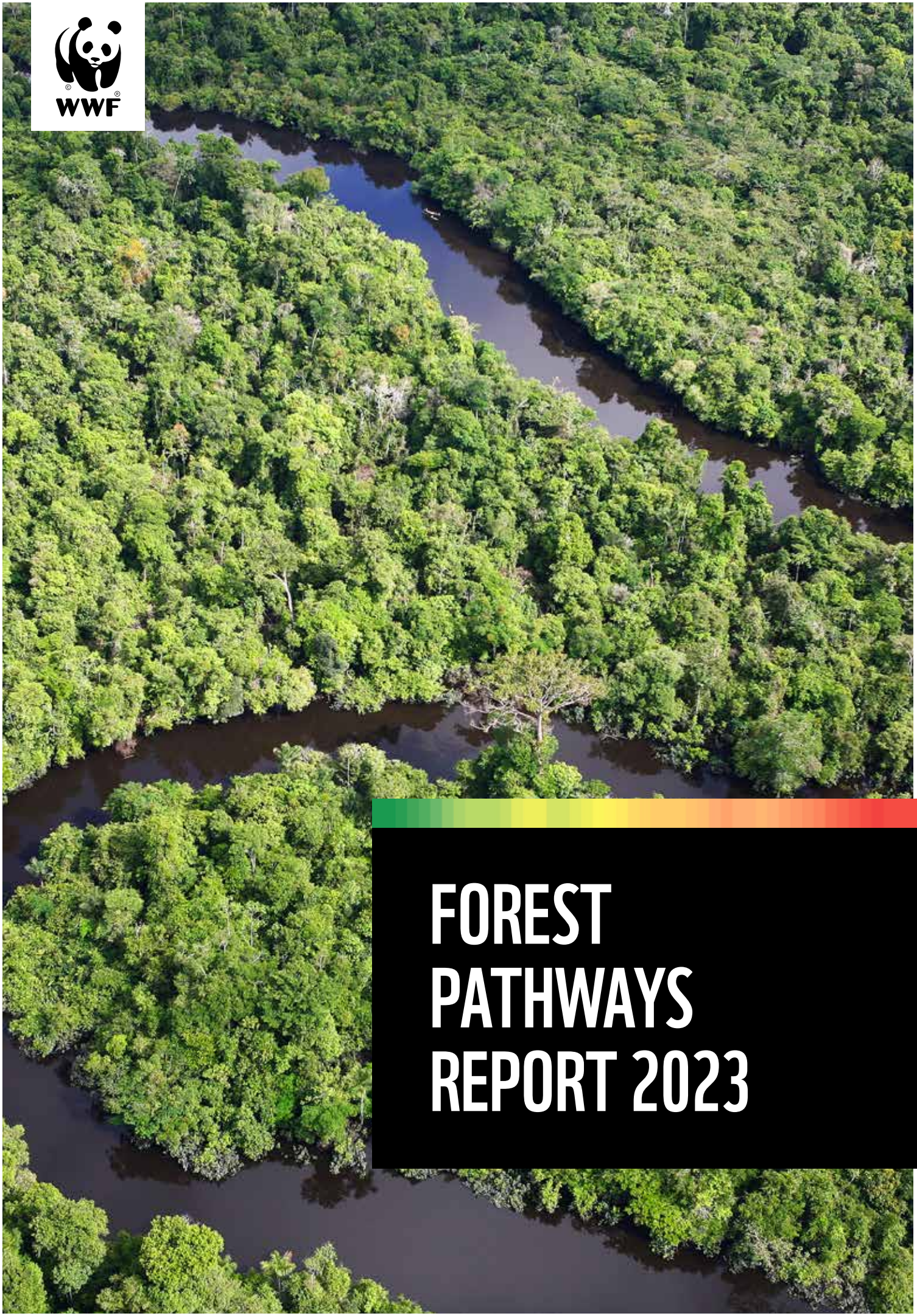

FOREST PATHWAYS REPORT 2023

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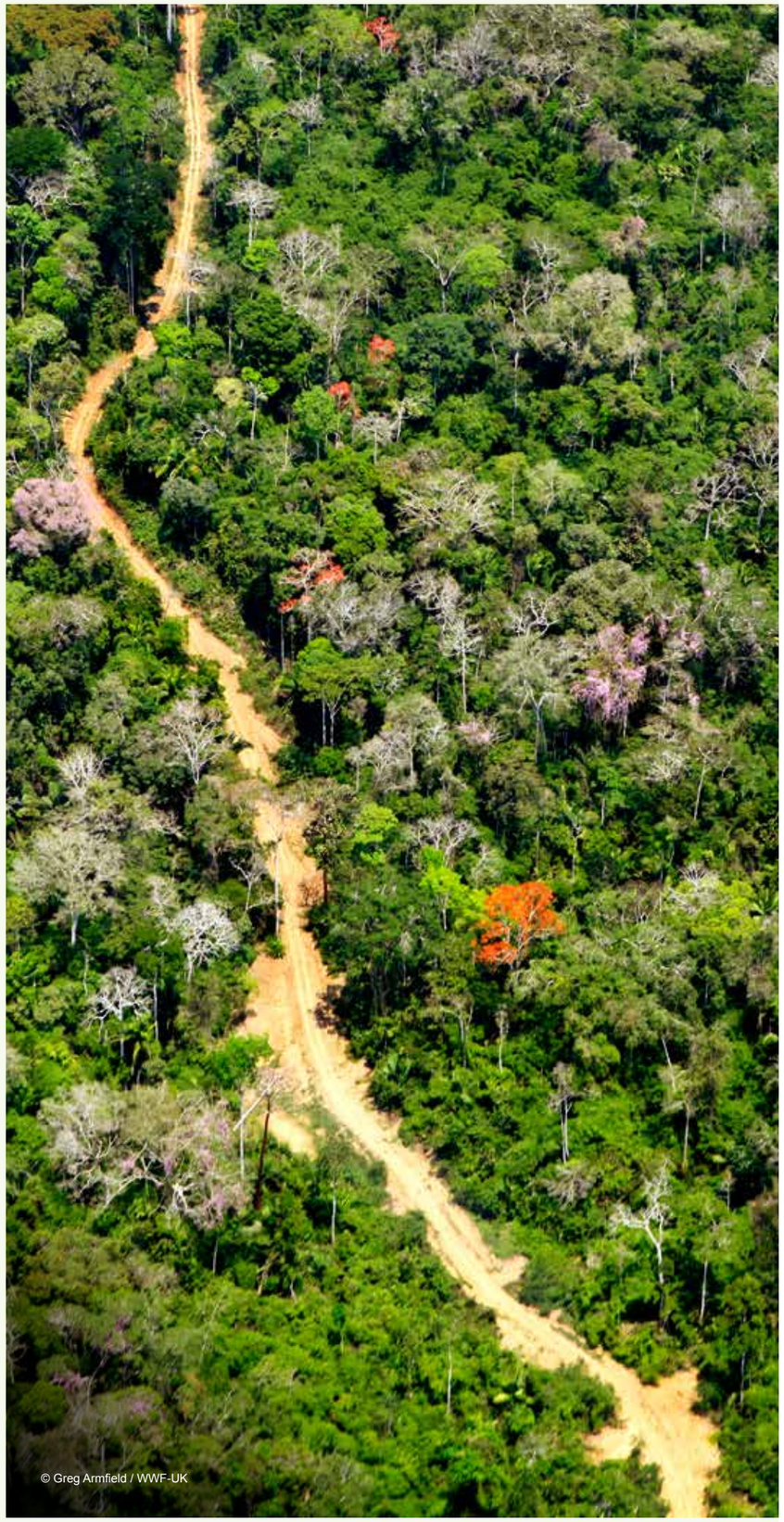
Facts correct as of October 18th 2023 and for Forest Declaration Assessment 2023 draft of that date.



Cover photography: Aerial shot of the Amazon, Loreto region, Peru.

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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INTRODUCTION

FRAN PRICE, LEADER, WWF FOREST PRACTICE
WWF INTERNATIONAL

Failing forests just isn't an option.

FORESTS NOW

Forests are our greatest asset in the fight against climate change. Tropical forests cool the planet by more than a degree, but they face ever-greater pressures from the impacts of a warming and drying climate: longer fire seasons, hotter droughts, and wildfires in forests where they were once rare. They are being converted to other land uses, especially agriculture, and are being harmed by climate change, degradation and unsustainable and illegal logging. Forests house 80% of our terrestrial biodiversity, but are being emptied of their most iconic species. The abundance of 1,428 observed populations of 343 forest specialist species, monitored across the globe, declined by an average of 79% between 1970 and 2018.[1]

Indigenous Peoples and local communities living in or near forests are experiencing economic poverty, denial of their land rights, and are not uniformly and fully included in forest governance and management. Where they have tenure security, their territories have lower rates of deforestation and degradation across the tropics.[2] Finance is not arriving for Indigenous Peoples and local communities at the scale and pace needed.

Incentives for conversion and degradation far outweigh those for keeping forests standing, with an estimated US$2 billion going to forest finance each year as compared to up to US$1 Trillion in environmentally harmful subsidies and incentives that include funding for forest conversion. These unsustainable agricultural systems and gray infrastructure incentives make forest conversion to other land uses financially appealing, causing continued loss of primary forest and supporting deforestation, conversion and degradation.

Forests directly generate US$250 billion in economic activity each year and have an estimated value of US$150 trillion, double the total value of all global stocks, largely due to their ability to store carbon.[3] However, emphasis on forests' economic value overlooks the multiple values they have for Indigenous Peoples and local communities, and the ecological values they have for nature.

For natural forests to do everything they can for people, nature and climate, they need space to regenerate, in the form most suited to each habitat – yet our forest gains are dominated by monoculture plantations, while natural forest is lost to unsustainable agricultural practices and the degrading impacts of our changing climate.

We can choose a future with more forests, or a future with less.

We are at a major turning point with irreversible consequences. Climate change and the drivers of forest conversion are currently in charge of our forests' future. A stable climate and drivers of regeneration need to be put in charge. If society rallies, by changing course to limit warming to 1.5°C and following the IPCC's sustainability-focused emissions pathway, land-use change models show our future could be a world with an additional 350 million hectares of forests by 2100.

However, if we do not achieve our climate goals, follow the highest impact scenarios, and fail to reduce emissions or to allow some cultivated and degraded land to return to forest, our land-use change models show a loss of a further 500 million hectares of forest by 2100.[4] Our decisions will deliver the difference between meeting our forest goals and failing them.

CHANGING CLIMATE, CHANGING FORESTS

Forests do not exist in isolation from the broader climate and nature emergencies. Increased tree mortality is occurring after extreme climate events.[5] Tropical forests are beginning to act as a carbon source, not a sink, under the pressures of a warming, drying and increasingly extreme climate.[6] Widespread and increasing deforestation and degradation in the planet's three largest tropical forest basins, the Amazon, Congo and Southeast Asia, could deliver a global climate catastrophe. Were the Amazon biome's carbon stores to be released into the atmosphere, the initial CO_2 increase would cause an additional 0.5°C of warming.[7]

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FINDING BETTER PATHWAYS TOWARDS OUR FOREST GOALS

There is widespread recognition that we cannot meet our global goals, whether they be on climate, nature or sustainable development, without halting and reversing deforestation. There is a great deal of political and business will to do this, and to restore what has been lost.

- The Forests and Climate Leaders Partnership (FCLP), a coalition of governments founded after the UNFCCC COP26 led to the Glasgow Leaders Declaration on Forests and Land Use, aims to accelerate global progress to halt and reverse forest loss and land degradation by 2030.
- The New York Declaration on Forests (NYDF), a political declaration adopted in 2014, pledged to halve the rate of deforestation by 2020 and to end it by 2030, and to restore hundreds of millions of acres of degraded land.
- Consumer and production groups around the globe are increasing the ambition of their deforestation and conversion-free commitments, while new regulations – such as the EU Deforestation Regulation, Articles 64 and 65 of the China Forest Law, the UK Forest Risk Commodities Regulation and the US Forest Act – are beginning to bring compliance to commodities drivers.
- Momentum is growing in steering green economy initiatives into forest challenges, with the Libreville Plan, agreed in March 2023 at the One Forest Summit, aiming to reconcile economic development in forested nations with environmental ambition and deliver sustainable livelihoods in the three tropical forest basins – the Amazon, Congo Basin and Borneo-Mekong-Southeast Asia.

There are promising increases in forest-related climate finance, from both the public and the private sector. However, these are dwarfed by the size of forest-harming subsidies that need to be repurposed to deliver finance on the ground.

WHERE ARE FOREST-POSITIVE GAINS BEING MADE?

There are gains being made, but they are just not large enough, or occurring uniformly. The monitored gain in protected areas since 2010 is 22 million km^2,[28] a value which surpassed the Aichi target of 17% coverage by 2020. However, the rate of protected area designation has slowed in recent years, while progress in other effective area-based conservation measures (OECMs) has been slow to gain momentum. As these new categories of protected and conserved areas develop it will be vital to include measures on the quality of implementation of the OECMs and the inclusion of Indigenous Peoples and local communities in conservation.

In recent times more nations have certified forest areas, but progress has slipped. According to the Forest Stewardship Council (FSC), there are now 83 nations with certified forest areas which initially peaked at a total of 230 million hectares of FSC-certified forest. However, this has since dropped to 160 million hectares.[9]

There have also been positive gains on afforestation and reforestation. In the last two decades new forest areas of about the size of Peru have been noted, with net gains in forest cover in 36 countries.[10] But restorative practices are not being implemented fast enough: overall losses exceeded gains over the last two decades by around 100 million hectares.[11]

WHERE DO WE NEED TO MAKE GREATER PROGRESS?

"Forests are a thermometer to measure our success in reaching the Sustainable Development Goals, because they intersect with all of them."

MANUEL CARMONA YEBRA

Only seven years are left to meet the global goals of halting and reversing deforestation and conversion, and for that to happen deforestation needs to be reduced by at least 10% annually.[12] The 2023 Forest Declaration Assessment finds that the world remains off track from the pathway needed to halt deforestation by 2030. In 2022 6.6 million hectares of forest loss occurred, a 21% divergence from what is needed to be on track to 2030. Within the tropics, 4.1 million hectares of primary forest were lost in 2022, a 33% divergence from targets.[13]

The rate at which deforestation and conversion is coming down is not fast enough, and the gains being made in forest cover are not associated with the levels of increasing forest quality and the recovery of forest biodiversity that are needed to restore healthy forest that offers maximum benefits to people, nature and climate.

