?

Climate Focus, convenors of the Forest Declaration Assessment Partners.

The past decades have seen several multi-lateral initiatives adopted to protect and restore the world's forests.

In 2011, the Bonn Challenge was launched to restore 150 million hectares of land by 2020 and 350 million hectares by 2030. The challenge has so far secured 74 pledges from 61 countries totaling 2010 million hectares to be restored. In 2014, the New York Declaration on Forests (NYDF) was established as a political declaration calling for global action to protect and restore forests. Signatories included over 200 national governments, sub-national jurisdictions, companies, civil society, and Indigenous Peoples' organizations. This initiative offered a common framework for various stakeholders to collaborate in forest protection, restoration, and sustainable use.

The NYDF was launched without a built-in mechanism for monitoring and accountability. Out of that gap, the NYDF Progress Assessment was born. The NYDF Progress Assessment was developed by a coalition of independent, civil society organizations called the NYDF Assessment Partners. In 2015 they published their initial assessment framework and reported on progress, organized around the ten goals of the NYDF.

Efforts to track progress on global forest goals have evolved over time in response to a changing landscape of international initiatives and commitments, such as the 2015 launch of the Sustainable Development Goals (SDGs). Recognizing the interconnectedness of social, economic, and environmental aspects of development, these 17 goals provide a framework for ending poverty, protecting the planet, and ensuring peace and prosperity for all by 2030.

Even more significant was the launch of the Glasgow Leaders' Declaration on Forests and Land Use (GLD) in 2021 to end and reverse forest loss and land degradation by 2030. This declaration was driven by governments, and at the time of its launch received support from 141 nations, together accounting for over 90% of the world's forests. Building on the 2030 goals enshrined in the NYDF, the Glasgow Declaration revived momentum among governments to achieve ambitious forest goals within the decade.

In 2022, following the adoption of the Glasgow Declaration, the NYDF Assessment Partners re-branded as the Forest Declaration Assessment. With this re-branding came an expansion of the scope of the Assessment to provide more comprehensive coverage of progress on global forest goals and the gap remaining to protect and restore forests by 2030. In addition to the SDGs and GLD, the Assessment now considers all major forest declarations and several other commitments and targets, including the Paris Agreement, and the Kunming-Montreal Global Biodiversity Framework, which aims to protect 30% of the world's ecosystems by 2030.

The Assessment now measures progress against four core themes: 1) overarching forest goals, 2) sustainable production & development, 3) forest finance, and 4) forest rights & governance. These themes highlight not only the key areas for performance but also the interconnectedness and influence of various stakeholders across sectors. The Assessment Partners work together to enable accountability to global forest goals by building critical partnerships, tracking progress, and communicating findings and recommendations.

TECHNICAL SECTION 2.1

WHY FOREST FINANCES FAIL TO DELIVER

As stated previously, estimates for the money needed to protect, restore and enhance the world's forests are US$460 billion per year,[210] but domestic and international finance for forests averages just US$2.2 billion per year.[211] Assessments suggest financing needs to be at least 50 times higher – and possibly far more than that – to eliminate deforestation and carry out necessary restoration.[212] The UN Forum for Forests highlighted the need for a financing strategy in May 2023.[213] To compound the challenge, existing funding often fails to deliver long-term changes in the form of effective protection, sustainable management and restoration. Forest investment does not lend itself to quick fixes and long payback times are problematic in volatile economic markets, particularly if funds are only payable on results. Nine of the major barriers to effective use of forest finance are outlined below.

1. **Poor practice is rewarded through perverse incentive mechanisms.** Several issues come together here. A plethora of perverse incentives, including agricultural subsidies (see Deep Dive on Subsidies) and tax breaks, also drive deforestation and conversion.[214,215] Companies continue to invest in unsustainable operations. Asset managers in the Glasgow Financial Alliance for Net Zero still retain forest-risk investments worth an estimated US$8.5 billion, a decline of just 3% since UNFCCC COP 26, with some of the largest investors increasing their exposure to forest risk investments since joining the Alliance.[216]

2. **Positive incentives only reach a minority of forests.** On the other hand, positive incentives are generally directed towards the most threatened forests, which could perversely encourage land clearance. Directing finance to deforestation fronts makes sense intuitively. But this means that countries with healthy forests are not incentivized to protect them.[217,218] Intact forests today can become forest frontiers of the future, as has already played out in the Amazon and Southeast Asia. Attempts to use carbon funds to support less threatened forests have been dismissed as "worthless" by critics, further distorting the incentive structure.[219]

3. **Approaches to economic valuation have often focused on theoretical rather than realizable value, and financial incentives for conversion often outweigh arguments for protection.** Numerous studies have shown that the ecosystem services from a living forest often have greater sustained economic value than the timber and alternative land uses that replace a felled forest.[220,221] But these values are diffuse, benefitting large groups of people or even the global community in the case of climate benefits, rather than the individual or the owners of the resources. Many ecosystem services do not have a ready market[222] and conversion offers more immediate value to the owner or community. The financial benefits of converting forested land are nearly always the most "attractive" option from the perspective of both private forest owners and of governments in the form of tax revenues, even if the economic analysis suggests the reverse from the long-term perspective of society as a whole.

4. **Projects attempt to solve intractable problems piecemeal and fail to address the drivers of deforestation across the landscape.** Many projects focus on alternative livelihoods at a small scale, yet there are few examples of such projects which have been proven to have a net conservation gain.[223] Alternative livelihoods seldom offer better options than forest conversion and are seldom driven by the needs and aspirations of rights-holders.[224] Most have not been set up in ways to allow evaluation of their success.[225] Carbon offset projects have often failed to deliver amid concerns about additionality, permanence and leakage.[226] Wider investment at landscape scale, or in green economy solutions to replace the financial benefits of conversion, are largely lacking.

5. **Lack of corporate leadership and investment beyond the value chain.** Zero-deforestation commitments are being adopted by many companies, and roundtables and certification schemes generally advocate cut-off dates for legacy deforestation. But many companies lack credible implementation plans and focus mainly on project-based offsetting rather than demonstrating leadership and investment in interventions that protect and restore forests for the long term. There has been a general failure to leverage private finance. Loose reporting means companies can market a small proportion of products certified as deforestation-free and benefit from good publicity, while buying most of their goods from uncertified or newly cleared areas. Furthermore, sustainability commitments often do not transfer if forests are sold on to another operator. In Indonesia's palm oil estate alone 6.1 million hectares of forests are considered "stranded assets" as companies cannot convert them – these are at risk of sale.[227]

6. **Failure to go to scale.** Even when schemes are successful – such as water funds that pay communities to protect forests to supply downstream water users – institutional and cultural barriers, and lack of a robust theory of change for scaling, mean that uptake is often slow or model schemes are not replicated. Analysis of payment for ecosystem services (PES) schemes finds them influenced by a range of factors including project duration, scale, payment methods, the types of buyers, sellers and sometimes intermediaries, and the nature of the ecosystem service involved.[228] The public finances needed to start such initiatives have generally failed to leverage the private finances required to keep them going. This is typical of conservation-based initiatives: most start slowly and a significant proportion never pick up speed.[229]

7. **Investments are often donor-driven rather than country-led.** They are therefore generally influenced by outsiders' priorities rather than local aspirations.[230] These do not always transfer easily to other cultures or informal economies,[231] nor do they take into account differing perceptions of risk.[232] As such they often fail to factor in cultural contexts influencing behavior, with social scientists usually absent from teams preparing projects, meaning that apparently logical "solutions" fail to work out in practice. If poorly planned they can have the opposite result; bringing cash into a community can foster increased exploitation of natural resources, e.g. by financing rifles for unsustainable bushmeat hunting.[233] Different arguments for sustainable management are needed in different places and need to be informed by an understanding of influences like cultural values, elites, vested interests and corruption.

8. **Accessing available funds is often difficult and time consuming, and payments are typically ex-post.**[234] This is due to bureaucracy, corruption, complicated donor requirements, lack of enabling policies, and a long chain of intermediaries that reduce the total funds before they trickle down to the forest and its stewards. The latter has been highlighted with respect to funding for IPs, with the majority of funds earmarked for projects on Indigenous territories often spent long before they reach the communities concerned.[235] Funding constraints may hamper progress, for example long-term funding guarantees, lack of funds for pre-investment, or funds tailored to particular project needs. Streamlining funding without opening funds up to misuse continues to present important challenges, although there are signs that this may be changing.[236]

9. **Lack of capacity and technical assistance leads to investments under-delivering.** This can occur even where systems are theoretically in place to ensure sustainable management, such as investments in identification of High Conservation Value (HCV) set asides, jurisdictional carbon programmes, or the protection of riparian corridors in logging operations. These often do not have the capacity on the ground to manage and to monitor if they are being implemented, leading to money being wasted. Even in Europe, where foresters are usually professionally trained, lack of capacity is identified as a block on implementing sustainable management.[237] In the tropics, these problems are often more intense, e.g. HCV demands in oil palm developments being beyond the capacity of managers.[238] At a national level, governments can lack capacity to follow through commitments. Governance challenges, including lack of secure tenure and conflicting government policies towards forest management, may undermine otherwise practical initiatives.


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SPOTLIGHT ON SOLUTIONS

1. **Repurposing perverse subsidies**. Just as important as putting good money into sustainable forest management is taking bad money out.[239] A huge increase in funding is needed for forests. But although the costs seem daunting, governments are already spending the equivalent on perverse subsidies that destroy forests, with funds often going to some of the world's richest countries and companies. The World Bank reports that "Agricultural subsidies are responsible for the loss of 2.2 million hectares of forest per year, equivalent to 14 percent of global deforestation", with subsidies focused on rich countries.[240] "People say that there isn't money for climate but there is – it's just in the wrong places," says Axel van Trotsenburg, Senior Managing Director of the World Bank.[241] Rather than finding new funds, the first action is to redirect funding which drives deforestation towards conservation and support for a green economy.[242] This implies major finance reforms from national governments and multilateral development banks.

2. **Using private finance more responsibly**. Voluntary certification schemes and deforestation-free commitments are not perfect but they are a major step forwards, particularly if they can be applied at a landscape scale.[243] With better monitoring and transparency, and stronger oversight driven by growing government and civil society concern, companies can use their purchasing power positively, investing in both conservation and the green economy, showing leadership for improvements beyond minimum legal requirements, for example through the WWF Forests Forward initiative.[244] Businesses can take a stepwise approach by integrating nature into their climate transition planning and aligning transition plans with nature-positive goals.[245] At-risk forests may need transformative financing to develop conditions in which other forms of support are likely to succeed. Guidance on best practice is available[246].

3. **Focusing finance on the most important places and people**. Preserving standing forests is ecologically preferable and more cost-effective than restoration. Research projects have mapped the world's most precious forests from the perspectives of biodiversity conservation and climate resilience.[247] We know where conservation investment is going to have the biggest impact; innovative finance for high-integrity forests can ensure that the GBF's request for a focus on "areas of particular importance for biodiversity and ecosystem functions and services" is met responsibly.

4. **Implementing new funding mechanisms, including blending public and private finance where the right mechanism does not currently exist (e.g. high-integrity forests)**. Progress is hampered by insufficient, uncoordinated funding which is expected to show results in unrealistically short time periods, and a fundamental lack of private finance for forests. Without unlocking and scaling private finance we will not close the funding gap. Public and philanthropic finance is required to reduce risks, increase returns and develop projects with enabling conditions to attract private finance. Sustainable regional economies need to be robust enough to counter pressure for forest conversion. Actions need to be on a landscape scale,[248] integrating conservation action with investment in the green economy[249] to stimulate regional economies, generate jobs and provide tax revenues for governments that can compete with forces driving conversion. Today, numerous schemes, funds and platforms are being tested and applied, and we present a new proposal on page ##. These provide larger sums of money over a longer time, with safeguards to ensure effective use. Some of the more promising schemes include:

- **Project Finance for Permanence:** large, multi-year sinking funds to enable governments and local communities, with funders and NGOs, to take advantage of an array of financial instruments and secure long-term management and financing for networks of conservation areas. The government has to achieve a series of performance-based milestones to keep drawing from the fund.[250] See case study on the Amazon Regional Protected Areas programme.

- **Debt for Nature swaps:** debtor countries buy back part of their debt at more favorable terms to pay for conservation initiatives rather than debt service, with an institution (usually a development bank) taking the political risk for the new loan, allowing more favorable terms.[251]

- **Payment for ecosystem services (PES):** links finance with forest conservation through water funds or similar.[252] Most schemes rely mainly on state or voluntary funding. It is suggested that National Forest Funds might serve as intermediaries between sellers and buyers to bring more blended solutions.[253] PES needs plausible monitoring, safeguarding policies and advocacy to ensure additionality with legislative development often required to guarantee adoption at scale.[254] A carbon tax could be a form of mandatory PES.

- **LEAF:** the LEAF Coalition aims to channel funds to forest governments by purchasing high-integrity jurisdictional REDD+ credits; initial donor governments are the US, UK, Norway and The Republic of Korea.[255]

- **Central African Forest Initiative (CAFI):** US$718 million from the EU, seven European countries and The Republic of Korea, supporting direct investments, with funding based on achievement of policy milestones outlined in Letters of Intent with beneficiary countries. See case study on Financing Forests in the Congo Basin.

- **Dutch Fund for Climate and Development (DFCD):** a climate resilience fund, supporting projects which benefit vulnerable communities and landscapes, injecting funds into credible business solutions advancing climate adaptation.

5. **Country owned and led solutions**: Donor-focused projects have consistently failed to deliver, in part because people in recipient countries react against what they perceive as a continuation of colonialist approaches. Handing control back to the countries with the forests is essential if long-term progress is to be possible, at both national and particularly at local level. Donors must also consider institutional limitations in any given region and tailor funding vehicles to minimize risks. Funds earmarked for IPs and local communities need to reach people on the ground and not get spent on intermediaries,[256] with initiatives from the Glasgow Summit and the Forest and Climate Leaders Partnership hopefully providing credible examples. A proportion of finance available in small grants, with little associated bureaucracy, can help local groups draw on the model of the Global Environment Facility Small Grants Programme.[257]

6. **Investment in local capacity building and technical assistance**. Finally, none of this will be possible unless there are trained people – in governments, in companies, in communities and among IPs – with the skills to carry out the commitments. This requires an economic transformation, where jobs that contribute to preserving or restoring forests are competitive and attractive. The need for capacity building is enormous and continuing.[258] Climate change means that even if a traditional management system has delivered sustainable outcomes up to now, it may not do so in the future. Capacity building therefore also needs to include co-development, experimentation, adaptive management and the willingness to learn on the job.

Figure 2: The forest checker board represents the pathways through elements of trade, finance and policy threats to forest goals. We know what the pathways to protected, restored and sustainably managed forests are and what needs to be done to scale them up.

FINANCING FORESTS IN THE CONGO BASIN

The Congo Basin contains the world's second largest tropical rainforest: some 180 million hectares, including areas that have still scarcely been explored. Until recently it has remained relatively untouched compared to the massive deforestation that has taken place in Southeast Asia and the steady eroding of the Amazon Basin. But today this is changing, with forest loss increasing rapidly. And unlike many other areas, these losses are still being driven primarily by small-scale farmers expanding plots with the threat of large-scale industrial clearances increasing.

Addressing deforestation in the Congo is particularly challenging. Countries are often characterized by weak governance and are particularly susceptible to financial crises, which makes them high-risk environments for investors. The region gets just 4% of the forest finance received by either the Amazon or Southeast Asia, and people trying to address forest loss are increasingly frustrated by the disparity; debates about comparative funding almost broke down negotiations on the CBD's Global Biodiversity Framework in late 2022. Investment is particularly lacking in green economy initiatives to promote economic development that values the forest and, more broadly, significantly increased funding is needed for all three major tropical forest basins.

Things are gradually changing though, with new funds being identified and a fresh impetus to address forest losses at a regional scale. Governments have all committed to climate targets and are members of COMIFAC, the Central African Forests Commission, which has agreed a convergence plan to address forests, biodiversity, climate change and sustainable development. The Central African Forests Initiative has raised US$718 million from a collection of donor countries. Options for jurisdictional REDD+ are being examined.

New research for WWF has identified a portfolio of possible solutions that could mobilize additional climate finance for the Congo Basin for green economic development and conservation actions, grouped into three main areas. Public finance will remain critically important for the foreseeable future and could be used to establish a dedicated Congo Basin fund for sustainable development, or to increase fiscal space by assigning value to the Congo Basin's natural assets and reforming countries' debt management frameworks. Blended finance options could include high-integrity forest bonds to attract private investors and de-risking private investment by enhancing the use of guarantees in the context of climate finance and green growth. Finally, private finance can support private investment in pipeline development through, for example, creating an investment and technical assistance facility for environmental markets. Establishing environmental markets investment promotion agencies in the countries of the Congo Basin could be another mechanism to attract foreign direct investment. All these ideas require further elaboration, but they offer credible pathways to increasing international financial flows to sustain the Congo Basin's forests.[259]

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TECHNICAL SECTION 2.2

GROWING EMISSIONS OVERSEAS

"In 2022, gross emissions from deforestation increased by 6% percent, totaling 4 Billion metric tons of carbon dioxide equivalent" FDA, 2023[260].

INTRODUCTION

Up to 80% of all deforestation and ecosystem conversion is caused by commercial agriculture and forestry,[261] in order to produce commodities that are either consumed directly, used in the manufacture of products, or fed to livestock which form a continually growing part of our diets. This includes commodities such as cocoa, palm oil, soy and coffee, that are traded around the globe in huge volumes despite being directly implicated in deforestation and conversion.[262] Parties of the Convention on Biological Diversity agreed within the Kunming to Montreal Global Biodiversity Framework, agreed in December 2022 at COP15, to restore at least 30% of degraded ecosystems and reduce the global footprint of consumption and to conserve 30% of the earth, as part of their overall goal to halt and reverse biodiversity loss by 2030.[263] Parties should now fully implement their commitments, including to reduce the global footprint of consumption[264], by including SMART numerical targets in their National Biodiversity Strategies and Action Plans (NBSAPs) and implementing the necessary transformative actions to achieve them.

Agriculture, forestry and other land activities contribute nearly a quarter of global manmade GHG emissions.[265] The emissions from land-use change arise because natural vegetation, including forests, typically has higher above-ground carbon and higher soil carbon than agricultural fields or pasture. When the land is cleared through burning, or if it has particularly carbon rich soils (e.g. peat), substantial additional emissions can occur. Subsequently, once cleared, land and livestock release further GHGs, with the two biggest sources being nitrous oxide from agricultural soils and methane from livestock. This results in agriculture being directly responsible for up to 8.5% of global GHG emissions, with a further 14.5% coming from land-use change.[266]

In this chapter we explore the key trade patterns for four deforestation and conversion-risk commodities, looking at the trade volumes, land requirements and embedded GHG emissions from land-use change. We illustrate the difficulty that these exported emissions pose for the producer countries' abilities to meet their Nationally Determined Contributions (NDCs).

METHODS

Annex 1 contains a detailed description of the methods. The following is a brief summary.

Four commodities – soy, oil palm products, coffee and cocoa – were assessed. These commodities are all associated with significant deforestation and conversion and between them cover a wide range of producer geographies. The analysis can be extended to other commodities in future years, such as beef and maize.

The quantity exported, the land area required to produce those exports, and the embedded GHG emissions from land-use change in the exports were estimated for each commodity. The embedded GHGs were further compared with national emissions for producer countries, and with their NDCs.

All data is for 2021.

TRADE FLOWS

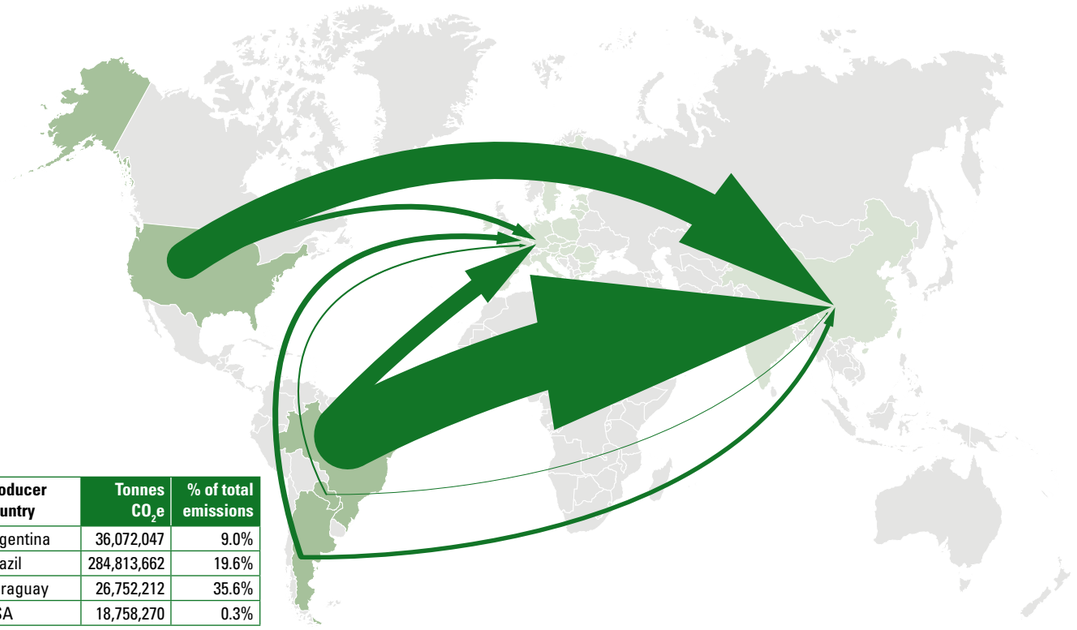
The major suppliers of soy, oil palm products, cocoa and coffee (i.e. those supplying at least 3% of the globally exported commodity) and the major importers (i.e. those importing at least 3% of global imports) are shown in Figure 3. The EU is the major importer of coffee and cocoa, second behind China for soy and third behind China and India for oil palm products (palm oil, palm kernel oil and palm kernel meal). Other important markets are the USA (oil palm products, cocoa and coffee) and Japan (oil palm and coffee). These countries account for the majority of global trade in each of the commodities (see Annex 1).

On a per capita basis, the EU and China's imports of soy are similar, whereas New Zealand dominates per capita imports of palm oil among major importer nations. Per capita cocoa and coffee imports are dominated by the EU and Malaysia and the EU, Japan and USA respectively (Figure 3 and Tables 5 and 6).

Figure 3: Trade flows between major producers and major importers of four deforestation risk commodities.

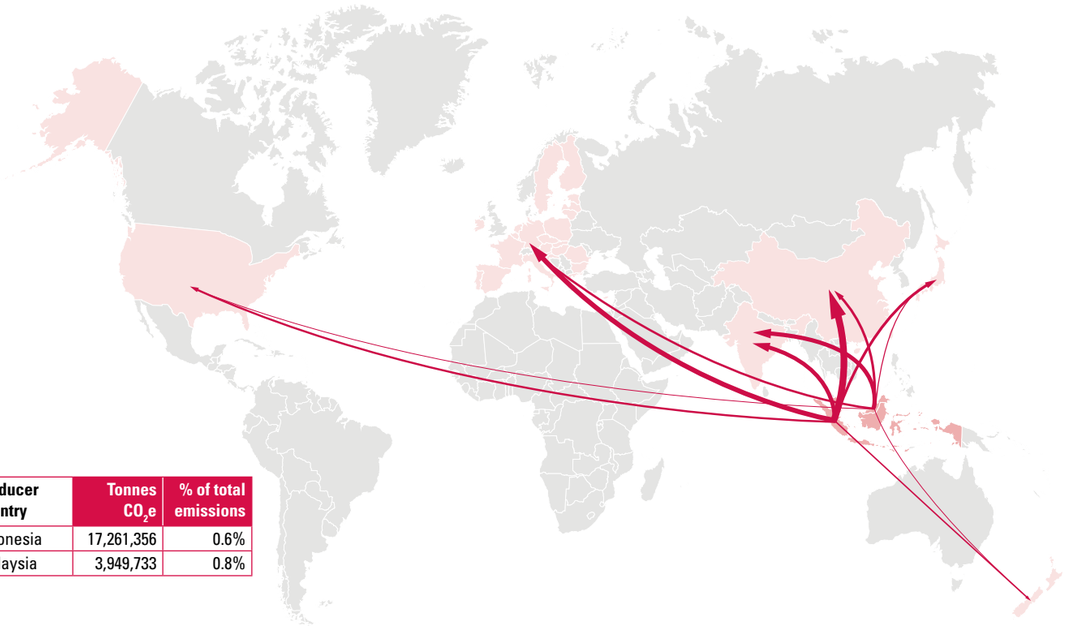
Importer nations are shown in lighter shading and producer nations in darker shading on the maps for soy, palm oil and coffee. On the cocoa maps no separate shading is used due to the complexity of the trade flows. The width of lines indicates the relative volume of traded commodities, with the GHG emissions from land use change associated with this trade given in the embedded tables. The lines are mathematically calculated but weighted to indicate the dominance of soy, which accounts for 79% of the trade in these four commodities. Major producers and importers were defined as those trading nations that supply or import at least 3% of the four commodities analyzed.