Dysfunctional financial and subsidy flow practices which harm forests persist, and the footprint associated with commodities is causing millions of hectares of damage to forests each year, and spilling that damage into other ecosystems such as savannahs and grasslands. Our single-value focus on forests for carbon or conversion, in which the environmental costs of forest loss are not included in market prices, is intrinsically embedded in our failures.

The global forest footprint associated with the commodity trade in timber, soy, coffee, cocoa, rubber, palm oil and beef in 2020 alone was estimated by Global Forest Watch to be 3.7 million hectares[14], equivalent to a land area the size of Belgium.

The time to find better pathways towards meeting global forest goals is NOW. We do not need new goals, we need to implement the ones we have with high ambition.

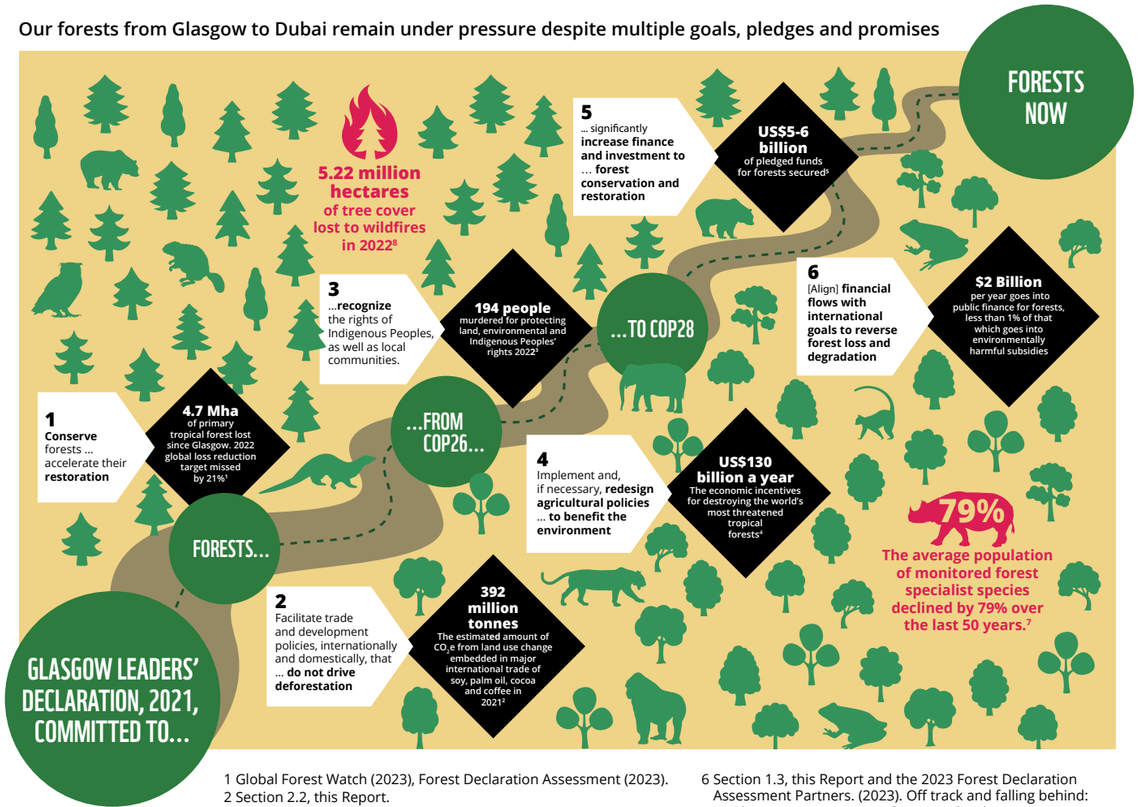
Consensus is building on what paves the way for better pathways to meet our forest goals: an increase in finance to avoid conversion of forests for other land uses and to support restoration, smart use of public finance to leverage private finance, implementation of wider private commitments to halt deforestation and degradation, complete recognition of the land tenure and governance rights of Indigenous Peoples and local communities, fully implemented import constraints from consuming nations, widespread combating of the threats from illegality, and an end to harmful subsidies are all needed. Underpinning these positive pathways, however, is the need for a global pivot in how we value forests that inclusively recognizes multiple values beyond carbon and conversion, recognizes Indigenous forest knowledge, and is committed to the growth and just transition towards green and sustainable forest economies. Understanding what has and has not worked in the past, and which instruments for change show promise or have been difficult to achieve at scale, is the first step we take in the *Forest Pathways Report*.

This report is intended to spur real change, with insights on what does and does not deliver positive outcomes for forests. It is not a call for commitments, but a guide for action that shines a light on the pathways that lead to a forest-positive future.

In this first edition of the *Forest Pathways Report* we ask how our global forests are doing, and what better pathways we can take to meet 2030's global forest goals. The excellent global forest pledges and treaties that have been signed in recent years set the stage for ambitious change: what is now needed is implementation at pace and scale.

Figure 1: What journey have global forests been on, from COP26 to COP28?

Our forests from Glasgow to Dubai remain under pressure despite multiple goals, pledges and promises



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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.[15] Global forest loss rises and falls over time, with deforestation fronts[16] 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.[17] 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.[18] Forest losses impact biodiversity[19] and ecosystem services including carbon storage,[20] with the climate impacts of primary tropical forest loss alone equal to India's annual fossil fuel use.[21] 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[22] under the combined pressures of climate change[23] and deforestation,[24] and could be approaching an irreversible tipping point[25] with huge implications for wildlife, food production, water supply, livelihoods,[26] cultural and spiritual significance[27] and the stability of the global climate system.[28]

Outside the tropics, threats to old-growth or primary forest are particularly concerning.[29] Natural old-growth forests are often replaced by commercial, often non-native, plantations with far less value for wildlife and ecosystem services.[30] In the UK, of the ancient woodland we have left, 40% of it has been cleared and replanted with non-native timber species.[31] 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,[32] often via some combination of edge effects, selective logging, fire and drought, habitat fragmentation, species removal and infrastructure development.[33] Data good enough to estimate degradation only exists for the tropics,[34] 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,[35] as well as other climate impacts. Estimates of the area of degraded tropical forest range from around 100[36] to 500 million[37] 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.[38] 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.[39] 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[40] – 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,[41] 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".[42]

There are multiple causes of forest degradation

Logging natural forests has multiple negative impacts on species' distribution and survival.[43] Fragmentation isolates species, reducing their gene-pool and chances of survival.[44] Overhunting[45] creates "empty forests,"[46] threatening hundreds of species with extinction[47] (see Section 3.1 Empty Forests). Invasive pathogens and pests[48] are increasing; 15 non-native pests kill trees releasing 5.53 teragrams of carbon a year in the USA alone.[49] Air pollutants damage trees[50] and kill lichens and mosses,[51] while pesticide drifts far from source,[52] resulting in huge declines in vital tree-pollinating insects.[53,54]

Tree mortality is rising everywhere.[55] There have also been increasing trends in wildfires over the past 20 years,[56] with frequency, severity and fire season duration increasing in many regions.[57] Wildfire now burns about twice as much tree cover as it did two decades ago,[58] with hotter, more intense fires impacting major tropical forest areas that have little evolved adaptive fire resilience.[59] Impacts are cumulative; the loss of fire-resistant primary tropical forest[60] increases future fire risk within that forest.[61]

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[62] and hampering their ability to regenerate.[63] Forest ecosystem services for water and food security, disaster risk reduction and climate stabilization are all declining.[64] 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.[65] Older-growth forests with more stable dynamics are being replaced by stands of younger trees with faster turnover rates,[66] as is being seen with the loss of ancient redwoods in the Pacific Northwest.[67] 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.[68]

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;[69] some of this is due to increased nutrition among some of the poorest people.[70] 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.[71] As a result, agriculture is the largest driver of forest loss in the tropics[72] and up to 80% of global deforestation and conversion has crops and livestock as a primary cause, often linked with logging and infrastructure.[73,74] Fire is used as a low-cost option to clear tropical forests for farming and provide quick soil fertilization.[75] 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[76] (although this has reversed to some extent at least in Brazil),[77] while smallholders remain important in Africa[78] 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[79]. Almost half of all global land conversion is estimated to be illegal.[80] Soy,[81] cattle and palm oil[82] are often quoted as the top three commodity drivers of forest and ecosystem loss,[83,84] but this varies regionally. A survey of 28 biodiversity-rich tropical forests found the largest drivers to be rice, rubber, cassava and maize.[85] 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.[86] Additionally, infrastructure development, urbanization and mining are all important drivers of forest loss, with impacts varying regionally.[87] Some 84% of direct mining-related deforestation takes place in just 10 countries, although its indirect impacts are both larger and more widely distributed.[88]


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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.[89] It increases fire frequency,[90] including in forests that do not usually burn,[91] and produces hotter fires[92] creating long-term damage even in fire-adapted forests.[93] It raises the length and severity of droughts,[94] inducing water stress[95] and killing trees.[96,97] Our changing climate is also linked with increased pest and disease attacks on trees.[98] Warming threatens forests and ecosystems with nowhere to migrate, such as mountain forests,[99] while mangroves are threatened by sea-level rise. A combination of climate-related stresses[100] means that many countries in the dry and wet tropics,[101] temperate[102] and boreal regions[103,104] are experiencing increased tree mortality and larger and more frequent regional-scale forest die-off events, e.g. as measured in Europe.[105]

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,[106] 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.[107]

Protected and conserved areas provide refuge for forest species and safeguard multiple ecosystem services. Legally protected areas cover 700 million hectares,[108] with another large area under traditional sustainable management.[109] The CBD's Global Biodiversity Framework (GBF) radically boosts targets for protected and conserved areas – 30% by 2030 (30x30) – without explicitly naming forests,[110] and calls for increasing management effectiveness. The GBF target includes "other effective area-based conservation measures"[111] (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.[112]

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,[113] although deforestation has already decreased[114] - while Cerrado conversion increased dramatically in the same period[115] - 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).[116] In parts of the Congo Basin rates of deforestation have risen sharply.[117] 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.[118] There have been multiple statements, pledges and strategies involving global government and business partnerships, however the global deforestation rate continues to rise[119]. 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.[120] 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.[121]

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.[122,123] 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.[124] 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.[125] 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.[126]

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[127] there was concern that voluntary carbon mechanisms were not proving to be the conservation funding model that had been hoped.[128] There is a widely acknowledged need for a reboot,[129] 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.[130] 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.[131]

Much forest expansion is via natural regeneration, which occurred across over 50 million hectares from 2000-2015.[132] 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)[133] is as non-native monocrop plantations, which now cover 3% of total forest area.[134] Plantations supply timber, pulp and fuelwood but support less biodiversity[135] and fewer ecosystem services,[136] while being more fire-prone than native forests.[137,138] Planting trees in semi-arid grassland can increase degradation[139,140] and release carbon,[141] while planting on peat can also release large amounts of stored carbon.[142] Additionally, some plantations are sited on natural grassland[143] and savannah,[144] e.g. in Brazil,[145] China,[146] and the Congo,[147] damaging biodiversity.[148]

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[149]

Forest restoration is critical but needs to be planned carefully and at landscape scale, through forest landscape restoration[150] or similar approaches. The UN Decade on Ecosystem Restoration,[151] the UNCCD Land Degradation Neutrality target,[152] the EU's Nature Restoration Law[153] and results-based payments (e.g. voluntary carbon markets)[154] 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.[155] It is worrying that 45% of pledges made by governments to the Bonn Challenge for forest restoration are for monoculture plantations.[156] 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.[157] The global deforestation target for 2022 was missed by 21%.[158] 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.

TREE STORY

Bristlecone Pines: markers of time

Pinus longaeva and Pinus aristata

The oldest solo-growing trees known to science bear such scars of time and environment that we have a special name to describe their gnarled forms: *krumholz*, meaning crooked, twisted, bent wood.

The two species of bristlecone pines – two of three known collectively as the "foxtail pines" – live in the subalpine treeline landscapes of the USA's western mountain chains. *Pinus longaeva*, the Great Basin bristlecone pine, is found in the mountains of Utah, Nevada and California; while *Pinus aristata*, the Rocky Mountain bristlecone pine, is found in high altitude perches spanning Colorado, New Mexico and Arizona.

That such geographically close areas have seen adaptations and evolutions ending in two distinct species gives a clue to the life history of the bristlecones. The ancestors of the bristlecone pines first appear in the fossil record about 45 million years ago.[159] However, over the last million years these ancients were subjected to the forces of natural climate change as the glacial phase settled our planet into periods when much of the northern hemisphere was under giant ice sheets, followed by periods of "interglacials" with conditions warmer than today.

In this period of geological time the bristlecones would have expanded down the mountains in cool, glacial periods, and retreated to the high-altitude sites they occupy now in warmer periods, separating into two populations. These mountain-top interglacial sites were not connected in the way that the lower forested ones would have been, and so, in our current interglacial, two distinct lineages speciated from the bristlecone's common foxtail pine ancestor. Not much distinguishes the two species.

These remarkable little pines (at a maximum of about 50 feet they are short for a pine tree) have experienced adaptation in every part of their growth and function to allow them to thrive in high, dry, cold mountains on poor soils. Their superpower is biding their time. They grow slowly, and as they age they efficiently shut down ever-increasing parts of their trunks until they are left with just one small section containing live bark, and sometimes just one or two branches above it; a growth form known as "strip bark".[160]

These unusual trees ended up in an ecological niche that is as hard as it gets for a naturally growing tree (although today our urban environments are the hardest places on Earth for a tree to grow): the short growing season and cold, arid conditions favored the adaptation of slow growth, and that in turn meant these trees live for millenia.

Perhaps the most startling thing about visiting a bristlecone pine forest (other than the lightheaded shortness of breath that comes from hiking in heat, on steep slopes, at 3,000m) is that it doesn't really look like a forest. Everything about the habitat makes it clear that only bristlecones are really comfortable here. There is little understory because not many other plants can cope with the harsh environment, and there are large gaps of white, dolomite rock between the isolated, often single, trees.

Their strip bark growth form, and extremely durable wood, combines with the ice storms of winter to sculpt bristlecones' exposed, barkless trunks into ridges and javelin-sharp stalactites of semi-petrified wood.

Moving around these trees in close proximity must be done with extreme caution by those privileged to carry out research alongside the bristlecones: one careless move will see you left with a scar for life, but at least with a good story to tell about it!