SOY



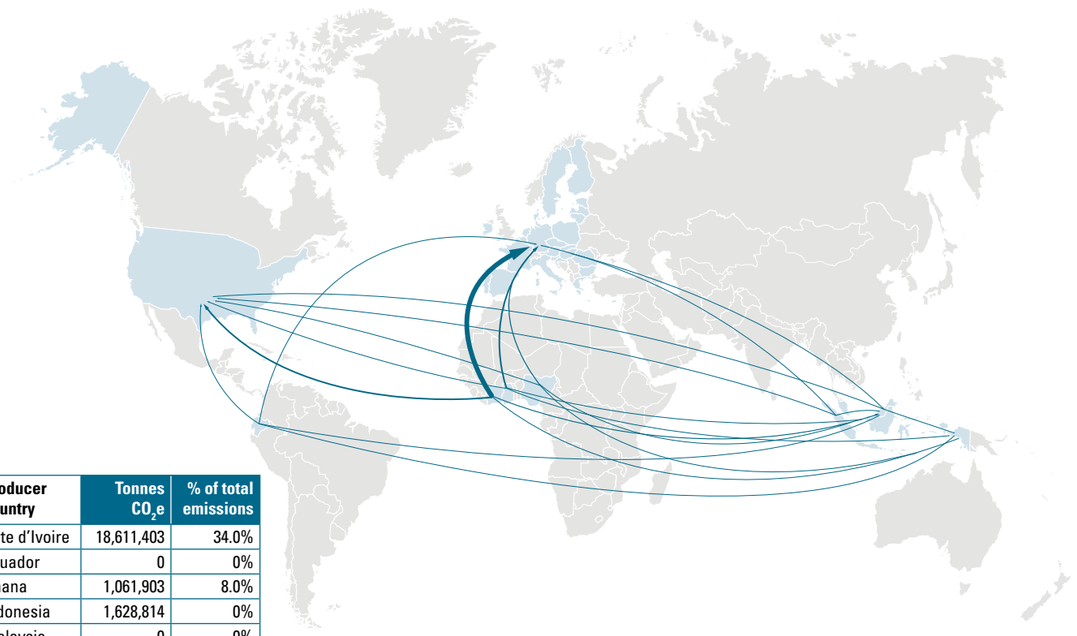
Producer country	Tonnes CO_2e	% of total emissions
Argentina	36,072,047	9.0%
Brazil	284,813,662	19.6%
Paraguay	26,752,212	35.6%
USA	18,758,270	0.3%

PALM OIL



Producer country	Tonnes CO_2e	% of total emissions
Indonesia	17,261,356	0.6%
Malaysia	3,949,733	0.8%

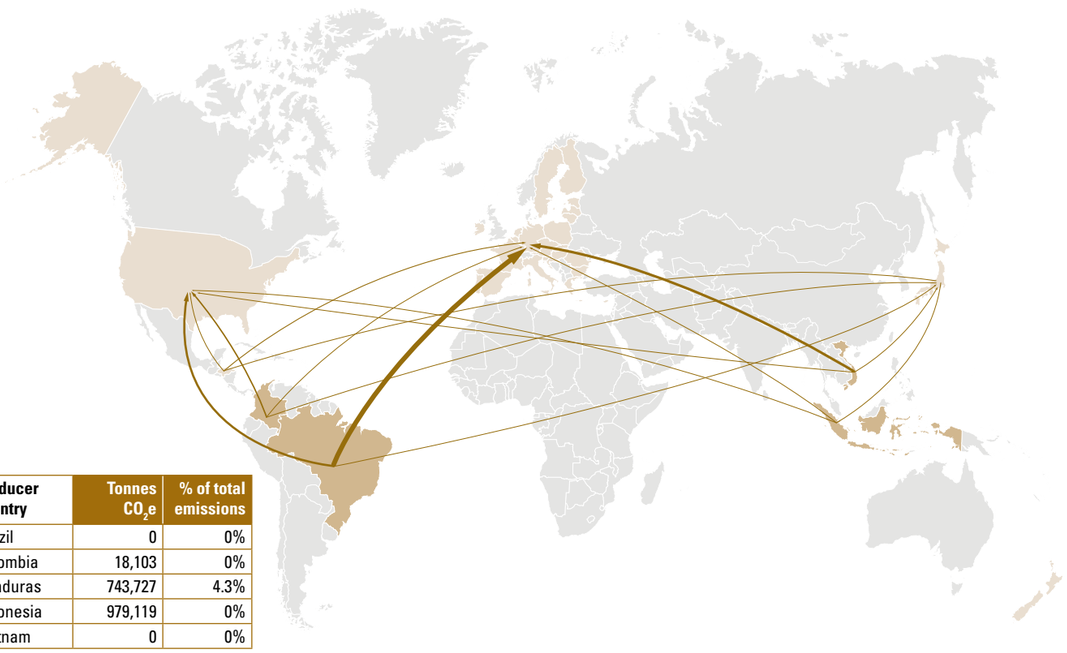
COCOA



Producer country	Tonnes CO_2e	% of total emissions
Côte d'Ivoire	18,611,403	34.0%
Ecuador	0	0%
Ghana	1,061,903	8.0%
Indonesia	1,628,814	0%
Malaysia	0	0%
Nigeria	4,406,030	1.1%

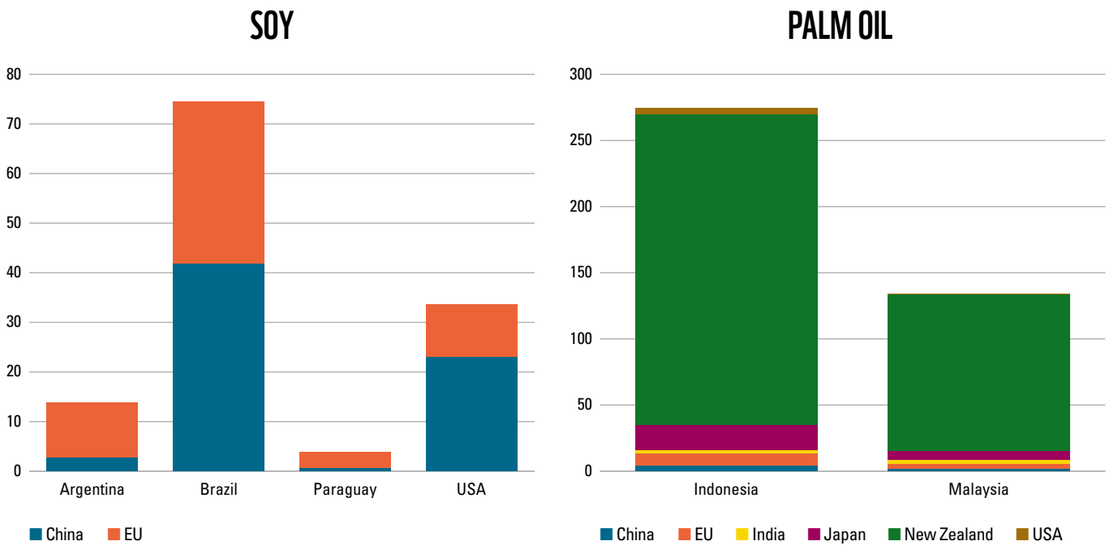
*Indonesia and Malaysia are both importers and exporters

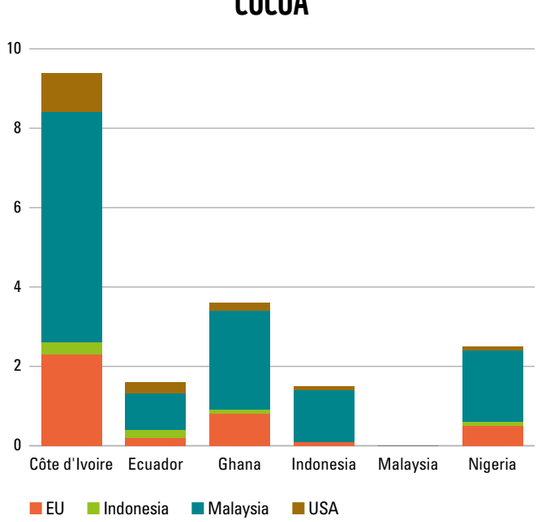
COFFEE

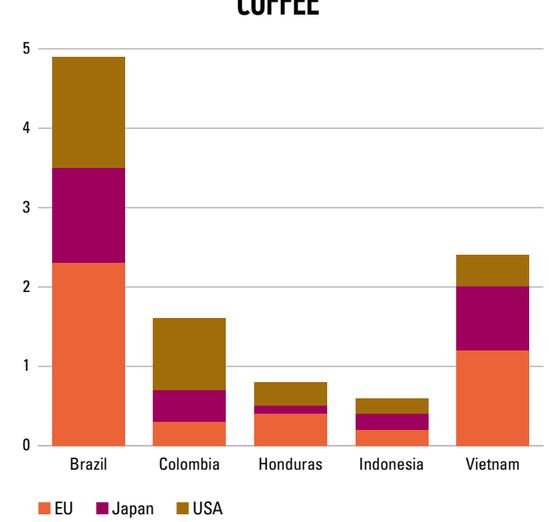


Producer country	Tonnes CO_2e	% of total emissions
Brazil	0	0%
Colombia	18,103	0%
Honduras	743,727	4.3%
Indonesia	979,119	0%
Vietnam	0	0%

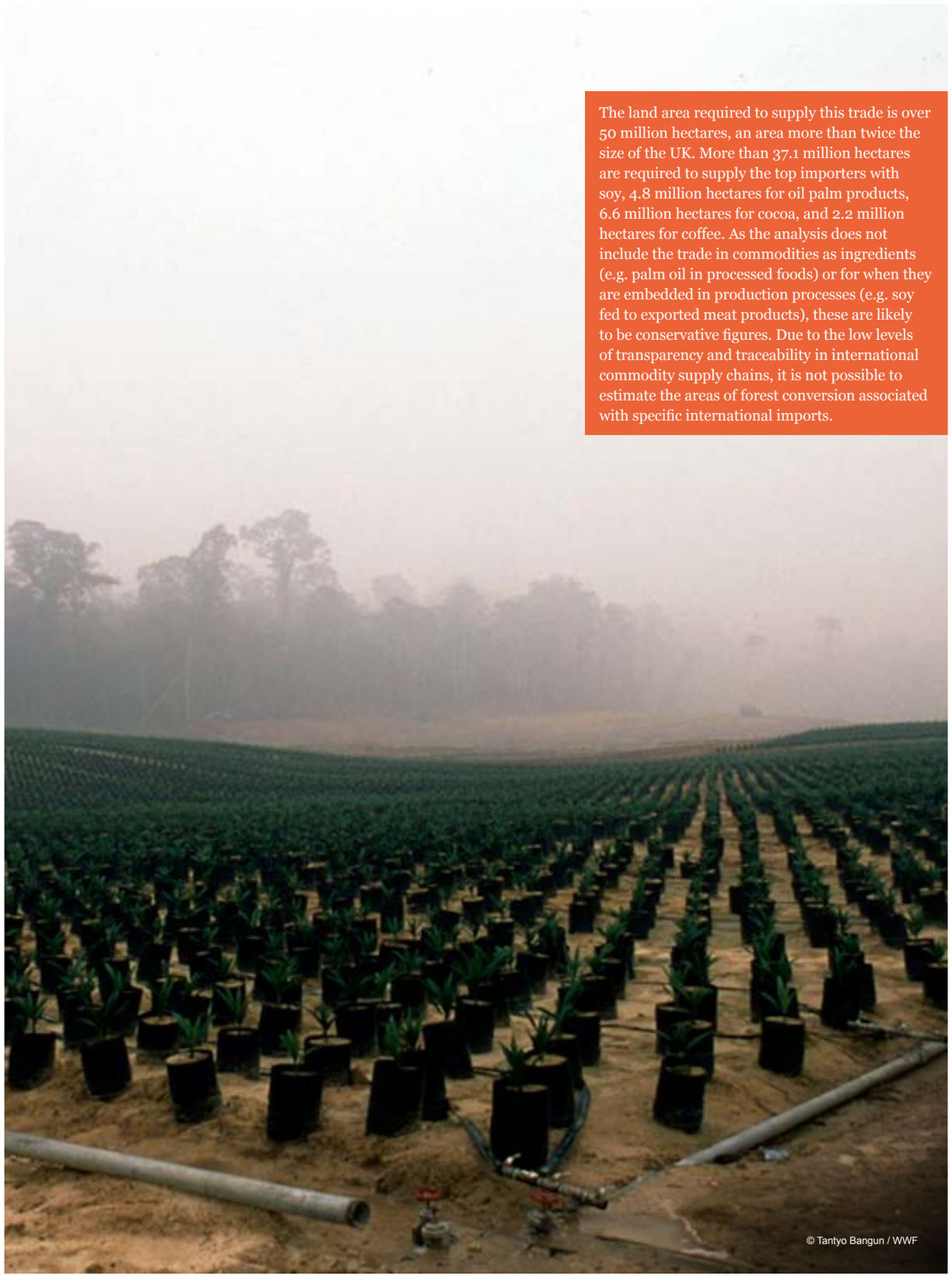
Figure 4: Trade flows between major producers and major importers of four deforestation and conversion-risk commodities, in kg imported per capita in 2021.







The land area required to supply this trade is over 50 million hectares, an area more than twice the size of the UK. More than 37.1 million hectares are required to supply the top importers with soy, 4.8 million hectares for oil palm products, 6.6 million hectares for cocoa, and 2.2 million hectares for coffee. As the analysis does not include the trade in commodities as ingredients (e.g. palm oil in processed foods) or for when they are embedded in production processes (e.g. soy fed to exported meat products), these are likely to be conservative figures. Due to the low levels of transparency and traceability in international commodity supply chains, it is not possible to estimate the areas of forest conversion associated with specific international imports.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EMBEDDED GREENHOUSE GASES

The GHG emissions associated with the conversion of natural ecosystems and changes in land cover for those trading nations that supply or import at least 3% of the four commodities amounted to almost 392 million tonnes CO_2e in 2021 (Table 5 and 6). More than 87% of this total is from soy, and nearly three-quarters (72%) is attributable to Brazilian soy. A further 5% is associated with Ivorian and Indonesian cocoa. At present the biggest importers of these with the market share of 95% of embedded GHG emissions are China and the EU.

Table 5: Estimated GHG emissions from land-use change embedded in exports and imports of four deforestation and conversion-risk commodities. Quantities are thousand tonnes CO_2e.