Everything about bristlecones is a celebration of being really, really old. Their wood is dense, filled with preserving resin, and has been grown as slowly as is possible without stopping altogether. Even the needles live on branches for half a century[161] (the leaves on a pioneer rainforest tree might live for only 50 days).[162] The standing deadwood stays in these high, arid, cold environments for as long as the trees live – which means the snag in the image below, high above Shulmans Grove in California's White Mountains, the bristlecone pine mothership, might have lived for 4,000 years but might also have died 4,000 years ago, making its wood a staggering 8,000 years old. But these trees are not old in the way that trees which clone their way through time are: bristlecones are single trees that last a really long time, whether alive or dead. When you stand with your hand against the frost-ridged sides of a standing deadwood bristlecone trunk there is a very reasonable chance you are touching a tree that was young when there were still mammoths living in the Arctic.

So how old are these trees? We love numbers from nature and the battle for the titles of tallest, oldest, widest and so on help connect us all with the wonder of our global forests. For many decades the names Methuselah (4,789 measurable annual rings from core samples) and Prometheus, (4,862 measurable annual rings via cross-section, collected when the US Forest Service gave a young researcher permission to fell it)[163] were synonymous with the oldest known trees on Earth. However, there is an older bristlecone, known to just a few researchers associated with the University of Arizona's Laboratory of Tree Ring Research. At 5,062 years and counting, its location is kept secret. It was not given a human name by dendrochronologist Tom Harlan, who measured its rings, and those left in stewardship of its core samples refer to it simply as "Harlan's Secret Tree".[164]

In her beautiful homage to the rings inside trees, Valerie Trouet says the bristlecones are life's faders.[165] There is no live fast, die young for these veterans. Growing slowly and fading that growth, by narrowing rings and allowing segments of roots and branches to die off, lets them live for thousands of years. Their virtually indestructible wood has the side effect of allowing them to stay standing, as deadwood, in the landscape for many more millenia.

FUTURE GENERATIONS

Mountaintop living is an adaptation that served the bristlecones well until the Anthropocene's supercharged climate arrived. Now these high-altitude sites expose the bristlecones to a greater threat from our warming, drying climate than other species. Quite simply they have nowhere to go if our climate changes beyond their tolerance,[166] because you cannot migrate upwards from the top of a mountain.

With our climate changing at a faster rate than anything they have experienced in their 45 million years, evolutionary processes of natural selection and adaptation will not have time to act before climate change becomes a risk to the bristlecone's survival. Our warming, drying climate and its associated "hotter droughts" are also giving new pathogens a chance to thrive in the bristlecone's habitat. In the past, threatening pathogens, including the bark beetle (known rather dramatically as the "red hand of death" for the red stress signals the needles of impacted trees show), could not get a foothold in the mountaintops, but with warmer, dryer conditions bark beetles are killing bristlecones for the first time.[167]

Bark beetles and drought go hand in hand, and the bug is thought to have dealt the final blow to a large number of the 150 million trees killed in California's "hot drought" of 2012-2016.[168]

Not surprisingly, those who steward the bristlecones for future generations are deeply fearful of the twin threats of climate and pathogens these ancient forests are facing.

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.[169] Targets from the UN Convention to Combat Desertification on Land Degradation Neutrality *imply* the same target without stating it explicitly.[170] 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,[171] 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.[172,173]

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,[174] 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).[175] Confusion is further compounded by multiple definitions of the word "forest".[176]

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"[177] (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[178]. 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.[179]

A clear and agreed definition of deforestation is needed in our global forest goals. Many exist[180], 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.*[181] 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."*[182] 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*,"[183] a definition that drew on one used by FAO in 2000.[184] But more than 50 definitions are known,[185] and significantly by 2020 FAO was advising governments to draw up their own definition of "degraded forests,"[186] 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.[187] 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.[188] 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.[189] 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,[190] 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

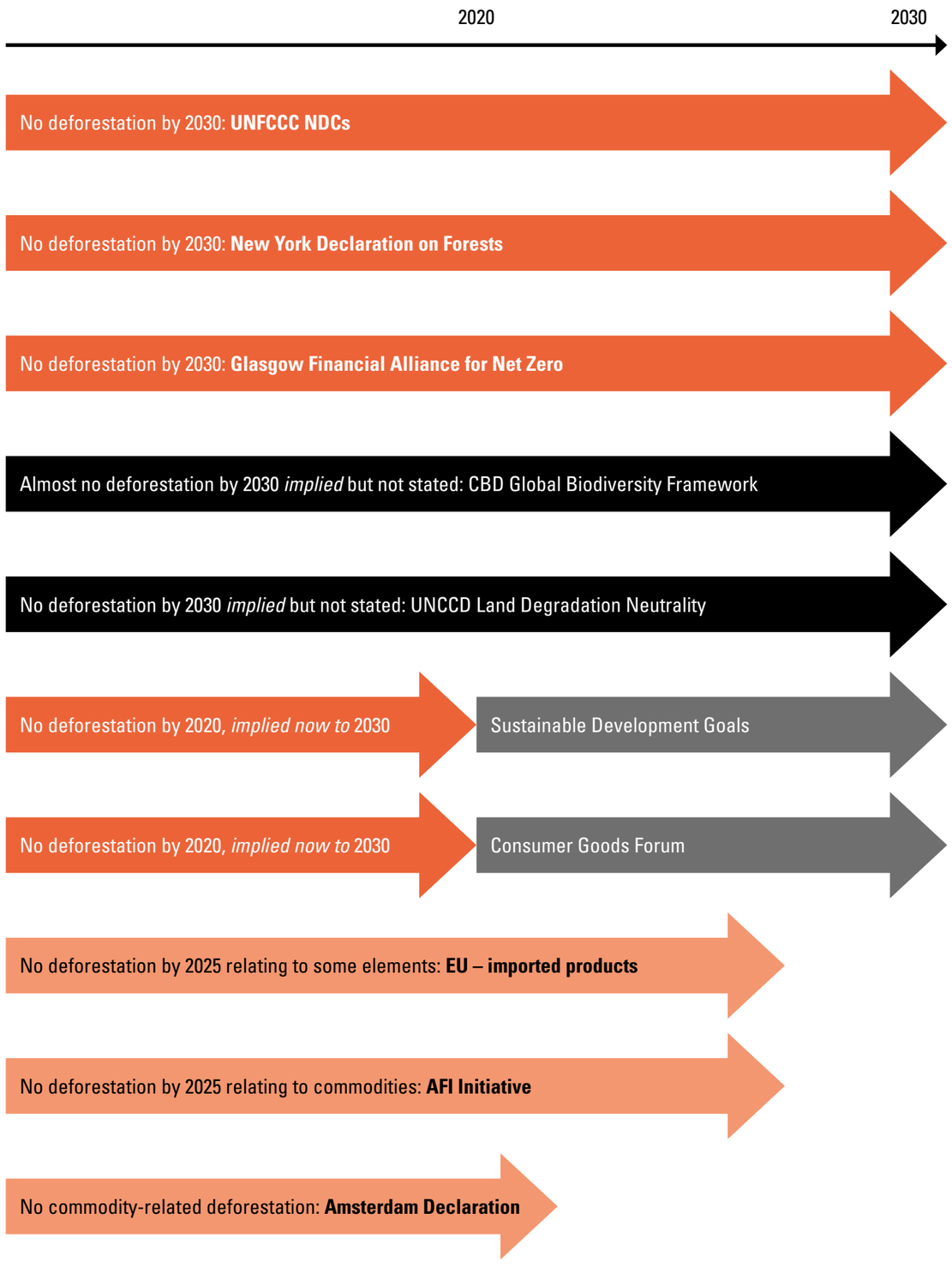
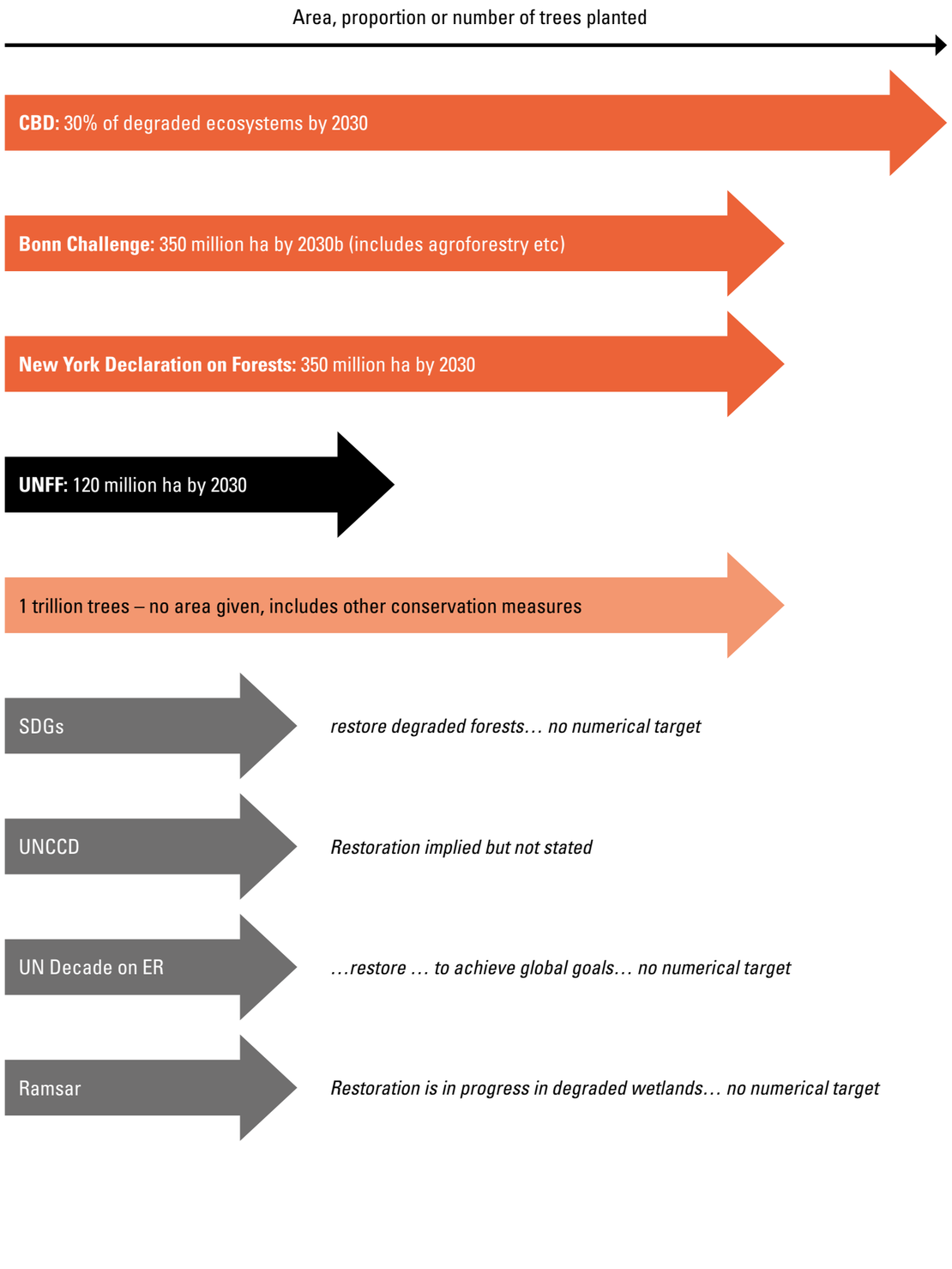


Table 3: Restoration targets



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.[191]

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[192]	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.[193]
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).[194]
Degradation	Forest degradation occurs when forest ecosystems lose their capacity to provide important goods and services to people and nature.[195]
Grounded in…principles	Ecologically founded restoration principles were proposed two decades ago to restore ecosystems, not just timber resource potential.[196] 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

CASE STUDY

Wonderful Welsh woodlands and blazing a restoration trail in Wild Ingleborough

WILD INGLEBOROUGH

A restoration effort in the north of England – 'Wild Ingleborough' – is carrying out active woodland restoration to return a continuous belt of woodland to a degraded landscape; planting and conservation grazing also support natural regeneration of woodland (by WWF and funded by Aviva).[197]

Wild Ingleborough is a collaboration between WWF-UK, Yorkshire Wildlife Trust, Natural England, the University of Leeds, the United Bank of Carbon, Woodland Trust and local communities to restore over 1,500 hectares around Ingleborough. This upland region of England would historically have been a biodiverse landscape of woodland, heather moorland, lichen heathlands and blanket peat bog. However, land-use impacts over time have degraded the habitats and reduced biodiversity.

WWF's work in the western Yorkshire Dales has evolved from the management of the National Nature Reserves (NNR) and a handful of Yorkshire Wildlife Trust (YWT) reserves via strategic land purchases that brought a partnership of organizations together and established Wild Ingleborough.

With the support of WWF and injections of funding from corporate partners, Wild Ingleborough has developed into a strong and powerful programme that is beginning to demonstrate what might be possible for nature's recovery at landscape scale in England.

This has been taken further with the successful bid to the Landscape Recovery Scheme for the Three Dales Project, which will enable us to take the thinking behind Wild Ingleborough to land managers in the surrounding areas.

The vision is for a wildlife-rich western Yorkshire Dales with Wild Ingleborough at its heart, connected to other wilder land partnerships by a nature recovery network managed through nature-friendly farming, regenerative agriculture, and rewilding.

Regenerating, re-establishing and reconnecting woodland habitats

The UK is one of the most nature-depleted nations in the world. This is reflected in the Yorkshire Dales, where pockets of native woodland and natural habitat are restricted to isolated fragments.

Sheep farming is an intrinsic part of life in our uplands, but for decades farmers have been asked to produce more and more from the same land, and things have got out of balance. The bare limestone pavement of the Ingleborough landscape is open and breathtaking; however, this land is not as biodiverse as it would have been before land-use impacts became dominant. The rich biodiversity of a mosaic of woodland, heather moorland, lichen heathlands and peatland has been lost and a careful restoration, planting and grazing programme is needed to bring it back. Restoring healthy natural woodlands is of particular importance as only 9% of England's natural woodlands are in good ecological condition.

A combination of active planting and natural regeneration is being used to restore the landscape around Ingleborough. Active planting is being used in particular to connect areas of fragmented woodland. In some areas sheep grazing is being replaced with cattle grazing. Cattle are much less efficient with how they graze, which allows some vegetation cover to naturally regenerate, which then over time allows natural broadleaf woodland to establish itself.

So far Wild Ingleborough has restored 85,000 trees through active planting to connect fragmented woodland patches, protected 62 hectares of peat bog, and brought 230 hectares of woodland into restoration.

Regenerative farming in Wild Ingleborough's mosaic landscapes

WWF's Wild Ingleborough partnership is also supporting low-intensity farming, restoring wildlife-friendly habitats, and sharing skills and knowledge, so we can help make Ingleborough a haven for nature and people.

This includes regenerative farming practices in some areas, removing the input of grass crop-improving fertilizers which are vital for providing food for animals but have negative biodiversity impacts, allowing the dominance of rye grass over natural grassland species richness. The grazing of cattle on grasslands which have not been improved through the addition of fertilizer is allowing the land to be agriculturally productive, while at the same time allowing biodiversity to flourish.

Through the project's active and natural regeneration methods, recovery of the unique patchwork habitats of Ingleborough will support a return of the rich diversity that has been lost.


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WALES: WONDERFUL WOODLANDS, ADMIRABLE AMBITION – BUT CHALLENGES IN DELIVERY

Wales' woodlands cover just 13% of its land area, but they are amazing. Around a third of Welsh woodlands are ancient, which means they have remained largely undisturbed for at least 400 years and their ancient soils provide a haven for an incredible variety of wildlife. In the UK ancient woodlands are home to some of our rarest and most threatened species. They are also our largest woodland carbon stores.

Today, all Welsh woodlands are important to society and our climate, as well as to nature. They are not just sources of timber and places of recreation, but are also effective means of capturing and storing carbon and reducing flood risk to local communities.

The Welsh government recognizes these benefits and has ambitions for the country's woodland and forests. In 2015 Wales became the first country in the world to legislate for the well-being of current and future generations in a way that aligns with the United Nations Sustainable Development Goals. The Welsh government recognizes the role of woods and trees in delivering this vision. Its Woodlands for Wales Strategy[198] acknowledged the vital importance of woods and trees, not only as a source of sustainably produced timber, but also as havens for biodiversity, for recreational opportunities, and as a means of improving health and well-being.

A National Forest for Wales

In March 2020, sadly on the eve of the Covid pandemic, the Welsh government launched plans to create a National Forest for Wales,[199] with the aim of forming "a connected network of well-designed and managed woodlands and forests stretching the length and breadth of the country". The ambition is to create new areas of woodland and help restore and maintain some of Wales' irreplaceable ancient woodlands. The project aims to provide spaces for leisure and nature, to help capture and store carbon, and provide timber as a sustainable construction resource.

As part of the plan, the Welsh government is offering grants[200] to create 100 "tiny forests" and has already announced plans for 14 National Forest sites. In the spring of 2023 the Welsh government launched its "My Tree, Our Forest" campaign offering 295,000 trees free of charge to households in Wales who could plant them.[201] Those without space to plant could elect to have "their" tree planted on public land. They were made available either by post, or via a network of NGOs including Coed Cadw Woodland Trust and the Llais y Goedwig ("voice of the woodland"), Wales' community woodland network. The project surpassed its target, planting 300,000 trees across Wales.[202]

Ambitious targets

In 2022, Climate Change Minister Julie James updated her government's tree-planting target, meaning that Wales needs to plant 43,000 hectares of new woodland by the end of this decade, equating to over 5,000 hectares per year.

According to Forest Research's latest provisional statistics[203], just 1,190 hectares of new woodland was created in Wales in the 2022-23 planting season, less than a quarter of what is needed to meet the target – though admittedly the figure had more than doubled from the previous year's 580 hectares.

This is despite the grants offered to farmers and landowners to plant new woods. As of May 2023, the Welsh government had offered farmers grants of up to £7,750 per hectare to plant trees over a 12-year period,[204] plus additional payments for infrastructure (fencing etc.) to support their efforts.

Why has this option failed to appeal to so many farmers and landowners?

Sadly, part of the answer lies in the government's failure to successfully engage with farming communities. There have been a number of well-publicized cases where Welsh farms have been bought up by companies based in metropolitan areas of England with the aim of using the land for afforestation, funded by carbon credits. This has fed into a narrative that sees planting trees as undermining the farming way of life, jeopardizing local employment and posing a threat to Welsh communities.

A high-profile project, Summit to Sea, launched in Mid Wales in 2018 with Rewilding Britain as a partner, was generally seen as a "rewilding project" and failed to gain public support from within the farming community due to fears around land-use change.[205] The project was portrayed locally as being aimed at rewilding a landscape that had traditionally been a sheep farming one, with farming families expressing profound fears around perceived land-use change. Under consultation, the original project has now been recast as Tir Canol (Middle Ground),[206] a partnership involving local communities in a co-design process providing positive outcomes for nature and people through the use of the land and sea, a process that holds lessons for best practice around land-use change that impacts rural and farming communities.

As part of the UK, and formerly part of the Europe Union (EU), within Wales the Common Agricultural Policy previously paid farmers to manage grazing land, produce livestock and grow crops, but not generally to manage woodland for sustainable use. As a result, the significant practical benefits that woodland offers – from shelter for livestock, to protection of soils, timber production and reduction of flood risk – were not widely part of commonly experienced land-use management practices for the rural families and farming communities who steward 90% of the Welsh landscape.

Following Brexit, at the urging of WWF-Cymru and other environmental groups, the Welsh government has undertaken to recast agricultural policy, passing a landmark Agriculture (Wales) Bill in 2023,[207] which will provide for the introduction of a Sustainable Farming Scheme[208] to replace the current Basic Payment Scheme of the Common Agricultural Policy. Broadly, the intention is to pay farmers for providing the public goods or environmental services that society needs to protect and restore nature and stabilize our climate. It's an idea that has strong support in rural Wales. In 2022 an opinion poll of 1,000 people commissioned by WWF-Cymru[209] found that 96% of residents in rural Wales agreed that farmers have an important role to play in protecting nature, and 88% agreed that farmers have an important role in tackling climate change.

At the same time, only around a third of residents (34%) agreed that farmers are already doing enough for nature, and the majority (60%) agreed that government financial support should only be given to farmers who make changes to protect nature and the climate.

Current plans for the Sustainable Farming Scheme[210] include a requirement that farms should include at least 10% woodland cover, plus an additional 10% of other wildlife habitats. If these plans are implemented and generally taken up by farmers, they would deliver the Welsh government's tree planting target for the period between now and 2030 as well as helping to create the conditions for a significant recovery of nature.

Stump up for trees

One interesting regional initiative which aims to support this is Stump up for Trees,[211] an independent charity based in Southeast Wales which aims to plant 1 million trees in the Bannau Brycheiniog (Brecon Beacons) area. Founded by Robert Penn, an author and former round-the-world cyclist, and Keith Powell, a seventh-generation Black Mountains farmer and vet, the organization has already established partnerships with more than 10 companies and raised funding from the National Lottery Community Fund.

Stump up for Trees has established its own tree nursery, and in 2020 very publicly announced its existence by cutting its name into the bracken on the soon-to-be planted hillside at Bryn Arw in the Black Mountains, along with a line of specially composed Welsh verse, "Daw eto ddail ar fryn", meaning that leaves would soon reappear on the hillside.

As of spring 2023 the charity had planted 231,530 trees, very nearly one-quarter of its target of 1 million.

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Celtic Rainforests

Another high-profile initiative to protect and restore Wales' woodland heritage is the Celtic Rainforests project.[212] The ancient woodlands on the western seaboard of Britain have a temperate climate, consistently high rainfall and damp conditions which are internationally rare and support a particular assemblage of plants, lichens and fungi not found elsewhere. According to the Eryri National Park, they are believed to be under greater threat than tropical rainforests.

The Celtic Rainforests project is led by the Eryri National Park Authority and includes the Woodland Trust, RSPB, Welsh Water and Natural Resources Wales as partners, and is funded by Natura 2000 and the LIFE fund. It is focussed on four areas in west Wales, including Eryri (Snowdonia), Cwm Einion, Cwm Doethie-Mynydd Mallaen and the Cwm Elan. The project has a total budget of £7 million and is running between 2019 and 2025.

As well as managing invasive species such as rhododendron and undertaking restoration work, the project also aims to raise awareness of celtic rainforests among the next generation. The project offers free educational visits for schools, including both school-based sessions and field visits.

Wales' wonderful woodlands are widely recognized as a huge asset, and the aim of creating more of them has wide support – and well-financed, co-designed initiatives can make a real difference at local level where they are widely supported. But any significant change in land use, such as increasing woodland cover across the nation, or creating a connected network of well-designed and managed woodlands and forests stretching the length and breadth of the country, will need a more fundamental change in attitudes among the land-owning community. That may possibly come, influenced by the new Sustainable Farming Scheme, but it will be a long and a slow process.

DEEP DIVE

Guardians of the land: Indigenous Peoples and forest governance

LILIANA LOZANO FLORES, WWF INTERNATIONAL,
CRISTINA EGHENTER, WWF INTERNATIONAL,
TRACEY LUE, WWF-CANADA

"Only by recognizing the rights, knowledge, innovations, and values of Indigenous Peoples and local communities will we be able to push forward the global agenda to sustainably use and conserve biodiversity."

LAKPA NURI SHERPA, INDIGENOUS REPRESENTATIVE FROM NEPAL. DECEMBER 2022. COP15.

INTRODUCTION

Indigenous Peoples (IPs) and local communities are vital custodians of the world's remaining natural landscapes, with at least 15.5% (5.11 million km²) of the total forest area formally and traditionally governed by them (data from 52 countries representing 90% of the global forest area).[213] Globally, there is growing recognition of the important roles and contributions of IPs as custodians of biodiversity as well as partners in the conservation, restoration and sustainable use agenda. Appropriate recognition of, and support for, the rights of IPs over land and resources, and engaging them as partners and rights-holders rather than beneficiaries, is critical for reaching globally ambitious forest goals. We must further invest in advocating for recognition of the collective rights of IPs, supporting self-governance systems, enhancing the revival and intergenerational transmission of traditional and local ecological knowledge, and fostering appropriate social and cultural management practices based on traditional knowledge systems.


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WHY ARE INDIGENOUS PEOPLES CRITICAL ACTORS IN EFFECTIVE AND EQUITABLE FOREST GOVERNANCE?

Research drawing on data from 64 countries comprising 82% of global land area shows that IPs and local communities own or govern, either through legal or customarily-held tenure, approximately 18% of the total; but only 10% has been formally recognized.[214] Their lands are in good ecological condition,[215] and intersect 40% of all terrestrial protected areas and ecologically intact landscapes.[216] IPs hold an intimate connection to their lands and waters and accumulated knowledge on the conservation of their territories. Traditional Indigenous territories coincide with areas that encompass 80% of the world's biodiversity,[217] providing global environmental functions and services.[218] Furthermore, IPs have contributed to mitigation strategies related to resource management and forest monitoring;[219] their lands contain at least a quarter of carbon stored above ground in global tropical forests.[220] They have also been proven to hold knowledge and capacity that often gives them a greater ability to respond and adapt to environmental threats more swiftly than centralized state responses. Finally, in addition to ecological and cultural contributions, studies in the Amazon biome have shown that Indigenous forest management strategies have made proven contributions to the local and national economy in terms of carbon sequestration, pollution reduction and sustainable use of resources.[221]

IPs have developed a diversity of management practices that have allowed them to keep the flow of forest resources and ecological services together with ensuring the provision of their livelihoods.[222] These management practices rely on traditional ecological knowledge that can include temporal restriction or total protection of certain species, protection of specific habitats due to cultural or ecological value, resource rotation, monitoring of forest resources and habitat, and watershed management.[223] Furthermore, management practices are supported by self-governance systems which enable Indigenous groups for self-organization, institutional learning and innovation that allow them to adapt and overcome the multiple socio-environmental challenges they face.

DRIVERS AND CHALLENGES THREATENING INDIGENOUS TERRITORIES

Multiple land-use drivers threaten Indigenous territories including mining, land conversion for agriculture and livestock rearing, infrastructure development, and illegal logging. A recent study shows that over a quarter of IPs lands could face pressure in the future if commodity-driven development increases; this could be exacerbated if it is combined with a lack of formalized rights and poorly applied Free, Prior and Informed Consent (FPIC) processes.[224] Tenure insecurity further undermines the sustainability and future of their territories and forests, while persistent structural and cultural challenges – linked to the primacy of colonial values over Indigenous vision and the perception of IPs as a homogeneous group – hamper the full inclusion of IPs in forest governance.

Multiple institutional responses to the diverse and interrelated threats and challenges have been developed, both by IPs and state institutions. These have included old and new models linked to state-led conservation (e.g. creation and expansion of protected areas); community-based conservation such as the integrated conservation and development projects (ICDP); co-management schemes; and, recently, market-based mechanisms such as payment for ecosystem services.[225] However, these tools have not always been fully successful, and in some cases they have brought major problems. For instance, the setting of protected area systems such as the ARPA system in Brazil has shown success in conservation outcomes[226]. Simultaneously, in some cases, the establishment of protected areas has also been linked to processes of land dispossession and less access to forest resources increasing the risk of livelihood provision to local communities[227].

More recent developments have included rights-based approaches such as the recognition of rights to ancestral lands and territories, governance systems, and sustainable economies.[228] Such approaches recognize that IPs play an outsized role in conservation through their worldviews, cultures and ways of life,[229] despite often receiving little to no formal recognition or support. The full inclusion and recognition of IPs not only makes conservation more equitable, but makes it more successful in terms of effective biodiversity and conservation outcomes.[230]

RECOMMENDATIONS AND WAYS FORWARD

International policy and corporate funding supporting Indigenous initiatives has not been enough to halt deforestation and conversion within Indigenous territories. We also highlight that policies considering the whole range of ecosystems critical for culture, livelihood and territorial claims is a key recurrent ask from Indigenous Peoples and local communities[231].