		IMPORTER								
EXPORTER	Commodity	China	EU	India	Indonesia	Japan	Malaysia	New Zealand	USA	**Export Totals**
Argentina	Soy	15,607	20,465							**36,072**
Brazil	Soy	226,691	56,440							**283,131**
	Coffee		0			0			0	
Colombia	Coffee		5			2			11	**18**
Côte d'Ivoire	Cocoa		11,644		904		2,222		3,842	**18,611**
Ecuador	Cocoa		0		0		0		0	**0**
Ghana	Cocoa		708		37		177		139	**1,062**
Honduras	Coffee		468			25			251	**744**
Indonesia	Cocoa		441				787		401	**19,869**
	Palm oil	5,341	3,842	3,194		2,169	1,605	1,110		
	Coffee		513			150			316	
Malaysia	Palm oil	898	795	1,500		373	131	253		**3,950**
	Cocoa		0		0		0		0	
Nigeria	Cocoa		2,876		410		833		287	**4,406**
Paraguay	Soy	1,664	3,455							**5,120**
USA	Soy	16,343	2,414							**18,757**
Vietnam	Coffee		0			0			0	**0**
Importer totals		**266,545**	**104,067**	**4,694**	**1,350**	**2,719**	**5,756**	**1,363**	**5,247**	
Commodity totals	**Soy**									**343,079**
	Palm oil									**21,211**
	Cocoa									**25,708**
	Coffee									**1,741**

CONTRIBUTION OF EXPORTED GREENHOUSE GASSES TO PRODUCER COUNTRY INVENTORIES

The methods used to estimate GHGs from land-use change here and in national GHG inventories are different, with different reporting dates, and so are not directly comparable (see Annex 1). However, they do provide a general picture of the likely importance of emissions embedded in trade to producer countries, and, by extension, the extent to which the trade in deforestation and conversion-risk commodities is likely to hinder their plans and targets to reduce emissions.

In some cases, the GHG emissions from land-use change that are embedded in exported soy, palm oil products, cocoa and coffee are significant contributors to the national emissions of producer countries (Table 5 and 6). In particular, soy exported to China and the EU comprises a significant part of the national emissions of Brazil, Argentina and Paraguay. Similarly, oil palm products exported to India, China and the EU are likely to make up a significant proportion of Malaysia's national emissions, as are cocoa from Côte d'Ivoire (particularly to the EU) and coffee from Honduras (exported primarily to the EU and USA). Under UNFCCC accounting procedures, these emissions are solely accounted for by producer countries.

Table 6: Estimated proportion of GHG emissions embedded in commodity trade with major trading partners. Proportion of national emissions (UNFCC)

		IMPORTER								
PRODUCER	Commodity	China	EU	India	Indonesia	Japan	Malaysia	New Zealand	USA	**Producer Totals**
Argentina	Soy	4%	5%							**9%**
Brazil	Soy	16%	4%							**20%**
	Coffee		0.0%			0.0%			0.0%	
Colombia	Coffee		0.0%			0.0%			0.0%	**0.0%**
Côte d'Ivoire	Cocoa		5%		0.4%		0.9%		2%	**9%**
Ecuador	Cocoa		0.0%		0.0%		0.0%		0.0%	**0.0%**
Ghana	Cocoa		3%		0.2%		0.7%		0.6%	**4%**
Honduras	Coffee		5%			0.3%			3%	**9%**
Indonesia	Cocoa		0.0%				0.1%		0.0%	**1%**
	Palm oil	0.4%	0.3%	0.2%		0.2%		0.1%	0.1%	
	Coffee		0.0%			0.0%			0.0%	
Malaysia	Palm oil	3%	3%	5%		1%		0.9%	0.5%	**11%**
	Cocoa		0.0%				0.0%		0.0%	
Nigeria	Cocoa		0.9%		0.1%		0.3%		0.1%	**1%**
Paraguay	Soy	2%	5%							**5%**
USA	Soy	0.3%	0.0%							**0.0%**
Vietnam	Coffee		0.0%			0.0%			0.0%	**0.0%**

Note that the percentages only indicate the general likelihood of importance of land-use change emissions from the commodities assessed (see Annex 1) and are not intended to be read literally.

NATIONALLY DETERMINED CONTRIBUTIONS

As shown above, consumer countries in effect "outsource" significant emissions from land-use change to producer countries. In turn, this means that producer countries' GHG emissions reductions, as determined by their NDCs, have to be achieved in spite of emissions from land-use change that are embedded in exports.

Table 7 illustrates the diverse ways in which emissions from land-use change – including those embedded in exports – are dealt with by producer countries in their NDCs. At one end of the spectrum, Honduras explicitly excludes emissions from land-use change from its NDC targets.[267] That means that the country can, in theory, continue to export commodities associated with deforestation without any impact on its attainment of its NDC. This would, however, mean that its overall emissions would be higher than any progress towards its NDC would suggest.

At the other end of the scale, Colombia's NDC includes an explicit target to reduce the rate of deforestation to 50,000 hectares per year in 2030, with a complementary target of reducing deforestation of natural forests to zero by 2030.[268]

Other countries fall between these two poles. Argentina,[269] Ghana[270] and Malaysia[271] include land-use change within their national target, but do not have a specific target for land-use change emissions reductions. Ecuador,[272] Nigeria,[273] the USA[274] and Vietnam[275] all include emissions from land-use change within their NDC target. The focus is on increasing (net) forest area and/or restoring forests, with no specific target for reducing deforestation. Honduras, despite excluding emissions from land-use change from its NDC target, has similar policies. By contrast, Indonesia has a specific emissions target for land use, land-use change and forestry, aiming to turn the sector into a net carbon sink by 2050.[276] However, this is a net outcome, with no specific limit on deforestation. Finally, Brazil's NDC does not include an overall target for emissions from land-use change, but does target eliminating illegal (though not all) deforestation.[277]

Table 7: Coverage of deforestation in producer countries' NDCs

Country	Commodities	LULUCF excluded from national emissions reduction targets	No specific LULUCF target, included in economy-wide target	Target for increase forest area/restore forest, no deforestation target	LULUCF emissions target, no deforestation target	Action on deforestation without emissions target or area target	Target on deforestation (area or emissions)
Argentina	Soy		✓				
Brazil	Soy, coffee					✓	
Colombia	Coffee						✓
Côte d'Ivoire	Cocoa				✓		
Ecuador	Cocoa			✓			
Ghana	Cocoa		✓				
Honduras	Coffee	✓		✓			
Indonesia	Palm oil, coffee, cocoa				✓		
Malaysia	Palm oil, cocoa		✓*				
Nigeria	Cocoa			✓			
Paraguay	Soy					✓	
USA	Soy			✓			
Viet Nam	Coffee			✓			

* Note that Malaysia's NDC target is a relative reduction in emissions, not an absolute one

CONCLUSIONS

Put simply, if we are to overcome the twin challenges of biodiversity loss and climate change, agriculture and forestry have to become decoupled from deforestation and conversion. A significant proportion of the emissions from deforestation and conversion are embedded within trade, with importing countries around the globe in effect offshoring the deforestation and GHG emissions of their own consumption. We need to look to large-scale importing nations to seek better ways to produce and source our food to support developing producer countries in meeting their sustainable development and climate goals, by creating pathways to create a just transition to more regenerative agricultural and land management practices and responsible trade.

Forests, savannahs and other natural ecosystems continue to be converted at an alarming rate in order to produce commodities that directly or indirectly form part of our diets. This deforestation and conversion puts habitats, species, environmental services and the livelihoods and well-being of Indigenous Peoples and local communities at risk.

From a global perspective, the GHGs from land-use change that are embedded in the international trade of commodities such as soy, palm oil products, cocoa and coffee are, by any measure, significant. These embedded emissions are likely to be a non-negligible contributor to national emissions in countries such as Brazil, Argentina, Malaysia, Côte d'Ivoire, Paraguay and Honduras. Yet analysis of the NDCs of producer countries shows that few are explicitly attempting to reduce or eliminate deforestation associated with land-use change.

Importers from highly developed regions, such as the EU and China, are the major destinations for these embedded emissions and can play a critical role in supporting and enabling sustainable green economies. Yet, under UNFCCC GHG accounting procedures, they do not have to report on emissions embedded within their imports – this is the sole responsibility of producer countries. Importing countries could argue that the finances generated by this trade should allow producer countries to invest in reducing their national emissions, reducing deforestation, protecting and restoring forests. However, the evidence that the trade in deforestation and conversion risk commodities has positive impacts on nature and people is scant (or negative), and any economic gains are concentrated, with many stakeholders gaining little if at all.[278]


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There are currently no global mechanisms that require nations to address their imported emissions. However, for companies – who do the heavy lifting of the international commodity trade – a number of voluntary initiatives exist that facilitate the measurement and reporting of emissions in their international supply chains. These include the Greenhouse Gas Protocol, the Task Force on Climate-Related Financial Disclosures and the Science Based Targets initiative, all of which include at least the option and tools for measuring and declaring Scope 3 (i.e. supply chain) emissions. Regulatory measures are also emerging, most prominently the EU Deforestation Regulation,[279] which will in effect make it illegal to place certain products that are associated with deforestation on the EU market, and which requires major companies to undertake comprehensive due diligence to ensure that the products they sell have not been produced at the expense of forests.

Some of the key actions going forward will include:

- Elevating the existing targets on supply chain sustainability into binding and funded global commitments, with concomitant rules for private sector actors.
- Continued effort to verify forest-risk commodities are not driving deforestation nor conversion, across all markets.
- Effectively supporting the transition away from deforestation and conversion in producer countries, through initiatives such as the FCLP country packages. Funding could be based on the social cost of carbon emissions associated with a country's imports, or an equivalent mechanism to the EU's Carbon Border Adjustment Mechanism for energy-intensive imports.
- Transformational shifts in the demand for deforestation and conversion risk commodities in importer countries, such as reducing the consumption of animal-based protein.

TECHNICAL SECTION 3.1

EMPTY FORESTS

"We must not let a forest full of trees fool us into thinking all is well"[280] *– The abundance of 1,428 observed populations of 343 forest specialist species monitored across the globe declined by 79% on average between 1970 and 2018.*[281]

The empty forest phenomenon was first written about in western scientific literature in 1992 and described concern over the observed loss of large mammals from tropical forests, even where the forest looked otherwise abundant and healthy.[282] Over time, more and more observations have revealed that we cannot assume forest cover is an accurate representation of forest health, particularly in terms of wildlife and the ecological processes and functionality it supports. A first iteration of the Forest Specialist Index revealed a lack of correlation between trends in forest cover and forest specialist wildlife populations.[283] An ongoing forest challenge is found in the focus of global biodiversity policy (KM-GBF) on forest cover change without a similar focus on metrics of biodiversity below the canopy.[284]

Tropical forests are the most biodiverse of all terrestrial biomes in terms of vertebrate diversity, harboring more than half of global terrestrial vertebrate species.[285] Three decades on from the coining of the term "empty forests", trends indicate a 53% (±16.1%) decline in faunal species richness and 62.5% (±28.5%) decline in population abundance across the tropics.[286] If these trends continue, the tropical forests of the future could be much smaller, simpler and emptier than they are even today.[287]

Land-use change and degradation have been found to be the primary drivers of the decline in forest vertebrate populations, closely followed by overexploitation. In an assessment of tropical mammal distributions over time, land-use change was found to be the main driver of reduced distribution, but hunting pressure caused additional reductions specifically in large-bodied species'.[288]

Climate change, disease and invasive species compound and amplify these threats, reducing and fragmenting population sizes and driving species into an extinction vortex. Complicating this further, the loss of certain species is known to trigger the extirpation of others through co-extinction.[289]

The loss of wildlife from forests is a form of degradation that is both more cryptic and more pervasive than the forest loss we can see from satellites. Ignoring or underestimating the critical functional roles that wildlife plays in driving ecosystem processes poses risks to our climate and nature restoration targets.[290,291,292]

WHY FORESTS ARE EMPTYING

The removal of forest wildlife is not just historical, it continues – and this latest wave of defaunation is particularly dangerous because of the weakened state of many forest ecosystems.

Habitat loss, fragmentation and degradation continue to be primary drivers of wildlife loss and are the focus of most of the text of *Forest Pathways*. However, hunting also continues in forests that remain relatively intact, and evidence shows hunting drives declines in abundance and distribution of forest vertebrate populations and can lead to species loss.[293]

Meanwhile, the removal of management rights and marginalization of traditional forest owners, IPs and local communities, is not only driving forest loss and fragmentation[294,295,296] but also has further amplified overexploitation.[297] Miners and loggers, often brought in by companies, can also add to the toll on wildlife.[298] A major impact is seen both from inward migration, but also from the access provided to previously remote areas and readily available transportation to transfer meat and other wildlife products to markets. In many forests these are key factors underpinning the expansion in wild meat offtake over recent decades.[299,300]

Early iterations of the empty forest issue focused primarily on hunting by forest dwellers.[301] Thirty years on, studies highlight overexploitation, primarily linked to the expansion of commercialized hunting, as a key driver, alongside factors such as habitat loss, wildfires, wildlife disease, human-wildlife conflict, mesopredator release and the proliferation of exotic species.[302]

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COMMERCIAL OVEREXPLOITATION

IPs' community-based livelihoods are usually compatible with ecologically functional populations of tropical forest game species, due to low hunting offtake and low human population densities.[303] However, more than 40% of (western scientific) studies on defaunation cite overexploitation as the leading cause, predominantly for large-bodied mammals in the tropics.[304] Wildlife is removed from forests for a number of reasons including subsistence hunting and trade in commercial meat,[305] pets, medicine and other wildlife products. It is important to recognize the distinction between sustainable practices associated with low hunting offtake and commercialized overexploitation.

While a lack of management rights for traditional peoples is an exacerbating factor, traditional forest dwellers have hunted for millennia; the problem is that in addition to immigration from miners and loggers, many local populations are growing. These growing communities are often impoverished, often now have guns, and today have a lucrative market in many cities. This is not laying blame; many forest dwellers are among the poorest people on Earth and are badly mistreated. Many cultures were deeply altered and harmed by colonization, and many are simply continuing a traditional practice in changed circumstances.

Hunting for subsistence by forest-dwelling peoples was the norm for millennia, and wild meat remains an important source of protein especially for the rural poor in the tropics,[306] but hunting for markets has made the practice unsustainable. The sheer expansion of the hunting footprint in recent decades, due both to greater subsistence needs and the rapidly emerging wild meat trade for urban consumption, has accelerated overhunting.[307] Globally, the commercial wild meat trade is threatening more than 300 terrestrial mammal species.[308] The increasing commercialization of wild meat, demand from growing urban populations, accessibility to previously remote forests, and efficacy of hunting weapons are combining to generate unsustainable hunting rates in a landscape where IPs and local communities are often dispossessed of their traditional lands and unsupported in governing them sustainably.[309,310]

Commercialized market hunting has detrimental impacts on species and broader biodiversity, and on the livelihoods and well-being of forest-dependent IPs and local communities. In the Amazon and Congo Basins, hunters are removing more than 6 million tons of meat annually.[311] African forest species are at a heightened risk; observed trends in trade and consumption suggest an imminent reduction of large-bodied herbivores and their predators,[312] and over half of all forest species threatened by overexploitation are African primates.[313] The loss of large-bodied wildlife has also recently

been shown to degrade ecological processes in tropical forests that sequester and store carbon.[314] Authors elsewhere describe the range of carbon and climate-connected ecological processes and functional roles that wildlife deliver as “animating the carbon cycle”, and argue they should be better considered in defaunation risk, as well as natural climate solution support.[315]

Despite Covid-19’s demonstration of the potential risks from zoonotic diseases, illegal wildlife trade is estimated to have increased between 2020 and 2021.[316] Demand for the “ivory” casques of the helmeted hornbill has risen sharply in recent years;[317] the trade in live primates has steadily increased since 1995 with many suspected to be wild-caught;[318] social media platforms have enhanced the attraction and facilitated the acquisition of wild animals as pets;[319] and as the demand for traditional medicines grows, so too does the demand for wildlife products sourced from threatened species including wild tiger, pangolin and Asiatic black bear.[320]

Southeast Asian songbirds are another targeted group. Songbirds are mostly harvested from the tropical forests of Java, Borneo, Sumatra and Peninsular Malaysia. One-third of Java’s 36 million households keep between 66 and 84 million birds; they may outnumber birds in Indonesia’s forests.[321] Approximately one-third of the world’s bird species are traded as pets or products.[322]

WHY IS DEFAUNATION A BIG PROBLEM FOR FORESTS?

The extinction of 97 genera of large animals during the Pleistocene offers us clues:[323] not only did these losses impact nutrient cycling in the Amazon, globally they had significant effects on the structure of different ecosystems,[324] seed dispersal and land surface albedo.[325] Large wild species contribute to pollination, herbivory and the production of soil organic matter.[326] Without seed dispersers, tree recruitment drops[327] and carbon storage is diminished.[328]

Elephants play a huge role in forest disturbance regimes and seed distribution; some large seeds require passage through an elephant gut to germinate.[329] The avocado fruit co-evolved with South American elephants and giant ground sloths; after their extinction the only extant species large enough to disperse avocado seeds were humans.[330] The loss of African forest elephants is now leading to a wave of tree recruitment failures, favoring regeneration of the species-poor wind- and water-dispersed guilds of trees.[331] Loss of top predators can cause trophic cascades resulting in unregulated growth of herbivore populations and overgrazing, inhibiting forest regeneration, or domination of forests by unpalatable plant species.[332,333]

The spiritual and cultural values of empty forests are greatly diminished as many species have sacred values to particular human cultures,[334] and there is a strong argument to be made for the rights of biodiversity (species, ecosystems and the evolutionary potential) to a continued existence.[335]

CONCLUSIONS

Progress in understanding the defaunation crisis forests face has been made since the early defining work on the empty forest issue, but greater action is needed if forest wildlife successes are to become a regular feature of endeavors to restore nature. We also note extremes of viewpoint over the relationship between hunting and defaunation, expressed through wider debates about the landscapes of the wild meat trade, which point to the highly contentious and politicized nature of wildlife use and management.[336] Moreover, we note that there is no reliable information on the scale of the international wild meat trade.[337]

Within wider conservation practice it is now recognized that a complex set of interconnected positions have driven us to the current position of declining forest specialist species. If we look solely through a lens of large mammal species in tropical forests, commercialized overhunting drives losses. However, as soon as global forests and a wider range of forest specialist species are considered, a broader range of macro and landscape-level drivers comes into play – unsustainable food systems, climate change and wildfire degradation of forestscapes, habitat fragmentation, human-wildlife conflict, and the broader infrastructure pressures forests face all play a part. Infrastructure expansion into forested ecosystems brings with it exploitation of previously inaccessible populations of wildlife.[338] Restoring the ability of wildlife species to move and interact with other species across landscapes and seascapes is vital to enabling wildlife to fulfill its functional roles in ecosystems.[339] Improved forest governance and full recognition of the land tenure rights of IPs and local communities is needed, along with implementation of the rule of law around wildlife use and trade.

In tracking forest recovery globally, leaders must acknowledge that tree cover is not a proxy for biodiversity and that measuring ecological diversity is complex.[340] Advances are being made with the inclusion of forest quality and wildlife metrics into the Forest Declaration Assessment. The Forest Specialist Index[341] and the Spatial Monitoring and Reporting Tool (SMART)[342] provide two solutions to these challenges.

As the dominant hunting driver has shifted to be focused on commercialized hunting for urban centers, social marketing approaches that aim to reduce demand for wild meat and other wildlife products, particularly in urban centers, are necessary alongside holistic approaches for diversified and sustainable livelihood options for forest-dependent communities that support sustainable wildlife use.[343]


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TECHNICAL SECTION 3.2

FOREST POVERTY

POSITIONING FOREST POVERTY

As Indigenous Peoples and local communities are rightly making their voices heard in negotiations and discussions around climate and environmental policy and goals, western definitions of poverty become problematized. The UN Strategic Plan for Forests, Global Forest Goal 2[344] aims that "extreme poverty for all forest dependent people is eradicated". However, this perception intersects with those of Indigenous Peoples and local communities whose 'wealth' status may be poorly defined by economic valuations, which ignore the full livelihood/economic potential and multiple non-economic values their forest territories hold. Whilst a resolution to this debate is beyond the scope of this report, we highlight it as an important point of intersectional reference when considering the concept of forest poverty within our global forest goals. We point to wider literature on the geographies of poverty, which provide a constructive challenge to embedded, reductionist, income-poverty definitions, or poverty measured in terms of GDP or 1US$/day. Through these geographies, the poverty experience of those who depend on forests might instead be explored as local, diverse, complex and dynamic[345], providing a useful lens through which to reframe global forest hegemonies to be grounded in localized perceptions of wealth, rights, values and knowledge.

INTRODUCTION

Although recent and authoritative numbers are thin on the ground, around 1.6 billion people are estimated to live close to forests and woodlands globally,[346] with a similar number loosely defined[347] as "forest dependent".[348] It is likely that around 1 billion of these people are living in extreme economic poverty, around 80% of all the world's extreme economically poor.[349] More specifically, the poorest segments of societies around the world are principally engaged in non-timber forest product extraction.[350] Even allowing for the approximate nature of the estimates, forests and poverty are clearly connected. What is the nature of these connections, and what are the consequences?

The first part of that question has often been characterized as whether people living in economic poverty are dependent on forests because they are poor (or indeed driven to forests through lack of access to other resources), or whether dependency on forests keeps poor people in poverty.[351]

Given the diversity of people who are to some extent[352] dependent on forests and woodlands for their livelihoods, and the diverse ways that they use forests, it is perhaps unsurprising that there is evidence for both positions.[353] Generally, though, forests provide a pathway out of poverty only when high-value goods can be marketed or ecosystem services monetized – and in both cases only if the benefits accrue to the people dependent on these resources.

However, a binary characterization of the issue typically focuses on *income poverty*, which omits consideration of other critical factors that are increasingly understood to determine livelihood outcomes. Livelihood outcomes are determined by natural, social, human and physical assets, as well as financial capital, and by externalities such as policies, institutions and the context of shocks and disasters.[354]

Furthermore, a focus on income poverty does not consider other dimensions of poverty. People living in poverty often lack not only income, but education, health, justice, credit and other productive resources, and opportunities.[355] The extent to which forest-dependent people have access to these wider aspects varies. However, a general picture emerges of the importance of forests in providing food security for those who dwell in or close to them, either directly through harvesting plants and animals from the forest or indirectly through the ecosystem services that forests provide to agriculture.[356] On the other hand, the land tenure and use rights of forest-dependent people are often fragile.

Equally important are the cultural, spiritual and other values that forests provide to many people,[357] and local knowledge of forests.[358] Ecological knowledge is particularly rich among Indigenous Peoples, of whom an estimated 200 million are forest-dependent[359] and who are found to be among the (economically) poorest people across all geographies.[360] Indigenous ecological knowledge not only contributes significantly to the western scientific understanding of forests,[361] but it is also becoming increasingly recognized as being part of the solution to our global biodiversity and climate crises.[362] Indigenous lands account for less than 22% of the world's land area but contain an astonishing 80% of the world's biodiversity[363] and hold 35% of the world's remaining "intact" forests.[364] Yet the rights and tenure security of IPs and local communities to use forests is often threatened, sometimes violently.[365]

The interactions between forest-dependent people and forests are not always as simple as the assessments of Indigenous lands suggest. For example, local communities have become major drivers of deforestation associated with oil palm in


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Indonesia[366] (see Box 1) and cocoa in Côte d'Ivoire, Ghana, Cameroon and elsewhere – and most of them continue to live in poverty.[367] For the rural poor, converting forests may increase incomes, but it does not consistently provide a path out of poverty.

The complexity of the relationships between poverty and forests, and the diversity of forest-dependent people, mean that apparently simple solutions often fall flat, or worse, have the opposite impact to that intended. For instance, it is widely assumed that increasing smallholders' yields will provide them with additional income, and as a consequence, that they will have a reduced need to convert forest to agricultural plots.[368] In fact the opposite is often true, especially in areas where large areas of forest remain intact (and land rights are less codified): increased income can provide more resources for poor people to convert forest[369,370,371] in economies where exploitation of forest resources is the norm for economic growth, often artificially supported by forest-harming subsidies.[372]

Ultimately, the future of forests will to a significant degree depend on the model of poverty alleviation that is chosen. At the two ends of a spectrum we might consider an argument to support methods that alleviate income and food poverty at the expense of forests (essentially the prevailing norm), or approaches that place value on standing forest allowing retention alongside income generation. Schemes such as project finance for permanence (PFP) via protected areas initiatives[373] are highlighted as means to support forest peoples in protected areas through job creation and income generation schemes.[374] However, because protected areas limit agricultural development and exploitation of natural capital there is an assumption that they could limit income, while isolated studies have found no evidence that protecting forests has exacerbated local poverty.[375] Similarly, payment for ecosystem services (PES) schemes are obvious candidates for providing value from forests for local communities[376].

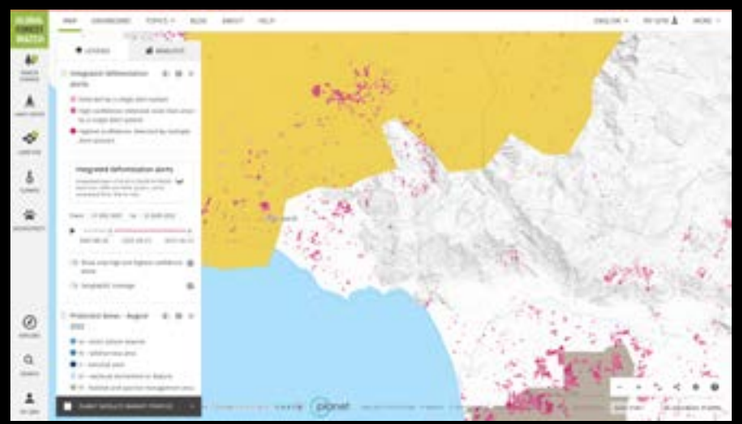
There are likely to continue to be trade-offs between people, climate and nature as we move towards not only our 2030 forest goals, but also towards fuller implementation of the Sustainable Development Goals and climate targets. Policies and practices which seek co-benefits for forests, people and climate are likely to be most successful in meeting these multiple objectives. Approaches such as the Forest and Climate Leaders' Partnership (FCLP) country packages aim to work with IPs and local communities to ensure that they receive a greater share of forest finance[377] (and see our Case Study on Koala Friendly Carbon). These identify and mitigate trade offs while providing pathways to more equitable sharing of forest finance, pointing to a way to balance the trade-offs between poverty and nature, but they are set against significant opposing finances (see Section 1.2) and will require significant support and expansion. Furthermore it is not a question of finance alone: IPs and local communities hold rights to forests, and partnerships should fundamentally acknowledge that by taking a human rights-based approach, which includes the rights to self-determination, participation, access, obtain benefits, and sociocultural diversity.

Box 1: Palm oil smallholders in Indonesia

Smallholders account for an estimated 23% of all deforestation in Indonesia,[378] and 36% of oil palm related deforestation (Figure 6).[379] The area cultivated by smallholders has seen a massive expansion,[380,381] Sumatra in particular has a strong smallholder presence[382] and some of the highest rates of deforestation in Indonesia[383] (see Section 1.4).