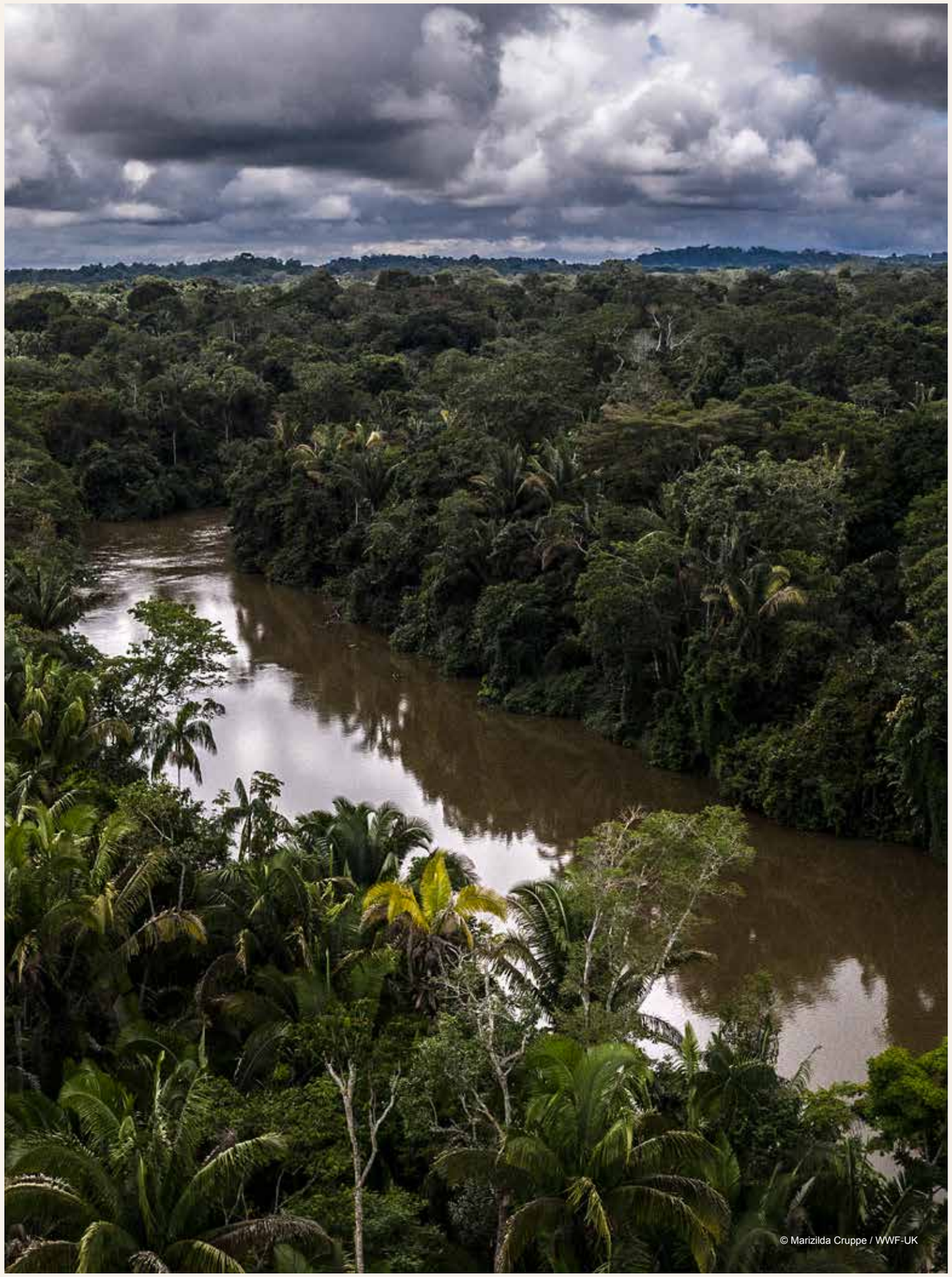
We ask for strengthening of the governance rights of IPs to protect their lands as well as critical policy developments that include:

For the governments

- *Recognizing IPs as rights-holders, and as leaders and partners in addressing climate crisis and biodiversity loss*. This implies recognizing their territories, rights and self-organization, as well as their leadership role, distancing from only considering them as collaborative stakeholders or participants, especially when it refers to decision-making process over their territories.
- *Ensuring that financial and technical resources are directly accessible to Indigenous groups to support their stewardship of forest and natural ecosystem lands,* which requires:
  - Recognizing IPs as rights-holders and partners for effective collaboration.
  - Using human rights-based approaches (HBRA) at all times (self-determination, participation, access, get benefits, socio-cultural diversity).
  - Consultation, participation, FPIC, inclusivity, transparency, culturally-tailored, and coherent donor support.
  - Taking into account the heterogeneous groups and contexts.
  - Transformational and holistic support, moving from only a "technical" view.

For conservation NGOs

- *Respecting Indigenous rights and supporting Indigenous communities in leading forest and ecosystem stewardship.*
- *Policy advocacy at national and subnational scale to influence national laws and policies on the recognition of Indigenous and traditional territories, their management practices and self-governance systems*. This implies providing adequate space for a dialogue in which Indigenous values, perspectives and priorities are listened and attended to.
- *Support the strengthening of self-governance systems to empower Indigenous institutions*. This entails strengthening the community actors and the social mechanisms that allow the functioning and sustainability of the Indigenous institutions. For instance, getting recognition as an Indigenous community; accessing rights to land and resources; putting in place mechanisms for preserving and ensuring the intergenerational transmission of the rich cultural diversity; running a comprehensive conservation approach that combines Indigenous and western knowledge systems; and strengthening youth and women's role in conservation.
- *Strengthening governance for resource management to empower Indigenous forest stewardship*. This entails running locally-led resource management practices in harmony with Indigenous traditional systems and specific ecosystems. For instance, implementing community-based subsistence strategies that rely on local production; enhancing Indigenous entrepreneurship; developing community-based monitoring strategies that combine both technological and traditional knowledge.



DEEP DIVE

Indigenous Peoples and forest management

IPs inhabit – either under legal agreements or through less formal and often insecure traditional governance arrangements[232] – many of the world's remaining areas of high biodiversity, particularly tropical and boreal forests. Research drawing on publicly available geospatial resources found that IPs manage or have tenure rights over at least ~38 million km^2 [233]in 87 countries or politically distinct areas on all inhabited continents. This is over a quarter of the world's land surface and intersects with about 40% of all terrestrial protected areas and ecologically intact landscapes (for example, boreal and tropical primary forests, savannas and marshes).[234] Research also suggests that at least a third of so-called Intact Forest Landscapes exist on Indigenous territories, probably more.[235] IPs therefore play a critical role in global biodiversity conservation strategies and in the future of these landscapes.

Biodiversity in Indigenous territories. There is good evidence from multiple sources that management of traditional territories by IPs is at least as effective – sometimes more effective – in retaining natural vegetation cover than alternatives, including many state-run protected areas.[236,237,238] This success, however, has been linked to secure land tenure in forest and ecosystem areas, a clear enabling condition.[239] Across the tropics Indigenous territories have a fifth less deforestation, conversion and degradation.[240] There is good information on the role of sacred natural sites in conserving aspects of biodiversity,[241] and some slightly more anecdotal or partial evidence of successful conservation from ICCAs and other forms of community management.[242,243,244] The site- and context-specific factors that enable the link between Indigenous territories and better outcomes for both IPs and their territories and for broader forest goals are poorly understood in detail and an area in which greater evidence is needed to inform policy.

IPs' representatives have been active in international conservation institutions, particularly the CBD, and have also increasingly been recognized for their conservation efforts on the ground. For example, in Canada, First Nations groups are protecting the Great Bear Rainforest,[245] containing a quarter of the world's remaining coastal temperate rainforests, an estimated 20% of the world's remaining wild salmon[246] and territories of 27 coastal First Nations.[247] Key success factors were use of ecosystem-based management (EBM) promoting human well-being and ecology, a strengthening of First Nations rights, land-use planning, development of enabling legislation and engaging key stakeholders and First Nations. The project brought consensus to protect 8.5 million hectares of coastal BC temperate rainforest,[248] supported local economic development and ended decades of conflict.

Pathways to fairer recognition of rights and roles. The CBD's Global Biodiversity Framework gives more explicit attention to IPs' rights and roles than previous agreements such as the Aichi targets, including the unresolved issue of how to ensure that Indigenous territories count towards the 30x30 target, whether incorporated within the existing PA and OECM frameworks or through some alternative means.[249] The GBF final statement wording was ambiguous, and it is important that this ambiguity does not pass into implementation. Given the evidence that Indigenous territories are critical to sustainable forest management and protection they must be included in the GBF's 30X30 target. Inclusion of Indigenous territories more widely in area-based conservation has many implications, including greater expectations for monitoring and adaptive management, and the need to react to changing climatic conditions.[250] At the same time, many Indigenous territories remain under pressure[251]and the need for adequate rights-based protection from threats is growing all the time.

The new opportunities presented by the GBF also carry some risks. Under implementation it is vital that governments do not simply hand over target-based responsibility for management of large land areas to IPs without adequate support, which would risk IPs being unable to defend their territories against outside pressures. IP partnerships should be fostered with government departments, NGOs and, where appropriate, with traders and businesses who are committed to rights-based and conversion and degradation-free commodities practices and sustainable forest management. Expanding funding and ensuring it reaches the people on the ground is an important priority.

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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 [252].

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.[253] 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.[254] 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.[255] 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[256] and the International Aid Transparency Standard (IATI)[257] provide guidelines for the provision of information on international financial flows – and its effectiveness[258] – 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.[259]

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.[260]

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**[261] and **US$2.2 billion a year**.[262,263] 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.[264]

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).[265] In 2020, however, finance **flows fell by almost half**, likely due to countries' changing budget priorities in the COVID-19 pandemic.[266]

For comparison, total finance for climate, from both public and private sources, reached **US$632 billion** in 2019-20,[267] 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.[268] 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**,[269] 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.[270] 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.[271] 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.[272] In other words, while the credits are available and the demand seems relatively high with nature-based credits selling for a premium,[273] the price of the credits is too low. A price of US$75[274] to US$100[275] per tonne is required. In addition, future demand for and supply of carbon credits remains uncertain.[276] 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.[277] Preventing deforestation in the most at-risk tropical forests alone requires at least **US$130 billion**[278] 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.[279]

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.[280]

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.[281] 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.[282]


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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.[283]

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.[284] 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[285]. In other words, investments in forests (c. US$2.2 billion per year[286]) 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.[287] 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[288] 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.

DEEP DIVE

Repurposing harmful agricultural subsidies to curb forest loss

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THE GLOBAL AGENDA ON REPURPOSING SUBSIDIES

Repurposing environmentally harmful subsidies is high up on the global agenda. Global alliances, including non-state actors and business coalitions, are calling for reform and repurposing of subsidies to achieve more sustainable food systems while embracing a just rural transition, and a nature-positive and net-zero economy.[289] Given that about a quarter of global emissions are associated with food production, and half of this is linked to land-use change,[290] repurposing subsidies may have a significant impact on climate mitigation. Moreover, target 18 of the new Kunming-Montreal Global Biodiversity Framework (K-M GBF), adopted in 2022 by 196 member governments, calls upon governments to identify (by 2025) and eliminate, phase out or reform harmful subsidies by 2030 in a "just, effective, and equitable manner". In addition, the G7 in 2022 committed to "redirect or eliminate incentives including subsidies harmful to biodiversity by 2030 at the latest".

An estimated **US$378 billion** to **US$1 Trillion** ([291,292] and section 1.3 of this report) of potentially environmentally harmful subsidies are spent in the agricultural sector each year, including crop commodities responsible for driving forest loss and conversion of other natural ecosystems. This also has impacts on greenhouse gas emissions, carbon sequestration and biodiversity loss. At the same time, it is estimated that **US$460 billion per year** are needed to halt and reverse forest loss by 2030. Currently, domestic and international mitigation finance for forests averages US$2.3 billion per year – less than 1% of the total needed.[293]

Consequently, repurposing harmful subsidies is needed not only to promote deforestation- and conversion-free agriculture and agri-food production, but also to support the uptake of practices that support restoration of degraded lands, including through agroforestry or regenerative agriculture,[294] as well as forest and biodiversity conservation. The value of forests to improve and support agriculture, help build resilience to climate change[295] and contribute to food security[296] and production is evident, but is so far hardly reflected in agricultural (support-) policymaking.

AGRICULTURAL SUBSIDIES AND DEFORESTATION

Agriculture drives more than 90% of tropical deforestation.[297] A portion of commercial agricultural expansion is driven by subsidies, in a range of different ways. However, the transmission mechanisms through which subsidies lead to deforestation are complex and difficult to quantify.[298] A number of efforts have been made to understand these links. For example, a recent study from the World Bank[299] examines the causal link between agricultural price support and deforestation, and estimates that it would be responsible for about 2.2 million hectares of forest loss per year, or 14% of annual deforestation. In addition, the report suggests that subsidies in consuming countries also contribute to tropical deforestation in producing countries (e.g. increasing subsidies to livestock in the USA would have some impact on soy expansion in Brazil, and subsequently on deforestation).

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REPURPOSING WHY AND HOW?

Many conventional agricultural support and incentive programmes do not achieve their intended purpose and lead to undesirable environmental outcomes.[300] Removing subsidies may reduce those outcomes, but more is needed to support the transition to more sustainable food systems, including behavioral and technological shifts.[301] In this regard, a subsidy reform is not only about removing harmful subsidies but repurposing these resources to ensure effectiveness and long-term sustainability, including consideration of social fairness and inclusion. Sustainable development, poverty eradication and food security must take center stage as most of the agricultural support policies' intention is to increase food security and reduce rural poverty.[302] Therefore, the successful repurposing of subsidies is highly dependent on political will and public perception.

Social, economic and environmental dimensions need to be considered in designing the repurposed subsidy; guidance exists and can be built on, as is discussed below.

From a **social dimension**, the subsidy reform needs to be **just, fair and equitable**.[303] The Just Rural Transition initiative[304] has developed a set of 10 principles aimed at providing guidance and a framework to shift towards just rural food systems, including what this means in terms of desired outcomes, planning and decision-making processes, systemic changes needed, and tensions that must be managed.[305]

From an **economic perspective**, the private financial and social economic costs and benefits of reforming subsidies and repurposing options need to be fully considered. A subsidy reform will entail short- and long-term gains, trade-offs, and winners and losers that have to be fully acknowledged for specific private actors and for the society as a whole.[306] Tools such as FAO's Monitoring and Analyzing of Food and Agricultural Policies (MAFAP)[307] or BIOFIN's new guideline[308] can help identify, analyze and monitor harmful subsidies, their current and true costs (including externalities), redesign options, and socioeconomic and environmental trade-offs.