Figure 5: Ketapang tree cover loss (2001-2011), sharp edges for several kilometres and right angles more typical of large concessions[384]

Figure 6: Integrated deforestation alerts (pink) in the north of the Rawa Singkil Wildlife Reserve (grey), Sumatra, from December 2021 to June 2023. Patches are odd-shaped polygons and less than half a kilometre wide – more characteristic of smallholders.[385]



This story is complicated. At 50 hectares, the official cut-off for a smallholding is large, making "smallholders" a mixed group: from very poor people to wealthier, more powerful individuals, often political elites.[386] Many smallholders are under political pressure to develop land.[387] Pushed out to marginal land, smallholders often clear and plant on peat swamps[388] or steep banks – planting such unproductive land is devastating for conservation and generates poor returns for farmers.

Smallholder palm is highly unregulated,[389] allowing so-called "leakage" of deforestation-associated palm oil into zero deforestation supply chains. The country's leaders often use poor smallholders as a defense against efforts made by importers to ban deforestation-associated oil.[390] The EU's new regulation aims to eliminate deforestation and degradation from consumer goods;[391] this may exclude non-legal smallholders but could also improve smallholders' positions in the global marketplace.[392]

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TECHNICAL SECTION 3.3

PROTECTED AND CONSERVED AREAS

In 2022, 1.2 million hectares of forest was lost in forest key biodiversity areas. FDA 2023[393]

BACKGROUND

Protected areas (national parks, nature reserves etc.) are, if properly resourced and managed, proven cornerstones of successful biodiversity conservation.[394,395] Moreover, this is one key area where the world has (at least on land) met its pledges by quantity if not consistently by quality, with a gain in protected areas since 2010 of 22 million km².[396] Area-based conservation is critical to mitigating current threats to forests from land conversion (which can involve illegality)[397] and from forest degradation.[398]

Six protected area management categories are recognized by IUCN, including strict protection with restricted human access to long-established, biodiversity-rich cultural landscapes, which can include settlements, farms and forestry.[399] Four governance types are also recognized by IUCN (2008) and the CBD, and include government and privately governed protected areas, ICCAs governed by IPs and local communities, and a variety of shared governance models.[400] There has been a gradual broadening from state-governed protected areas to more pluralistic governance types and a wider range of management approaches; all are useful for conservation although the relative effectiveness of different approaches is very context-specific. Management effectiveness remains poor in a proportion of protected areas. Government rollbacks, labeled protected area downgrading, downsizing and degazettement (PADDD), are increasing in places – as for instance in the logging of Białowieża National Park and natural World Heritage site in Poland, one of the most intact forests in Europe.

As threats to global forests have changed over time, approaches to area-based conservation have also been adapted. In 2010 another type of area-based conservation was recognized by the CBD: other effective area-based conservation measures (OECMs).[401] There are several reasons why areas that deliver important in-situ conservation outcomes may not be recognized and reported as protected areas: they may be delivering ancillary or secondary conservation, or they may qualify as a protected area but a) may not be able to be recognized or reported as protected areas under (sub)national laws and policies, or b) rights-holders may not wish their areas to be declared as protected areas.[402] Governments are struggling with identification and recognition of OECMs, although more than 800 are already listed on the World Database of OECMs.[403] OECMs can provide a new opportunity outside of protected areas to advance the conservation impact agenda.[404] Together, protected areas and OECMs are often called "protected and conserved areas".

Roughly 17% of the global land surface is now in a protected area or OECM,[405] with a target under the CBD Global Biodiversity Framework (GBF) of reaching 30% by 2030 (30x30). Most additional areas will probably be OECMs.[406] Estimates for total forest protected areas are approximate. In 2009 the best estimate was 13.5% of global forests;[407] by 2014 the UNEP World Conservation Monitoring Centre estimated 20.1%,[408] but in 2015 FAO again suggested slightly less,[409] and in 2022 FAO estimated 18%[410] – but only counting those officially designated (i.e. not all Indigenous or privately managed protected areas). A reasonable estimate is 18-20%. It therefore seems likely that to meet 30x30, at least 10% of global forests should be integrated into area-based conservation, and more if ecological representation is taken seriously – a huge task.


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Which forests to protect?

Governments sometimes set up protected areas in politically expedient places rather than those best for biodiversity. Consequently, new protected areas under the 2010 Aichi targets did not achieve as much as was hoped in terms of real protection for biodiversity.[411,412] Many site selection methods have been developed, e.g., Key Biodiversity Areas,[413] software such as Marxan,[414] systematic conservation planning,[415] and gap analysis.[416] There is a growing focus from conservation professionals on the most endangered forests.[417] The oldest and least disturbed forests usually have the highest conservation values, and many definitions exist – primary, old-growth, intact[418] etc. However, the best sites for nature are often good for other uses, so that in particular lowland forests remain at high risk of degradation or conversion. Selection may increasingly be influenced by the potential for carbon sequestration and storage, including irrecoverable carbon,[419] which may not always match biodiversity priorities. The more flexible approaches offered by OECMs helps by increasing the range of management considered for area-based conservation.

What is allowed?

While IUCN has guidance about what, depending on their management category, should and should not occur in protected areas,[420] governments set national regulations and rights-holders often have some leeway to decide in individual sites: practices vary. Some protected areas allow e.g. logging and heavy visitation, undermining biodiversity, while climate change and human actions such as poaching or mining can create an "empty forest".[421] There is no global assessment of management effectiveness in forest protected areas. Improving effectiveness[422] – often changing management and/or enforcement – can be as important as increasing the area conserved. In OECMs, where strategies are developing, debates are intense. The forest industry claims many managed forests should be recognized as OECMs, drawing criticism from conservation NGOs.[423] The potential for specific forms of sustainable forest management (continuous cover, reduced impact logging etc.) to be recognized as OECMs is undecided, as is the possibility of including unmanaged lands in forest estates.[424]

How to measure success?

There is experience in site-level management effectiveness assessment with tools like the Management Effectiveness Tracking Tool (METT),[425] as well as a growing range of social impact measures.[426,427] Challenges remain in measuring biodiversity outcomes at global scale,[428,429] although many local studies exist.[430,431] Remote sensing gives data on cover and connectivity but says little about species. Camera traps and audio monitoring can help, as can enlisting local monitors with traditional ecological knowledge.[432] OECMs are complicated. Because they are defined by effectiveness, in theory they are no longer recognized if biodiversity declines. Monitoring is critical for all sites and is challenging, particularly for OECMs, which are not usually managed by conservationists – who does the monitoring, who pays, and how is this done?

How to manage under climate change?

Area-based conservation has been a static conservation tool; the whole point is to set aside an area "in perpetuity". But we know that climate change means ecosystems are changing and some protected areas may soon no longer contain the values they were set up to conserve.[433] There is evidence that healthy, diverse forests will be more resistant to climate change than degraded, fragmented forests,[434] and that healthy ecosystems will be more conducive to allowing movement of species due to climate change.[435] But these are only partial solutions: thinking through how to adapt a static conservation system to a fluid period of change is now an urgent priority.[436]

How to ensure social equity (and address past mistakes)?

It is well known that creation of some, perhaps many, protected areas involved the expulsion of people from their lands; often the poorest and politically weakest, including IPs.[437,438] Today there are safeguarding measures to prevent this by many governments, NGOs and the global community, although abuse still occurs and national laws do not always match the voice of global pledges, or have sufficient robustness at implementation. The GBF has set out strong conditions on human rights.[439] New protected areas and OECMs should only be established with the consent of the rights-holders and people inhabiting the areas. These demands go alongside a hugely ambitious timetable. If done correctly, 30x30 will strengthen rights, particularly of Indigenous land tenure, but there are many ways in which it could do the reverse; getting this right is perhaps the key challenge in the whole GBF.[440]

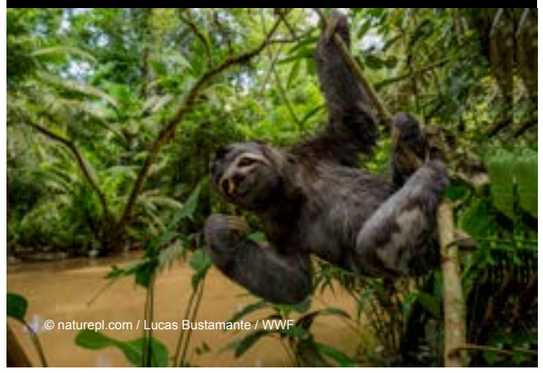
How do protected areas help against the current picture of forest threats?

In the first decade of the 21st century, strategies of many conservation NGOs and donors focused on expanding protected areas, particularly into remaining intact tropical forest, and strengthening inclusive management and governance, and conservation in existing areas. But over the last decade threats in tropical forests have taken on new complexity. For example, the narcotics trade has both increased deforestation from infrastructure (e.g. landing strip construction) or by seizing remote land to launder profits,[441] and also decreased[442] deforestation in different situations. Stakeholder priorities therefore differ with place and circumstance. For instance, while some communities want more open, less strictly protected areas, other communities see strict protection status as a bulwark against incursion by mining, logging and agriculture.

LAND REGISTRY SYSTEMS

Land planning authorities have for many years designed their cadastre system in order to mitigate the risk of land grabbing. While the proper rule of law and strong governance are additional conditions required for the system to work, in principle a strong land designation system that includes protected area status serves to build a powerful framework that can resist some of the intricacies of the land grabbing phenomenon.

- Land designation improves clarity and transparency, making it harder for criminal networks to claim ignorance of the designated purpose and grab land for other uses.
- Protected area status or land designation that includes legal protection empowers the regulatory framework to mitigate corruption.
- Public ownership and management allows governments to have more control over their territory, especially in those remote areas where massive deforestation and conversion is happening.
- Better monitoring and enforcement capacities make it easier to follow judiciary and security procedures when on designated land, unblocking government processes that can penalize actors grabbing land (i.e. properly designated land gives judges better tools to decide on their sentences and better investigative tools for the prosecutor's office to bring a case to court).
- Indigenous Peoples and local communities are empowered by protection, where rights are recognized and respected, as it gives them a powerful tool to resist land grabbing.
- Protected areas and OECMs also help bring potential new funding. After WWF raised this issue in Colombia, the UK government agreed to increase funding for capacity-building processes in the justice and security sectors, including registry offices, notaries and land superintendence agencies to better monitor and enforce land designation.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Is there a third way?

At the Montreal CBD Conference of Parties (COP) in 2022, Indigenous Peoples' groups argued that Indigenous and traditional territories should be eligible for contribution to the 30x30 target outside protected areas and OECMs. The final wording of Target 3 is ambiguous and still under discussion; some people interpret it as supporting this position, others not. At present, the headline *indicator* for the target is only for coverage of protected areas and OECMs, but future COPs could change this. Agreeing a third way will take time – maybe years – because criteria would be needed to determine what makes an Indigenous territory eligible for such recognition. This is complex, highly sensitive, and a debate likely to run for some time. Interpretation may take place at a national level, with countries taking different positions on this issue.

Is the area-based conservation model still fit for purpose?

There is not one model for area-based conservation but a plurality – of both management approaches and governance types. Over the past two decades, the contribution of Indigenous Peoples and local communities has been increasingly recognized. Finding an approach that works in a particular situation requires careful research and often lengthy negotiation, and a thorough understanding of what might provide a sustainable model. Despite efforts to raise funds through PES schemes, ecotourism and similar, most protected areas rely on support from states, civil society or the people living inside or nearby. Many pressures – economic, social, demographic and climatic – will increase. There are signs of governments and others walking away from commitments, both in terms of funding and political support.[443] Expanding the conservation estate is a huge challenge, but holding onto what we have may also face significant challenges. Different governance models, funding approaches and societal attitudes are all needed if 30x30 is not only to be achieved but also sustained.


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TECHNICAL SECTION 3.4

RETURNING FORESTS – PATHWAYS TO GLOBAL FOREST REGENERATION

Current ambitious global goals for natural forest restoration, most recently highlighted in Target 2 of the CBD Global Biodiversity Framework, are not matched by actual regrowth, which is estimated to be 50-60 million hectares of forest since 2000. Plantation forests cover another estimated 131 million hectares, 44% of which are made up of non-native species. Although there are optimistic plans to increase the area of forest, a number of problems, old and new, make major reforestation challenging. Restoration goals are hampered by climate change and land-use demands for food, a lack of finance, political will, and often physical limitations such as a supply of seedlings. Despite these conditions though, natural regeneration is continuing; while in addition human-driven monoculture plantations are expanding, although the latter have few biodiversity benefits and make only limited and sometimes short-term contributions to other ecosystem services. The key issues we examine here are: (1) the status of current forest regeneration, (2) inclusive and equitable stakeholder engagement, (3) the role of plantations, (4) when assisted restoration does not work – trees planted in the wrong places, (5) forests regrowing in inconvenient places, and (6) what good restoration looks like. The section closes with some recommendations.

BACKGROUND

Current global goals for forest restoration, most recently highlighted in Target 2 of the CBD Global Biodiversity Framework, are not matched by actual regrowth, which is estimated to be 50-60 million hectares since 2000.[444] Plantation forests cover another estimated 131 million hectares, 44% of which are non-native species.[445] Although there are ambitious plans to increase the area of forest, a number of problems, old and new, make major reforestation at the scale and pace needed challenging.