The **environmental dimension** of the reform contributes to reaching wider societal and development goals. Current and conventional agricultural subsidies, while historically focused on improving food security and progressing on socioeconomic indicators,[309] often lead to undesired outcomes[310] and potentially have wider negative impacts on the environment including driving forest loss.[311] However, many positive examples and studies of public incentives programmes that promote a deforestation- and conversion-free and forest-positive agriculture exist and can be drawn on.[312,313]

CONCLUSION AND RECOMMENDATIONS

There is political momentum and opportunity to repurpose harmful agricultural subsidies to protect forests and other natural ecosystems, as well as to support restoration of degraded agricultural lands and natural ecosystems. Much of the debate has focused on the agricultural sector and food systems, but has neglected the contributions of forests and their wildlife in maintaining ecosystem services (soil health, pollination, seed dispersal, water flow etc.) for the long-term sustainability of agriculture, food systems, and rural people's well-being.

When looking at the role of forests in food production, both the risks and opportunities need to be taken into consideration. If designed correctly, repurposed agricultural subsidies can incentivize a deforestation- and conversion-free agricultural production and at the same time promote forest-positive regenerative agriculture and agroforestry systems, that include sustainable tree-based food production and sustainable intensification[314] through the integration of trees and woodland into farming systems.[315] Since repurposing options entail social, economic and environmental trade-offs and winners and losers, strong political will and societal acceptance is needed (see Case Study: Wonderful Welsh Woodlands).

AN AGENDA FOR ACTION

There has not been a better time to drive this agenda forward, with international attention on the transformation of food systems[316] and the urgency of repurposing environmentally harmful food subsidies (see Deep Dive on Subsidies). At the same time a new EU regulation on deforestation-free products (EUDR)[317] has been adopted, preventing the import of agricultural commodities that are associated with deforestation into the EU. Furthermore, in the Glasgow Leaders Declaration on Forests and Land Use[318]145 government leaders representing 90% of global forests have committed to work together to halt and reverse forest loss and land degradation by 2030, including to "redesign agricultural policies and programmes to incentivize sustainable agriculture, promote food security, and benefit the environment".

While this looks like an obvious opportunity to reconcile forests and agriculture, existing institutional and political silos have to be overcome through strong political will and collective action. What is needed now is a strong action-oriented global agenda driven by ambitious public and private sector champions.

At international level, such an agenda could pursue the following actions:

- Establish a **working group t**hat cuts across and marries work and progress under the **Glasgow Leaders' Declaration**[319] and the **United Nations Food System Summit**[320] with the aim to more explicitly link agricultural subsidies and forest-related goals.
- Create an intersectoral working group (with members from FAO's COFO and COAG) on subsidies, best-practice examples and incentives for agriculture and forests, capitalizing on relevant findings of flagship reports from FAO and WB.
- Establish dialogues and roundtables on sustainable agri-food repurposing **with finance ministers** of forest-rich countries and key consumer governments. This could be facilitated through the **Forest and Climate Leaders Partnership.**
- Establish a task team on the role and promotion of forests and ecosystems in the agri-food agenda under the **Just Rural Transition initiative**[321].
- Use the momentum of the recently adopted **EU Deforestation Regulation (EUDR)**[322] and tailor agricultural repurposing-support programmes to meet the EU's requirements.

At national level, governments can start to identify and reform subsidies and scale up policies and support for deforestation- and conversion-free and forest-supporting agriculture, including through:

- Taking advantage of and engaging in existing support programmes, including FAO's MAFAP, BIOFIN's new guidance on repurposing (see above) and the findings of key research in this space (WB, CIF, ODI, WRI).
- Updating and strengthening National Determined Contributions (**NDCs**) by including targets from the agricultural sector that affect forests.[323]
- Including a national target and/or policies in the National Biodiversity Strategy and Action Plans (NBSAPs) on sustainable agriculture (target 10 K-M GBF) aiming at addressing deforestation and conversion in agricultural production.
- Optimizing the benefits of forests for food production and security by taking policy measures aimed at sustainable management of both forest products and forest ecosystem services,[324] as well as protecting, maintaining and restoring critical forest corridors.[325]

DEEP DIVE

Cross-region efforts to promote a responsible timber supply chain in Gabon

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Sustainable forest management practices, such as reduced impact logging, have achieved a great deal in avoiding degradation from logging. Reduced impact logging (RIL), as one example, has been found to reduce species loss in logged areas[326], preserve taxa[327] and reduce impacts on the physical environment[328] including protecting the soil during logging[329], a crucial enabling condition of ensuring forest management does not lead to severe degradation, and leaves forests with the soil, water quality, and seedbanks needed to undergo natural regeneration, post logging. RIL has also allowed management to reduce carbon emissions from logging[330]. Defining degradation is complex, but, green forest economy pathways have the potential to be limiting to high forest cover nations, without embedding the allowance of sustainable forest management as a means to avoid degradation in definitions, goals, commitments and targets, and ensuring the agency to develop economically.

We share here a case study in which Gabon has taken steps to develop a sustainable bioeconomy, with the forest sector representing the largest private sector employer. The implementation of a log export ban, commitment to move towards FSC certification by 2025, creating the enabling environment for processing facilities to operate sustainably, provide examples of the steps Gabon is making.

INTRODUCTION

Gabon is one of the world's most forested countries, with over 88% of its total surface area (267,667 km²) covered by tropical rainforests. Its floral diversity is linked to the Guinean-Congolese regional center of endemism,[331] and the diversity of its lowland plant species is among the richest in all of Africa.[332] Gabon's forests are also rich in wildlife, with a highly diverse megafauna, including about 60% of the world's remaining critically endangered forest elephants.[333] It also maintains a significant population of western lowland gorillas, mandrill monkeys, forest buffalos, and noteworthy birdlife.

Of the 22 million hectares of forest in Gabon, about 15 million are under logging concessions. The Forest Code makes the sustainable management of allocated forest concessions mandatory, as well as the processing of wood, banning the export of whole logs. In 2018, the Gabonese authorities announced that FSC certification would become mandatory by 2025. At present, there remains a gap between commitments towards the FSC certification and implementation and compliance with Forest Management Certification requirements promoted by the government.

Chinese-owned companies have the biggest stake in Gabon's forest concessions. This case study first looks at the encouraging signs of a shift towards sustainable forest management by Chinese (and other) companies in Gabon, before taking a broader view of China's potential for reducing the demand for illegal and unsustainable timber and fostering sustainable forest management.

CHANGING ATTITUDES

Of the 15 million hectares under logging concessions in Gabon, Chinese timber enterprises represent the largest group, with over half of Gabon's production forest (estimates range from 50-70%) being under Chinese ownership.

A major change WWF has witnessed in Gabon has been a shift in approach by Chinese forest enterprises towards pursuing FSC certification. Increasing the number of Chinese companies reaching certification standards would provide a signal to the market, and a blueprint for Chinese forest enterprises working in Gabon and the wider Congo Basin. This would in turn lead to an uptick in sustainable forest management in the country, and should also lead to positive impacts for biodiversity and the well-being of local communities over the longer term.

Although it is hard to pinpoint one specific cause of the shift, a combination of the Chinese government's roll-out of the amended Forest Law, coupled with the President of Gabon committing to mandatory certification, have both played their part. China's amended Forest Law includes a ban on buying, transporting, and/or processing illegally sourced timber, and requires processing companies to establish a data record of raw materials and products (Article 65, see below). Meanwhile, in September 2018 the former President of Gabon, H.E. Ali Bongo Ondimba, declared that all operating forest concessions in Gabon would have to be FSC certified by 2022 (recently pushed back to 2025). On 31 January 2020 a cooperation agreement was signed between the Ministry of Forests of Gabon and the Forest Stewardship Council (FSC). WWF helped to influence this by raising awareness and advocating to promote legality and FSC certification with the forestry administration, and supporting Chinese forest enterprises to move towards FSC implementation.

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BRIDGING THE CERTIFICATION GAP

In order to meet FSC standards, Chinese forestry companies are in need of capacity building, particularly around community relations, wildlife monitoring and traceability. Relations with local communities and chiefs are challenging with both a language barrier and misaligned expectations, while in some cases enterprises enter the timber sector in Gabon with no prior experience, having been established previously in sectors such as infrastructure.

WWF-Gabon under the UK Foreign, Commonwealth & Development Office (FCDO) flagship Forest Governance Markets & Climate (FGMC) programme has supported the establishment of "Chinese forestry company role models", which should act as benchmarks for other Chinese forestry companies to move towards sustainable forest practices. To do that, WWF-Gabon engaged and enrolled two Chinese forest companies as Forests Forward members (see Case Study on Cross-Region Efforts to Promote a Responsible Timber Supply Chain in Gabon). One of them, Bonus Harvest, employs nearly 200 workers in Gabon and has a forest concession covering 128,000 hectares. The other, Gabon Wood Industries (GWI), has concessions covering over 400,00 hectares.

When WWF-Gabon first started working with Bonus Harvest, few expected the company would achieve FSC certification. Bonus Harvest started active engagement with WWF in March 2021 after participating in a number of WWF group workshops on sustainable forest management and FSC standards. WWF-Gabon subsequently conducted an audit and provided recommendations on issues which needed to be addressed in order to progress towards reaching certification standards.

WWF has requirements that need to be met in order to onboard timber enterprises and offer further support. These include:

- Securing appropriate staff to deal with forest management, environment, reduced impact logging, wildlife/biodiversity, and social aspects
- Careful due diligence and compliance

Further support from WWF-Gabon included technical advice around certification processes, reduced impact logging, community engagement/social inclusion, participatory mapping and FPIC, and wildlife monitoring. Bonus Harvest and GWI have now achieved LegalSource certification. After becoming LegalSource certified, Bonus Harvest immediately engaged in FSC certification, and is seen by many as the leading Chinese timber company in sustainability in Gabon. Its operations have now improved in terms of securing appropriate staff, addressing legal requirements, reducing impact, protecting wildlife and biodiversity, and addressing social inclusion issues.

By supporting Bonus Harvest as an industry role model, FGMC has contributed to a wider shift in intentions across Chinese timber companies. Many other Chinese companies have since enquired directly with Bonus Harvest about how to improve forest management practices, and WWF-Gabon now receives around four enquiries a week from Chinese timber companies who want to work towards more sustainable forest management. Among them, 23 have been undergoing training on aspects of sustainable forest management and certification, while five have been selected to benefit from further WWF support (subject to due diligence).

The trend has also attracted engagement from non-Chinese enterprises. For example, WWF-Gabon is currently carrying out due diligence with the largest company in the Gabon Special Economic Zone (GSEZ), which owns seven forest concessions covering more than 1 million hectares – the company referenced the Bonus Harvest example in its request for support. Currently, GSEZ is in the process of joining WWF Forest Forward, establishing an agreement and action plan to implement good forestry practices and achieve FSC certification.

Another significant opportunity emerged to leverage progress in reducing illegal logging and promote sustainable forest management, when the minister in charge of forests and the environment issued order 41/MEFMEPCPAT/CAB-M on the creation, organization and operation of the legality control and traceability system for Gabonese timber. WWF helped to influence this step forward by raising awareness and advocating to promote the timber legality assurance system with the forestry administration. WWF-Gabon facilitated socialization and the involvement of stakeholders, co-organizing a workshop with representatives from more than 60 forest companies, NGOs, Indigenous Peoples and local communities.

The FGMC programme has made considerable progress since its launch. However, although the results have been positive to date, ensuring a permanent market shift will require more funds to support enterprises with capacity building and training in order to reach a critical mass of certified companies in Gabon.

CHINA'S GLOBAL DEMAND FOR TROPICAL TIMBER

China's imports of logs and sawnwood timber have increased significantly since 1998. By 2014, the total volume of imported logs and sawnwood (equivalent to 87.8 million m^3 of log volume) exceeded the volume of its domestic commercial timber production (82.3 million m^3). China's dependence on imports of logs and sawnwood reached 56% in 2019. China imports timber products from more than 100 countries. The top five suppliers in 2019 were Russia, the EU, New Zealand, the United States and Australia – together they accounted for 57% of China's total imports by value.

For hardwood logs, China's main suppliers in 2019 were Papua New Guinea (21%), Solomon Islands (15%), the EU (12%), Russia (11%) and the Democratic Republic of the Congo (5%). Customs data shows a surge in tropical log imports in recent years from some smaller suppliers, including Sierra Leone, Suriname, Central African Republic and Ecuador, indicating a decentralization trend in China's import sources. African countries have replaced Asian (mainly Mekong) countries as China's main sources of rosewood imports. According to Global Witness, about two-thirds of the world's tropical logs were exported to China in 2018, while most of the top 10 countries supplying China with tropical timber ranked very poorly against metrics for rule of law and control of corruption, with illegal logging rampant.[334]

CHINA'S ROLE IN SUPPORTING A SUSTAINABLE TROPICAL TIMBER TRADE

Due to its size and economic weight, China has an unparalleled impact on tropical forests globally – it is now the world's largest single country importer of tropical timber[335]. As a result, China has a unique economic and political influence on critical markets that represent an economic lifeline for certain forest-rich countries – but equally, if left unchecked, deforestation and forest degradation threaten both the forests and development of these countries and the reputation of Chinese companies operating overseas. In other words, China's actions through both its government and private sector have the power to make or break the ambitions of producer countries to crowd out illegal deforestation from their supply chains and support a transition to green carbon economies in high-forest-cover nations.

The loss of tropical forests is a global issue impacting the rights of Indigenous Peoples, the livelihoods of forest communities, and wildlife habitats. Recognition of China's responsibility for its overseas footprint is now well established in Chinese policy thinking[336] and debates, with China already having declared its commitment to ecological civilization, the establishment of rules-based global environmental governance, and the value of ecological redlines. Domestically, China has put in place extensive environmental protection legislation. The focus now turns to China's overseas footprint, which requires balancing the competing and contradictory forces of national growth, development, and global environmental stewardship.

ARTICLE 65 OF CHINA'S FOREST LAW

China's legislation for addressing illegal timber being purchased, processed and transported into the country potentially has significant consequences for wood purchases at both a domestic as well as a global level.

On 1 July 2020, Article 65 of China's newly revised Forest Law came into force. It clearly stipulates the following: "Timber processing enterprises should establish an account of the entry and exit of raw materials and products. No unit or individual may purchase, process or transport timber that he/she clearly knows was illegally felled or indiscriminately felled in forest regions".

This article provides a legal basis not only for China to address the challenge of the purchase, processing and transportation of illegal timber, but also for Chinese timber trading and processing enterprises to implement their due diligence obligations concerning legally produced timber.

Article 65 provides the basis for China's legislation regulating and supervising the legality of timber sources. At present, most Chinese timber-importing and processing enterprises lack functioning due diligence systems, while their recording of raw material purchases and sales is uneven. In future, businesses need to establish and control their material and product entry and exit accounts to comply with timber legality requirements.

UNCERTAINTY AROUND THE LAW

While Article 65 explicitly provides the legal grounds for preventing illegal timber from entering the supply chain, it is not clear whether this article includes imported timber and timber products – and, if so, how to determine the legality of such products. Several seminars have been organized to discuss this issue, with most participants suggesting that Article 65 should indeed encompass imported timber and that tracking timber legality to its original producing country should be included in the upcoming regulations for the implementation of the Forest Law.

There are also questions around how Article 65 should be implemented and enforced in practice, particularly in relation to timber imports. One option would be to use the CTLVS standard, although this is only voluntary. Another option would be to enforce Article 65 using a national mandatory standard. A third way could be to require Chinese importing companies to ensure transparency in tracing their products back to the country of origin, where possible adhering to standards such as the FSC's and PEFC's.

There are still divergent views on how to verify whether imported wood is "clearly known to be illegally and indiscriminately harvested". Our research team's analysis suggests that not all legally exported timber was drawn from sources that were legally logged. Some timber may have come from illegal sources but was nonetheless imported after legal export documents were obtained through illegal means. In practice, importers should be under an obligation to perform the necessary due diligence and manage the entire timber supply chain to ensure that the timber is legally sourced, rather than simply accepting the timber as legal because it has not been smuggled.

CONCLUSIONS

This case study has illustrated that unsustainable and illegal logging can be addressed at both ends of the supply chain: with Chinese-owned companies operating in Gabon and by China's own policy commitments.

In Gabon, the FGMC project has inspired forest companies to implement good forest practices and make progress toward certification. This is a positive start, but significant resources are still required to ensure a more profound market shift.

However, given the differing legislation across the Congo Basin and the prominence of Chinese enterprises across the timber sector, this work needs to go beyond the borders of Gabon and into ROC, Cameroon and DRC. Ensuring a strong legal and sustainable timber sector in the Congo Basin and working with Chinese timber enterprises will be crucial to secure the well-being of the forests and the people that depend upon them, as well as crowding out the illegality that risks preventing these countries from developing economically, equitably and sustainably. The impact of this, whether successful or unsuccessful, will be felt well beyond the borders of the Congo Basin, and will require international support and investment.

As the world's largest importer of logs and sawn timber, as well as being an important consumer market for timber products, China can help timber-producing countries improve their forest governance and reduce illegal logging. Such actions would demonstrate that China is taking its responsibilities in this arena very seriously, and align to the ambitions it has set through multilateral forums such as ASEAN and FOCAC for equitable South-South trade and development.

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TREE STORY

Rosewoods: a treasured part of our natural and cultural heritage

The term "rosewood" is a colloquial one, variously used for several species or genera of trees. However, it is most commonly associated with the genus *Dalbergia*,[337] which comprises lianas, shrubs and, crucially, small and medium-sized trees. *Dalbergia* species are members of the pea family. As such, they are nitrogen fixers and play an important role in the forest ecosystems where they are found.

Fossil records of the genus from the late Miocene epoch (from 23 million to 5 million years ago) have been found in France,[338] Hungary[339,340] and China.[341] Today, *Dalbergia* species occur across the tropical belt, from Central and South America, through Africa and Madagascar, into South and Southeast Asia.

Some species are known as rosewoods, because of the smell of the timber when cut. The heartwood of the trees (i.e. all but the outermost few centimeters of the trunk) is frequently coloured red, purple, brown, black or even striped, making it valuable for ornamental purposes, including furniture. China in particular has a long tradition of manufacturing elaborately carved rosewood furniture, only affordable by wealthy elites, and in Chinese rosewood is known as *hongmu* or red wood.[342] Elsewhere species have also been used in cabinet work, as veneers and for ornamental carvings; historically, rosewood furniture was also prized in the salons and drawing rooms of Europe.

DEMAND AND THREATS

Rosewood is the most widely traded illegal wild product in the world,[343] and is often called the "ivory of the forest". The United Nations Office on Drugs and Crime (UNODC) notes that it is traded more than ivory, rhino horn and pangolin scales put together[344]. Given the burgeoning demand for rosewood species – primarily for high-end furniture and upholstery for boats – there is a significant threat to the genus, with three Mekong species (Siamese rosewood, Burma blackwood, Burmese rosewood) facing extinction from threats including overgrazing, fires, overexploitation, habitat conversion and climate change. According to one report all of these species faced significant risks from at least one of these threats across 75%[345] of their native ranges.

Given that rosewood is a slow-growing species which takes decades to reach commercial maturity – and in some cases hundreds of years to reach full maturity – demand for it is outstripping supply, with devastating impacts. Examples of this can be found in both West and East Africa.

Because *Dalbergia* stocks are so depleted in many parts of the world, furniture manufacturers are turning to other species with similar properties. In West Africa, *Pterocarpus erinaceus*, also a member of the pea family, colloquially known as "kosso", is a rare raw material coveted for its medicinal uses and for luxury upholstered furniture. This species of tree can only be found in nature within West Africa's Sahelian region, stretching across a 5,400 km belt of land.[346] For kosso source countries, the illegal timber trade is as much an economic issue as an environmental one. Desperately needed tax revenues are lost to the illegal trade, while the illegal plunder diminishes vital resources used by local communities and increases the threat of desertification by degrading fragile forest ecosystems.

As well as providing economic revenues to both communities and governments, rosewood trees serve as key habitats, for example providing nesting sites for endemic animals such as ruffed lemurs[347] in Madagascar. Although the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) listed all types of Madagascan rosewood under Appendix II in 2013, prohibiting their trade except in exceptional cases, illegal extraction of rosewood continues to put significant strain on endemic Madagascan species that rely on it, as well as through the impact of illegal wildlife trading to supply loggers with food while in forest areas.

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WHERE DOES ROSEWOOD GO FROM HERE?

As with so many materials derived from wildlife, rosewood is not only a key component of our natural heritage, but is also deeply embedded in humankind's culture. Unlike, say, ivory or tortoiseshell, we are not yet at the point where we need to ban its use and trade completely. However, apart from *Dalbergia nigra*, for which international trade is already outlawed, some species currently on CITES Appendix II are past the point where further extraction is sustainable. The international community needs to work with range countries to ensure that these beautiful trees, with all of their unique cultural associations, remain with us in the future.

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,[348] but domestic and international finance for forests averages just US$2.2 billion per year.[349] 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.[350] The UN Forum for Forests highlighted the need for a financing strategy in May 2023.[351] 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.[352,353] 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.[354]

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.[355,356] 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.[357]

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.[358,359] 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[360] 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.[361] Alternative livelihoods seldom offer better options than forest conversion and are seldom driven by the needs and aspirations of rights-holders.[362] Most have not been set up in ways to allow evaluation of their success.[363] Carbon offset projects have often failed to deliver amid concerns about additionality, permanence and leakage.[364] 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.[365]

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.[366] 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.[367]

7. **Investments are often donor-driven rather than country-led.** They are therefore generally influenced by outsiders' priorities rather than local aspirations.[368] These do not always transfer easily to other cultures or informal economies,[369] nor do they take into account differing perceptions of risk.[370] 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.[371] 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.**[372] 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.[373] 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.[374]

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.[375] In the tropics, these problems are often more intense, e.g. HCV demands in oil palm developments being beyond the capacity of managers.[376] 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.[377] 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.[378] "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.[379] Rather than finding new funds, the first action is to redirect funding which drives deforestation towards conservation and support for a green economy.[380] 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.[381] 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.[382] Businesses can take a stepwise approach by integrating nature into their climate transition planning and aligning transition plans with nature-positive goals.[383] 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[384].

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.[385] 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,[386] integrating conservation action with investment in the green economy[387] 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.[388] 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.[389]

- **Payment for ecosystem services (PES):** links finance with forest conservation through water funds or similar.[390] 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.[391] PES needs plausible monitoring, safeguarding policies and advocacy to ensure additionality with legislative development often required to guarantee adoption at scale.[392] 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.[393]

- **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,[394] 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.[395]

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.[396] 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.[397]

DEEP DIVE

Voluntary carbon finance mechanisms can provide needed finance for forest protection and restoration

DAMIAN FLEMING, WWF INTERNATIONAL, AND COLLEAGUES

CARBON FINANCE FOR FORESTS TO DATE

Significantly greater investments in protecting and restoring nature and its ability to sequester carbon are necessary if we are to deliver on the Paris Agreement, the Kunming-Montreal Global Biodiversity Framework and the Glasgow Declaration on Forests and Land Use. It is widely acknowledged that mobilizing private finance will be crucial, alongside public and philanthropic funding. The voluntary carbon market (VCM), originally intended as a bridge to future compliance markets, has been widely heralded as one of the most promising market-based mechanisms: it has grown to around US$2 billion in size and is projected to grow at least five-fold by 2030. The appeal of carbon markets is easy to understand. However, the voluntary market remains small and a drop in the ocean of what is needed overall to protect, conserve and restore forests and other ecosystems globally.

The VCM has been tarnished by credibility issues that have been more publicly exposed[398] in recent years. Criticism is centered around three main areas. First, on the demand side far too many companies are relentlessly focusing on offsetting and using carbon credits as a short-cut to meeting spurious net-zero or carbon neutrality claims – favoring high-volume, low-quality, low-price credits, and as a substitute for setting and delivering on credible science-based decarbonization pathways. Second, on the supply side there are credibility issues related to performance measurement and verification based on the market's need to establish counterfactual baselines which often leads to carbon benefits being overstated (e.g. through inflated baselines, or leakage to adjacent areas outside the project site), or where benefits risk being reversed later on due to policy shifts or enforcement failures (permanence issues). Third, another major criticism is that the market actors fail to fully engage with local communities during the project design and benefits are not equitably shared.

However, we certainly do not want to turn off the tap to private sector finance that supports inclusive programmes that restore and protect our forests and other ecosystems. There are positive examples and important voices[399] in support of REDD+, the VCM and other approaches to mobilizing private finance.

To address many of the weaknesses of the VCM, there are a number of efforts to better regulate the market and facilitate a rapid transition towards high-quality, high-integrity projects – including national regulation and guidance from the Integrity Council for the Voluntary Carbon Market,[400] Voluntary Carbon Markets Integrity Initiative[401] and the Tropical Forest Credit Integrity Guide[402] – all of which is welcome.

However, due to the systemic nature of the problems outlined above, there are growing calls for a more fundamental shift away from certified tonne-for-tonne based approaches towards a money-for-tonne contribution approach.[403]

A NEW MODEL OF NATURE AND PEOPLE-POSITIVE CARBON FINANCE

A first fundamental shift is for all companies to be both decarbonizing as rapidly as possible (Scope 1, 2 and 3 emissions) and investing in protecting and restoring nature.[404] It is not either/or. Safeguarding forest and other ecosystems requires on one hand urgent and total phase-out of fossil fuels, the largest driver of the climate crisis, and major investment in renewable energy. On the other hand, it also means conserving 30-50% of land, ocean and freshwater sinks.

A second fundamental shift is from offsetting by companies towards a contributions approach. Offsets are far too frequently being used as a substitute for deep emissions reductions, and equally are ill-suited to the uncertainties that are inherent to the voluntary carbon market. It is almost impossible that each certified tonne of avoided CO_2 emission will prove real in an ex-post analysis, particularly for projects with a goal of reducing emissions from deforestation, and impossible to guarantee against reversals at some point in the future, or leakage outside of the project area. For these reasons, one tonne of carbon emitted by burning fossil fuels is never equivalent to that saved from a forest-based project, so offsets are essentially a false economy. At the same time, investing in forest and ecosystem protection and restoration yields multiple benefits, not just carbon sequestration. Through a contribution approach,[405] companies first account, disclose and reduce their value-chain emissions in line with an ambitious science-based target, and then quantify their remaining emissions and – using a fair price of carbon[406] – invest the resulting financial resources in activities or programmes for people, nature and climate impact where they are best able to make the most telling contribution towards global goals. These investments are not considered offsets, nor are they the basis for carbon neutrality or related claims. We are seeing many companies turning towards this approach. WWF is working with Gold Standard to develop guidance on the claims companies can make while following this approach.

Third, we need a shift from isolated projects to national and jurisdictional scale programmes (and nested projects within them), with long-term investment, and human rights and environmental due diligence, in order to effectively tackle deforestation drivers and circumvent issues of leakage and permanence. Technical assistance accompanying climate finance is crucial in setting baselines and appropriate policy frameworks and enabling good governance. WWF's NBS (Nature-based solutions) Origination Platform has recently been established to provide critical ex-ante finance in addition to project finance to collaboratively scope, develop and deliver NbS portfolios that address threats and drivers efficiently, incorporate transparent and equitable governance and benefit-sharing mechanisms, and generate durable impacts for climate, biodiversity and sustainable development in a combined manner.