In particular, plans to recover forests where they are degraded or have been lost face serious challenges from climate change, including long-term climatic shifts and extreme weather events.[446] Degraded, logged-over tropical forests are exposed to drying with increased levels of risk to wildfires, which over time increase in frequency,[447] with hotter forest fires impeding the forest's ability to recover, destroying seed banks.[448] Increased levels of pests, loss of critical seed dispersers such as birds, and subsequent droughts can all hamper further regenerations.[449] These impacts are often cumulative, e.g. in boreal Scandinavia, climate shifts are pushing defoliating moths north and killing birch trees,[450] and drier winters are supporting higher populations of reindeer[451] which browse saplings and prevent forests from growing, creating new tundra. Optimistic calculations that forest restoration and tree planting could store up to a quarter of atmospheric carbon[452] have been subject to serious challenge, due to overestimation of soil carbon gains,[453] misassumptions that naturally non-forested lands are suitable for afforestation,[454] and misunderstanding of global carbon cycle dynamics that are under flux due to climate change.[455] More active forms of restoration are often limited by the demands for land and lack of planting materials, with opportunities often pushed towards places less attractive to agriculture.[456]

Yet in the historic past, natural forest regeneration has occurred on a huge scale, notably after colonially introduced diseases caused pandemics in the Americas, reducing land use by people dramatically.[457] Much of the American myth of untamed wilderness is now known to be made up of secondary forest.[458] There are even suggestions that this regrowth may have caused noticeable reductions in atmospheric CO_2 levels.[459] Forest restoration is not new, it is an ancient human activity with areas of forest species composition managed to sustainably provide food, fuel, medicine and wildlife for communities.[460] Records for temple forests in Japan stretch back 2,000 years,[461] and forest restoration in India even further.[462] Major reforestation took place in Scandinavia in the 19th century and in Britain after the First World War. Our connection to forests and greening our urban areas is high, but large-scale planting campaigns often result in the wrong trees, in the wrong place and at the wrong time: for example, "Plant a Tree in 73" was launched in the UK in response to Dutch elm disease and sparked huge public interest, but 70% of planted trees did not survive.[463]

Current efforts to restore forests not only face more difficult climatic conditions and limited land but often bring a conservation ethic into what has frequently been a utilitarian practice. Conservation NGOs were slow to address restoration, until the scale of loss forced a rethink[464,465] and development of forest landscape restoration.[466] Today, restoration is reinforced by targets like the Bonn Challenge, the new Global Biodiversity Framework and the UN's Decade on Ecosystem Restoration, along with policies to mitigate climate change.

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This creates important opportunities for a global expansion of natural forest but also carries significant risks.

Forest expansion can take many forms: (i) tree planting through industrial plantation, household or village woodlots, (ii) active forest regeneration (including agroforestry, seedling, site preparation etc.), and (iii) natural forest regeneration.[467] The first choice from both an ecological and economic perspective is to create the conditions for natural regeneration. In sites with a buried seed source or trees nearby, natural regeneration is often the easiest way to bring back forests.[468] This can happen spontaneously, in areas of agricultural abandonment[469] and as a result of climate change.[470] However, natural processes may be problematic or take too long in some situations, where more active interventions are justified.

Forest restoration can occur a) where there is degraded forest, b) where forest was present historically but has since disappeared (reforestation), or c) where forest has never been present, or has been absent for a long period (afforestation). Which of these categories forest regrowth falls into is related to local and cultural acceptance (e.g. are forests a welcomed natural state after agriculture?) and changing climatic conditions (land that was historically forest may no longer be viable, and vice versa.) Forest restoration does not occur in a vacuum but has wider landscape-scale implications. Forest landscape restoration attempts to address these issues on a wider scale and is defined as a process that aims to regain ecological functionality and enhance human well-being in deforested or degraded landscapes.

LIVE ISSUES

Despite the challenging environment, forests are regenerating

As noted above, forests covering twice the area of France have regrown, rather than being replanted, since 2000, covering some 55 million hectares. This has been influenced by changing conditions such as changes in fire management and grazing pressure, control measures against dust storms and illegal logging, improved farming practices, urban migration, and sometimes factors like declining commodity prices leading to a downturn in cultivation.[471,472] Some of the increase may be regrowth following natural disturbance (e.g. fires, windblow) or after short-term deforestation. Some changes may be temporary.[473] Much of the increase is in the northern hemisphere, but important examples exist in the tropics, including the Atlantic Forest of Brazil,[474] Argentina and Paraguay, and parts of Central America.[475] While the regenerating forests will not be exactly the same as felled forests, and secondary forests will generally have lower genetic diversity,[476] the evidence shows that forests can still regenerate in the conditions present so far in the 21st century.

Forests are only likely to regrow with local actors' support

Whatever method is chosen, forests will only be restored effectively if pressures on the forest are removed or reduced and if local people support the idea of forest expansion. Along with active planting, methods may include controlling degradation by agreement to cut livestock and fencing areas to allow regeneration, establishing protected areas, reducing resource use and encroachment, or improving fire management. Involvement in communal tree planting can encourage landowners to pursue their own restoration strategies to recover ecosystem services, as seen in the Ecuadorian Andes.[477] Silvicultural issues are important; there are many practical challenges to establishing trees.[478] But restoring forests without also addressing underlying drivers and building a local consensus for more trees usually just leads to rapid loss of the restored area.[479]

Plantations have a role but are not a replacement for natural forests

Plantations are also increasing; a synthesis of data from FAO and WWF suggests up to 85 million hectares may have been planted between 2000 and 2015.[480] Plantations can, if properly managed, supply high quantities of timber, pulp and fuel, along with some ecosystem services[481] such as flood control. But they will only support a fraction of the biodiversity associated with a natural forest.[482] Even plantations of uniformly planted and aged native species will yield poorer biodiversity compared to naturally regenerated forests.

Forests are sometimes planted in the wrong places

Degraded grasslands and savannahs, sometimes mistaken for degraded forests, are being planted with trees in many parts of the world,[483] often linked to funding opportunities including carbon finance. However, this loses much of the soil carbon stocks, which may take centuries to recover, and destroys grassland communities.[484] Problems can be aggravated by efforts to meet UNFCCC or CBD goals,[485] if forest "restoration" or afforestation occurs in grasslands[486] or savannahs[487] with important biodiversity.[488] Bonn Challenge targets have encouraged some governments to focus on quantity of trees rather than forest quality.[489,490,491] Certain efforts to identify suitable reforestation areas, e.g. by the World Resources Institute,[492] have been criticized for including important grassland areas.[493]


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Forests sometimes regrow in places inconvenient for conservation strategies

Regeneration is not always welcomed. Pasture abandonment, e.g. in the Mediterranean and eastern Europe, is – in the absence of natural herbivores – leading to rapid forest expansion.[494] Grassland species are declining in some areas.[495] With the major decline of South America's herbivore guild,[496] grasslands require livestock to replace grazing regimes of extinct or missing mammals and protect against forest encroachment.[497] The extent to which forest expansion on abandoned farmland is a conservation "problem" is partly a societal choice; forest species will increase, but culturally-managed grasslands have replaced many original habitats and if lost will result in loss of biodiversity.[498]

What does good restoration look like?

Central to the challenges facing large-scale forest restoration is the question of exactly what will regrow. Changing climate not only means that average temperatures are rising, but extreme weather events are increasing in frequency and severity,[499] limiting growth and threatening the permanence of any carbon sequestered.[500] Restoration strategies need to take account of projected changes. Fire ecology is changing dramatically in Australia, for instance.[501] Research suggests that biodiversity-rich, functioning and well-connected ecosystems are more likely to be resistant to changes than simplified, fragmented or degraded ecosystems, so restoration needs to focus on the return of complexity as well as the number of trees.[502] At the same time, those implementing restoration need to be aware that the returning ecosystem may be different from the one present previously; the concepts of "novel ecosystems" and "survival ecology" are gaining traction.[503] Indeed, sometimes restoration ecologists may wish to take an active part in this evolution by translocating tree species to places where they are more likely to survive. Moving the focus to forest landscape restoration, which aims to regain functionality and enhance human well-being in deforested or degraded landscapes, is a strategic approach. Forest landscape restoration is not an end in itself but a means of regaining, improving and maintaining vital ecological and social functions in the long term, leading to more resilient and sustainable landscapes.

We need a global restoration platform that combines and validates country and project-level data in order to robustly track returning forests.

The global Forest Declaration Assessment for 2023[504] finds that positive trends in regrowth are indicated for the tropics, but that robust estimates of the area under active restoration, needed to monitor goal delivery, cannot be achieved currently because of the lack of validated, global, restoration tracking. The methodologies used to track returning forests are a mixture of country and project-level data. The former, for active restoration, is not disclosed, and the latter is not globally validated via a single platform, despite an active wish from restoration projects to have access to one. To the best estimate available, from global restoration platform Restor,[505] the global area under restoration is some 3 million hectares, or about 2% of the 2020 Bonn Challenge target. However, this is likely to be a conservative estimate. At the other end of the data limitation scale, regrowth in forests is measured in previously deforested areas, such that an increase in gross regrowth area could be due to a gross increase in previously deforested or degraded area.

What does WWF want?

- Strong connection and alignment among policies that influence and support forest landscape restoration. Achieving this requires a strong focus on landscapes, stakeholder engagement, restoration for multiple functions, maintenance and enhancement of natural ecosystems, and approaches tailored to a local context.
- Greater emphasis on natural or assisted forest regeneration with consideration for the difference between carbon gain from monoculture plantations but with limited ecosystem and nature services, versus the greater delivery for nature and value "beyond carbon" delivered by the restoration and regeneration of natural woodlands.
- Restoration management that takes account of climate change by e.g. minimizing other pressures, and recognizing shifting baselines. Recognition of the influence climate change will have over where forest can come back and what the functional and ecological characteristics of that forest will be.
- An increase in informed, long-term community engagement in the planning, management and governance of returned forest.
- We support the FDA's recommendation for a global restoration platform.

CONCLUSIONS AND RECOMMENDATIONS

What needs to happen to protect, restore and sustainably manage forests? We outline principles to guide forest decisions.

1. Global climate, forest and sustainable development goals are intertwined. If we are committed to our climate and sustainable development goals then we must make good on our forest commitments.

2. Sufficient finance must flow to forests, Indigenous Peoples and local communities. Collaboration and coordination between forest-rich and donor nations and the private sector should steer this finance flow.

3. Meeting forest goals requires strong implementation, accountability and robust tracking of targets. Goal tracking should fully and transparently track pledged finance.

4. Public finance should be used smartly to leverage private finance; this should be part of the progress tracking of international forest commitments. Biodiversity and carbon markets can catalyse finance for forests, but they are not a panacea, and need reforming to be useful at scale.

5. Smarter forest finance must be delivered at pace, scale and justly to local actors, in ways which take into account individual forested nation contexts, alongside investment to support green economic pathways. We need innovation in this space, scaling financial mechanisms that are working, and finding new financial instruments that can be activated quickly.

6. Repurposing of subsidies that are harming forests has to begin in earnest (in line with Target 18 of the Global Biodiversity Framework), ensuring that that funding is delivered to forests and to support sustainable agriculture and food systems.

7. We must recognize and deliver land tenure rights for all Indigenous Peoples and local communities, at an accelerated speed. Rights delivery must be supported by strengthened self-governance systems, empowered institutions and appropriate recognition, as forest partners and stewards.

8. The knowledge, practices and actions of Indigenous Peoples and local communities, who contribute to protecting forests, must be recognized, respected and valued. When rights have been delivered Indigenous Peoples and local communities should also be supported to realize those rights through facilitating access to markets, finance, legal protection and technologies. Their rights must be secure.

9. Reductions in illegal logging, management, trade, and overexploitation (of products, timber and wildlife) must be enabled by equitable protection and effective law enforcement on all axes.

10. Multiple forest value systems must be recognized, beyond carbon storage, conversion potential and economic asset. Our forest management and trade systems must recognize all that forests do for people, nature and climate.

11. We must see national commitments to ambitious and full implementation of the Global Biodiversity Framework, and ensure the target to reduce the global footprint of consumption includes national and import-based footprints. This target must be translated into national objectives and actions within updated National Biodiversity Strategies and Action Plans (NBSAPs), including numerical footprint targets.[506]

12. Commodity supply chains must be deforestation and conversion-free, be rights-based, and must not allow spillover of conversion to other (e.g. grassland and savannah) ecosystems.

13. Deforestation and conversion-free import regulations need to be fully implemented, and to recognize that importer countries also have responsibility for greenhouse gas emissions from deforestation and conversion embedded in traded goods. These recognitions cannot fully be served under existing frameworks such as the UNFCCC. Current UNFCCC national carbon accounting procedures define producer countries as responsible for these emissions. However, embedded emissions should also be defined in the NDC targets and implementation plans of importing nations. We ask that Nationally Determined Contributions, under UNFCCC reporting processes, include assessments of deforestation and degradation-embedded emissions, especially related to agriculture.

14. Increasing pressure from infrastructure development and extractive activities needs to be tackled through participatory, integrated and biodiversity-inclusive spatial planning as outlined under Target 1 of the Global Biodiversity Framework, together with robust strategic environmental assessments.

PATHWAYS:

- **Accelerating** the recognition of Indigenous Peoples and local communities' right to own and manage their lands, territories and resources – realizing, respecting and permanently securing those rights.
- **Mobilizing** massive financial flows, both public and private, and repurposing harmful ones to support green and sustainable forest economies and trade.
- **Reforming** the rules of global trade that harm forests, getting deforesting commodities out of global supply chains, and removing barriers to forest-friendly goods.
- **Shifting** towards nature-based and bio economies.

CONCLUSIONS

We are at a major turning point with irreversible consequences. Climate change and the drivers of forest conversion and degradation are currently in charge of our forests' future, but they do not have to be. What is needed now is for gaps in the accountability and implementation of global forest commitments to be filled, greater finance where it is needed, repurposing and scaling up where finances and instruments to deliver already exist, if we are to get on track to meeting global forest commitments.

The pathways, however, have a sequence; mobilizing, reforming and shifting finances and global trade systems will only deliver for forests once those forests are under the stewardship of those who hold secure rights to own and manage their land, territories and resources, free from the impacts of illegality. Accelerating the recognition of rights to Indigenous Peoples and local communities and realizing them, securely and permanently, underpins all the other pathways to meeting forest goals. We can acknowledge that transitions are difficult, but we must abandon pathways that have not worked to protect forests, and expand what is working.

Year on year we are failing to make progress towards global forest goals. Where systems of financing, governance, stewardship and management are making gains, they are not enough to push against the continuing incentivization of forest conversion, and forest-harming subsidies. We face a sustainable forest funding gap that could amount to hundreds of billions of dollars every year. The risks that come with these failures threaten people, nature and our climate stability.

A fundamental shift is needed in how we value forests, one which recognizes the multiple values that forests have for people, nature and climate. The forest value system we are currently driven by, which prioritizes the conversion of forest to other land uses over the protection and sustainable management of standing forest, is associated with our continued failures to meet global forest goals.

There is more opportunity than risk in a move away from single-value foci for forests, in which they are either valued for their carbon, or as having greater value converted to agriculture, to one in which the multiple values of forests govern the decisions we make and how we fund commodities practices.

Forested nations need a fair share of forest finance to protect their standing forests. The packages that deliver this support need to use appropriate existing financial instruments, but also develop innovative ways of financing where needed. The international actors that preside over trade and financial flows from major tropical forests need to become the sustainable changemakers halting primary tropical forest conversion and degradation and delivering sustainable forest management and deforestation and conversion-free production and trade.

Forests need a future in which $100s of billions per year in harmful subsidies stop and become part of the $460bn needed in investment in sustainable forest and food economies, in which we move from isolated project-scale voluntary carbon market activity, to jurisdictional scale, verified systems of carbon and biodiversity finance, from supply chains underpinned by illegality and encroachment into Indigenous territories to tenure rights to the 30% of forests in unrecognised Indigenous Territory stewardship, and from global trade systems that cannot deliver protected, restored and sustainably managed forests to ones that can.

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We do not need any more forest goals. What we need is to start implementing the ones we have justly, with ambition, and at pace, growing positive momentum in both the public and private sectors.

Our call to action is for governments and businesses to get on track, make good on their public commitments to halting forest loss, protecting, sustainably managing, and restoring forests and to start making continuous and meaningful annual progress towards our forest goals. We expect businesses and governments to step up at COP28 and outline how they will deliver their commitments.

ANNEX 1

METHODS

COMMODITY FOOTPRINTING

Estimating the quantity of imports and consumption

The methods for estimating quantities of imports and exports and their land footprint follows the approach used for similar studies, including the UK,[507] Belgium,[508] Denmark,[509] France[510] and Switzerland,[511] the Netherlands,[512] and for one sub-national study in Wales.[513]

Import data from the UN COMTRADE database[514] was used to estimate the quantity (net weight) of imports for 2021. We chose this database because it allows a similar method to be replicated for other countries, giving us a global comparable overview of trade flows. As all of the commodities are exported as co-products (e.g. soy beans, soy meal, and soy oil), net weights were converted into "whole commodity equivalents" using conversion factors from the technical literature.[515]

Given the global nature of this work, and unlike the studies cited above, only raw and semi-processed commodities were included, not those as an ingredient or component in manufactured products (e.g. palm oil embedded in processed food) or those embedded in exports as part of the upstream production process (e.g. soymeal used in pig feed embedded in exported pig products). See Table A for lists of the commodity co-products included within this analysis.

All countries that were responsible for at least 3% of global exports and 3% of global imports are included in the analysis. This covers the majority of global exports and imports for all of the commodities (Table B). Although a significant amount of trade is conducted by third-party countries, this was not assessed here. In part that is because the EU is treated as a single trading block, which significantly reduces the amount of intermediate trade (the "Rotterdam effect"), and partly because sensitivity analysis showed that doing so would provide limited additional information for analysis of this scope.

Table A: Commodity co-products included in the analysis

COMMODITY	HS CODE	COMMODITY
Soy	1201	Soya beans; other than seed, whether or not broken
	1507	Soya-bean oil and its fractions; whether or not refined, but not chemically modified
	2304	Oil-cake and other solid residues; whether or not ground or in the form of pellets, resulting from the extraction of soya-bean oil
Palm oil	1511	Palm oil and its fractions; whether or not refined, but not chemically modified
	151321	Vegetable oils; palm kernel or babassu oil and their fractions, crude, not chemically modified
	151329	Vegetable oils; palm kernel or babassu oil and their fractions, other than crude, whether or not refined, but not chemically modified
	230660	Oil-cake and other solid residues; whether or not ground or in the form of pellets, resulting from the extraction of palm nuts or kernels oils
Cocoa	1801	Cocoa beans; whole or broken, raw or roasted
	1802	Cocoa; shells, husks, skins and other cocoa waste
	1803	Cocoa; paste; whether or not defatted
	1804	Cocoa; butter, fat and oil
	1805	Cocoa; powder, not containing added sugar or other sweetening matter
Coffee	90111	Coffee; not roasted or decaffeinated
	90112	Coffee; decaffeinated, not roasted
	90121	Coffee; roasted, not decaffeinated
	90122	Coffee; roasted, decaffeinated
	90190	Coffee; husks and skins, coffee substitutes containing coffee in any proportion

Table B: Proportion of global exports and imports accounted for by countries exporting and importing at least 3% of global trade

COMMODITY	EXPORTERS	IMPORTERS
Soy	86%	57%
Oil palm products	88%	65%
Cocoa	77%	67%
Coffee	55%	58%

Estimating the footprint of imports

Estimating the land area required to produce the quantities of commodities exported is straightforward, as yield data is readily available.[516] The yield for each country, each year, was used to convert the imported volumes into an estimated land area required for production, i.e. land footprint.

Estimation of GHG from land-use change

The Land Use Change Impact Tool[517] was used to estimate commodity-specific per-hectare CO_2e emissions for soy, cocoa, coffee, coconut, palm oil and maize.

The tool allows emissions from land-use change to be assessed when the country of production is known, but the exact parcel of land used to produce the crop is unknown. This matches the level of detail of our provenance calculations which is determined by the available data. For this scenario, the tool uses an indirect approach to calculating emissions from land-use change (LUC), based on the relative rates of crop expansion at the expense of different previous land uses in a country. It uses FAO data on direct LUC (i.e. deforestation, conversion and crop-to-crop change) associated with a crop in a certain country and divides by the total expansion of the same crop in the country, assigning a rate of LUC (and therefore GHG emissions) per hectare of crop expansion.

Crop expansion is calculated for each year by comparing the average harvested area of the crop in the three most recent years for which data is available to the average of three years 20 years ago. For each subsequent year, this "baseline" will therefore shift or move up by a year and data on LUC in a specific year is not counted in subsequent years. The associated emissions per hectare are then calculated based on methods consistent with the Intergovernmental Panel on Climate Change (IPCC)[518] and the PAS 2050-1 framework,[519] including "amortization" so that the total emissions from the 20-year period of the LUC are apportioned equally over the 20 years (see tool's methodology for further details).

The commodity-specific per-hectare CO_2e emissions was then multiplied by the importing countries' land footprints per commodity in each producer country to estimate the GHG emissions associated with LUC per country, for each crop.

The method does not allow for GHG estimates for specific parcels of land, due to the lack of primary data at the necessary level of spatial detail. The figures used are therefore averaged for entire countries, meaning it is not possible to distinguish regional variations in emissions or assign deforestation to a specific piece of land. The values are therefore an indication of the risks of deforestation/land conversion and GHG emissions associated with the Netherlands' imports of such commodities.

Comparison of GHGs embedded in exports to national GHG inventories

The GHG estimations from land-use change (described above) were compared with total emissions (including LULUFC) reported to the UNFCCC.[520] UNFCCC reporting procedures mean that different countries have different reporting schedules, largely depending whether they are Annex 1 (industrialized countries that were part of the OECD in 1992) or Annex 2 countries. The most recent data recorded on Climate Watch for each of the producer countries is given in Table C.

Table C: UNFCCC national GHG inventory dates used

COUNTRY	LATEST UNFCCC DATA AVAILABLE
Argentina	2012
Brazil	2016
Canada	2019
China	2014
Colombia	2004
Côte d'Ivoire	2000
Ecuador	2012
Ethiopia	2013
Ghana	2006
Guatemala	2005
Indonesia	2000
Lao PDR	2000
Malaysia	2011
Myanmar	2005
Nigeria	2000
Thailand	2013
Uganda	2000
Ukraine	2019
United States	2019
Uruguay	2019
Viet Nam	2013

The methods used to estimate GHGs from land-use change here and in national GHG inventories are different, as are the dates for which emissions are estimated. The two sets of data are therefore not directly comparable. However, they do provide a general picture of the likely importance of emissions embedded in trade to producer country emissions.

NDCs

All producer country NDCs were assessed for the way in which they covered emissions from land-use change, and their treatment of deforestation, according to the categories shown in Table 7. NDCs are available from the UNFCCC NDC Registry.[521]

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506 We note there is no mention on whether the national commitments are only on domestic footprint or also include overseas footprint, but the overall aim is to reduce global footprint. While open to interpretation, both domestic and international footprint of major consumer countries need to be addressed to achieve the global footprint of consumption and production reduction included in the GBF. CBD Parties should integrate specific objectives, linked to GBF targets to take transformative actions to reduce global footprint (e.g 5, 7,10, 14-16 and 18). Countries with a bigger footprint will need to reduce their footprints more, so that action on environmental footprint supports a just transition.

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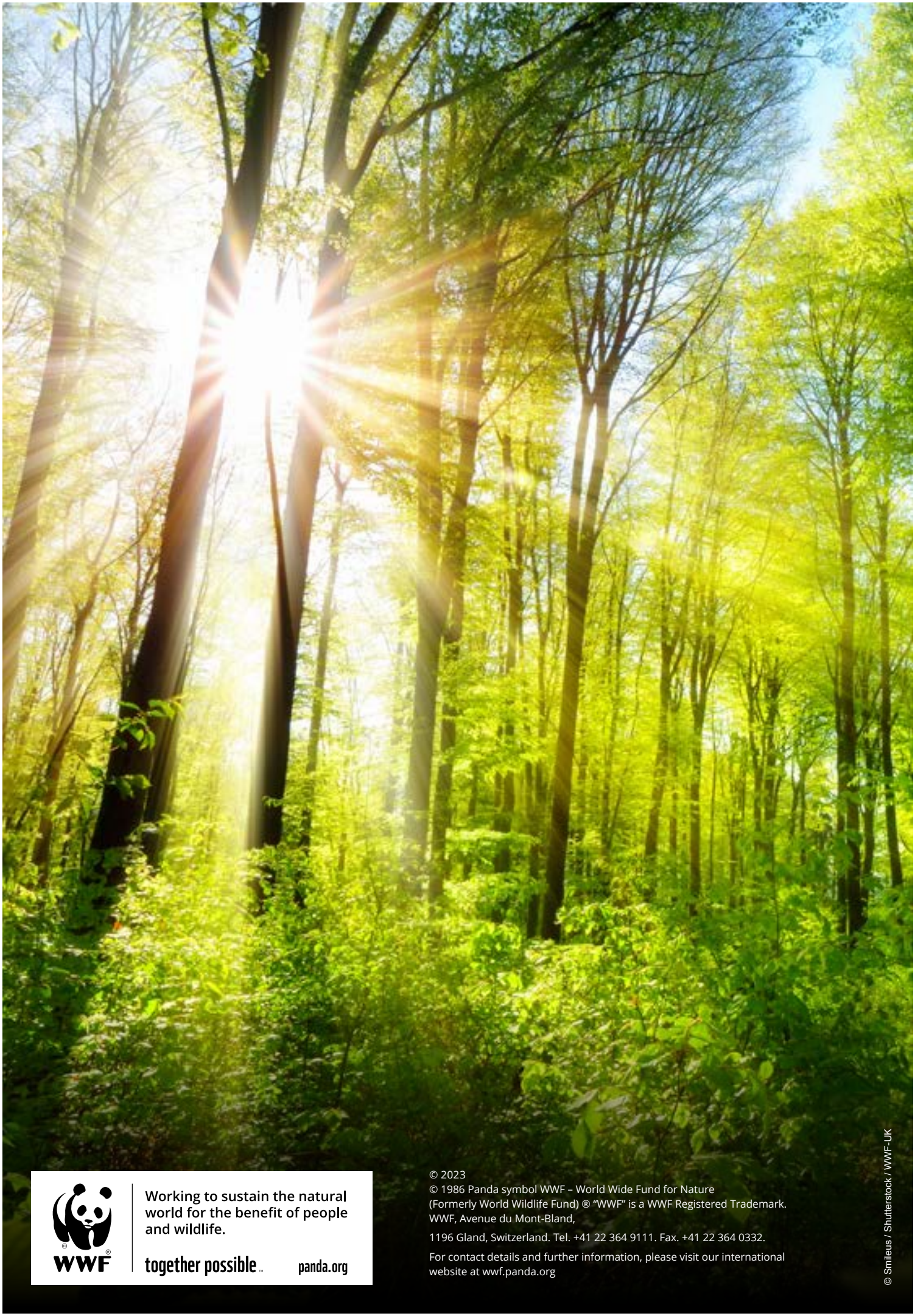

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