A further important shift is from wholly market-driven approaches to a focus on impact and landscape needs, and those of local communities. Market approaches naturally incentivize low-cost, high-volume transactions, and with a current average carbon price of less than US$10 a tonne it isn't surprising that we have such an abundance of low-quality projects. We must shift focus towards scaling climate funding for impact, including co-benefits beyond carbon, as acknowledged in the innovative finance paper released by the GEF earlier this year.[407]

NEED FOR INNOVATION

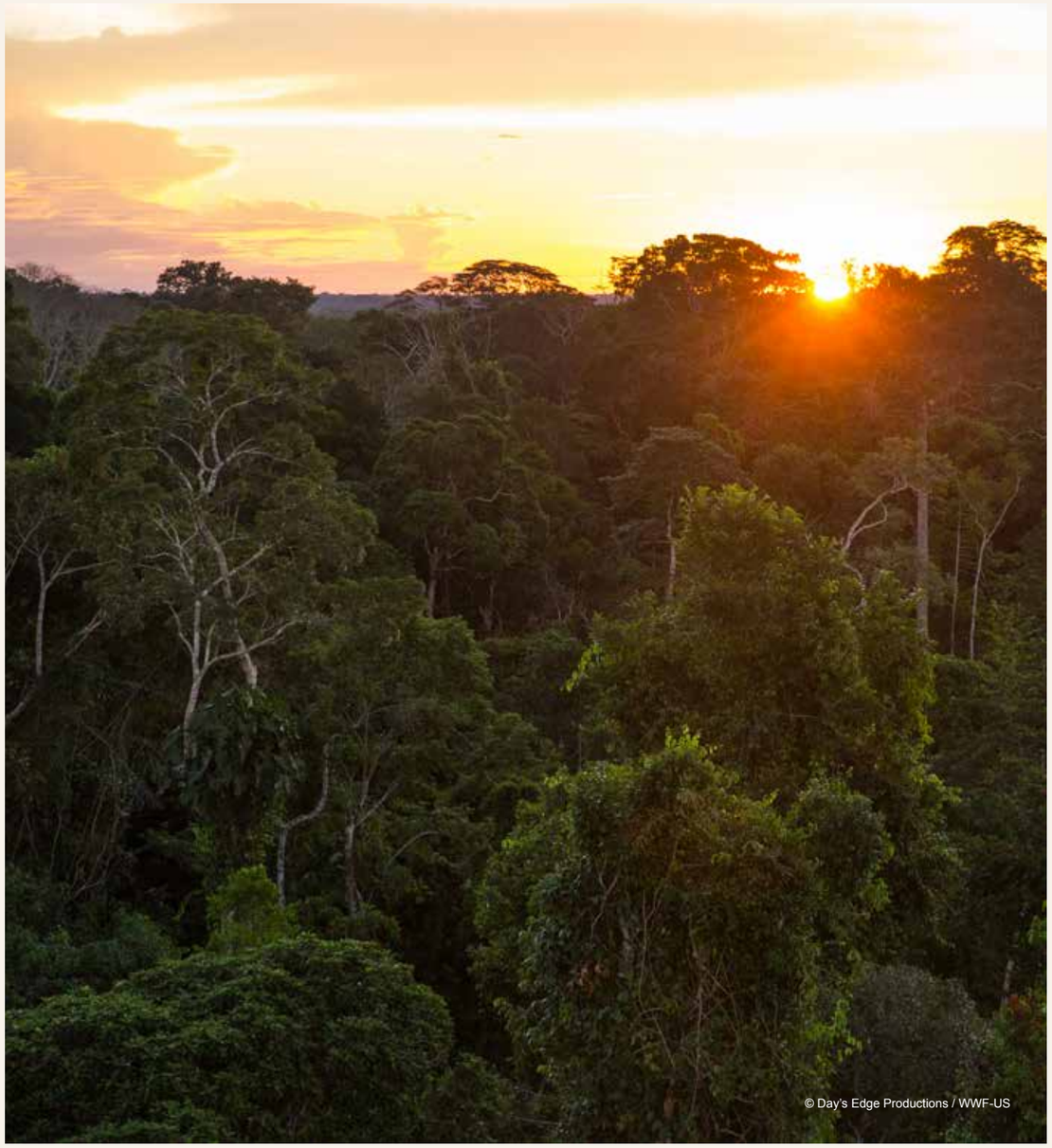
There is an urgent need for new mechanisms that deliver finance to the world's most critical forests and the local communities and IPs that live in and around them. Countries with largely intact natural forests have significant, untapped and cost-effective mitigation potential in NbS that could be mobilized through carbon finance. However, with accounting systems focused on emissions reductions or removals coupled with low carbon pricing, these countries are not sufficiently rewarded for taking action to conserve their forests. WWF is working with Congo Basin governments (see Deep Dive: Cross-region efforts to promote a responsible timber supply chain in Gabon) to explore innovative mechanisms that provide greater financial incentives to protect forests and stimulate a green economy. There is increasing interest in biodiversity credits[408] as another mechanism to deliver market-based finance, although the market is very young with little demand signal to date – and it will also need to overcome many of the criticisms of the carbon market listed above.

CONCLUSION AND RECOMMENDATIONS

Forest-based countries' calls for greater finance to conserve and restore forests and support a green economy are increasing in volume.[409] Alongside this there are growing efforts to develop new mechanisms and platforms to enable finance and technical assistance to flow, including the Forest Climate and Leaders Partnership launched at COP27.[410] Voluntary carbon finance undoubtedly has a contribution to make. A limited fraction of these investments can be done via high-quality market-based approaches, but there are a wealth of opportunities using non-market-based approaches which should be favored. Key recommendations include:

- Greater demand-side regulation towards a level playing field that supports and rewards companies to both rapidly decarbonize and invest in long-term, high-quality NbS through a contributions approach that fairly prices carbon.
- Ex-ante finance to support countries and jurisdictions to develop high quality programmes with multiple benefits, including support for participatory planning, feasibility assessments/spatial mapping, capacity-building and partnership development, implementation planning and costing, carbon accounting, financial modeling, and strategic aggregation of activities to achieve transformative impacts at scale. WWF is establishing an NBS Origination Platform in selected priority landscapes to service this need.
- Support to develop new finance mechanisms that incentivize the conservation of high-integrity forests alongside investment in a green economy, tailored to local contexts.
- Greater clarity in NDCs, NAPs and LT-LEDS in terms of ambitious, quantitative GHG targets for forests, the use of carbon markets to meet climate goals, and the inclusion and participation of IPs and local communities in policy processes and implementation.

There are well publicized global concerns over the integrity of the voluntary carbon markets. However, as part of the process of laddering up to a compliance framework for nature recovery, if demand and supply side carbon market integrity issues are fully addressed, carbon and biodiversity credits can make an important contribution to financing landscape level restoration. WWF believes there is still a place for high quality high integrity carbon credits, with strong safeguards.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CASE STUDY

Koala-friendly carbon

MICHAEL DAVIS AND COLLEAGUES, WWF-AUSTRALIA

In 2022, one of Australia's most iconic animals – the koala – was listed as endangered on the country's east coast. It is estimated that koala numbers have halved in the last 20 years, to as few as 86,000[411] individuals across Australia's eastern jurisdictions of Queensland (Qld), New South Wales (NSW) and the Australian Capital Territory (ACT). This is from a koala population estimated in the "many-millions" prior to European settlement of Australia 230 years ago.[412] The rapid decline in numbers has seen koalas go from no listing, to vulnerable, to endangered over the last decade, a trend meaning that koalas could be extinct in the wild on the east coast by 2050.

Many factors have led to the decline in koala numbers, with the 2019-20 bushfires alone impacting up to 60,000 koalas across Australia through death, injury and displacement.[413] Drought, disease, car strikes and dog attacks also contribute to reducing numbers. However, the greatest threat to koala populations has been land clearing and deforestation, with climate change also increasingly becoming a major threat. Over the last three decades, at least 9.6 million hectares of vegetation was cleared in NSW and Qld,[414] including both primary and regrowth forests. Although it is not clear how much of this land clearing affected koala habitat, it is likely to be a significant proportion.

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WWF-Australia aims to double koala numbers in eastern Australia by 2050. This will be done by **stopping** deforestation, **protecting** existing forests and woodlands, and **restoring** forests that have been destroyed, with a focus on climate refugia. By protecting and restoring koala habitats, a host of other Australian species that are under threat will also benefit. These include the greater glider, the yellow-bellied glider, the spotted-tail quoll, the eastern quoll, the long-nosed potoroo and the brush-tailed phascogale, in addition to many species of bats, birds, reptiles and invertebrates.

STOPPING LOSS, PROTECTING, AND RESTORING KOALA HABITAT

WWF-Australia is leading a range of activities to prevent the further decline of koala populations. This includes initiatives to:

1. **Measure and highlight the performance** of governments (state and federal) around Australia in transitioning from deforestation to reforestation through a Trees Scorecard.[415]

2. **Stop** deforestation in sectors such as agriculture by promoting approaches including deforestation-free beef; with incentives through branding, marketing and trade agreements used as the basis to discourage land clearing for beef production.

3. **Protect** 30% of land as part of Australia's commitment to the Global Biodiversity Framework 30x30 target, with emphasis on ensuring protection supports koala habitat. A recent win in this regard is the NSW state government committing to establish a "Great Koala National Park" that would connect 175,000 hectares of state forests with existing national parks to create a nature reserve of more than 300,000 hectares.[416]

4. **Restore** forests and woodlands through the use of high-integrity carbon and natural capital markets – see next section: Koala Friendly Carbon.

Through these initiatives, WWF-Australia is encouraging state and federal governments, as well as private landholders, to stop the ongoing destruction of koala habitat and support the restoration and protection of koala habitat to help koalas thrive into the future.

USING CARBON MARKETS TO RESTORE KOALA HABITAT: KOALA FRIENDLY CARBON

The Koala Friendly Carbon business model

WWF-Australia is working with private landholders to shift the economics of land-use toward the creation of high-quality, verified koala habitat.

To achieve this, WWF-Australia has partnered with one of Australia's largest developers of land-based carbon projects – Climate Friendly – to create Koala Friendly Carbon. This project aims to restore koala habitats of eastern Australia using the carbon farming industry to develop "premium" Australian Carbon Credit Units (ACCUs), in addition to delivering environmental, social, economic and First Nations co-benefits.

WWF-Australia and Climate Friendly provide the capital and expertise required for landholders to establish Koala Friendly Carbon plantings. Habitat creation involves planting up to 100 species of trees, shrubs and groundcovers to replicate original (pre-clearing) ecosystems, creating a vital and rich habitat for threatened species. The sequestration of carbon allows the landholder to earn carbon credits, issued by Australia's Clean Energy Regulator, for meeting carbon farming requirements approved through the Reforestation by Environmental or Mallee Plantings Method.[417] An environmental planting carbon farming project can deliver co-benefits of increased biodiversity, land quality and provide additional income for the land manager.

To ensure that habitat creation can be replicated and scaled, the land manager contributes a proportion of the carbon credits earned toward planting costs of both their project and future projects. The intention is to create a self-sustaining pool of funds that can cover the high upfront cost of establishing koala habitat.

The importance of working together

WWF-Australia and Climate Friendly are working together with initial funding support from corporate donors and government to deliver the project and to ensure good governance and all enabling conditions are in place.

WWF-Australia brings skills and expertise on best-practice climate-resilient planting design to ensure these are "gold standard" for koala habitat and incorporate landholder preferences and ongoing land uses. WWF works closely with the landholder to implement the project and provides maintenance for a minimum of three years post planting. Wherever possible, First Nations groups are engaged and employed to support these projects.

To measure the conservation impact of the project for koalas, WWF-Australia has worked with partners to develop an assurance standard through Accounting for Nature (AFN).[418] The koala standard assesses koala activity and habitat quality on a single property or on a portfolio of projects within a geographically defined area, providing third-party verified and measurable biodiversity benefits.

Climate Friendly identifies and works with landholders to assess and advise on project viability on individual properties. Climate Friendly is also responsible for determining carbon baselines, managing registration, audit and monitoring requirements over the carbon credit generating period of the project: 25 years, with a 100-year permanence period.

High-integrity demand

Koala Friendly Carbon aims to provide landholders certainty in the value of carbon credits and ensure these are sold to high-integrity buyers. Landholders are required to agree, through offtake arrangements, that all carbon credits be sold to select buyers only and are immediately retired, post sale. These "high-integrity" buyers are those that show genuine commitment to net zero, with carbon credits being in addition to, rather than instead of, activities to reduce emissions. High integrity may be demonstrated by commitments such as to the Science Based Targets initiative.

Piloting before scaling

Koala Friendly Carbon is being delivered through a staged approach, with 150 hectares (160,000 trees) planted so far as part of a phase one pilot. The pilot project focused on NSW Northern Rivers, successfully testing the business case with landholders, and registering carbon projects under the Environmental Plantings Method. It is estimated that these plantings will generate 118,000 ACCUs over 25 years.

A further 500 hectares (500,000 trees) of planting is currently under development, as an expansion of the phase two pilot.

Beyond pilot two, Koala Friendly Carbon proposes to establish more than 10,000 hectares of koala habitat over the next decade. This equates to almost 11 million trees sequestering approximately 8 million tonnes of carbon dioxide equivalent. It is estimated this could support up to a 10% increase in the koala population on the east coast of Australia.

Establishing and supporting projects such as Koala Friendly Carbon

By utilising and integrating on-ground, market and policy initiatives, Koala Friendly Carbon creates an opportunity to transform and unlock carbon finance on the east coast of Australia. By generating revenue from sequestering carbon and improving natural capital, at no cost to the landholder, Koala Friendly Carbon changes the business case for small-scale tree plantings and enables carbon farming to compete with more traditional land management activities.

Without initiatives such as Koala Friendly Carbon it is difficult for landholders to participate in habitat restoration, with barriers including:

- **Lack of commercial return:** Financial returns from carbon and biodiversity projects have been (1) lower than the cost of establishing the plantings, meaning limited or no commercial return on capital; and (2) lower than the returns that could be gained from other "traditional" land-use activities such as agriculture.
- **Impacts on land values:** Land valuations focus on productivity and potential returns from traditional economic activities such as pastoral farming or cropping. The value of natural capital, such as forests, woodlands and ecosystem services, is not accounted for when determining land values. Indeed, financiers refer to "improved land" as land that has been cleared of trees. There is a perverse incentive to plant and restore forests.
- **High upfront cost:** Upfront capital investment is high and a barrier to entry for land managers.
- **Lack of technical expertise:** Land managers have been responsible for designing and coordinating the plantings, which is technically complex and time consuming.
- **Complexity establishing and managing carbon projects:** Registering, monitoring and auditing carbon projects is difficult and requires significant technical skills. If done badly, projects suffer from integrity issues, undermining climate ambition and overstating biodiversity benefits. This may result in land managers having to repay the value of carbon credits should carbon measurements and reporting be incorrect.

A role for policymakers, funders and investors

Policymakers, funders and investors can play an important role to reduce risks and create incentives for land-use practices that encourage reforestation. Activities to incentivize and crowd-in investment for reforestation projects include:

- Providing price floors for carbon credits from high-integrity carbon projects. This would provide more certainty for landholders to commit land to reforestation activities. Meeting the cost of price floors could come from reduction in subsidies currently provided for many "traditional" agriculture activities.
- Provision of seed-capital (pun intended) or "first-loss" capital to establish habitat restoration projects. This would allow proof of concept to be shown and de-risk investment for commercial investors.
- Creation of financial incentives (or markets) for activities that have measurable benefits for biodiversity. In Australia, while revenue can be generated from carbon credits, there is currently no clear financial incentive or a formal means to capture the value from the co-benefits, such as biodiversity improvement. Where co-benefits from project activities can be demonstrated as additional and permanent, additional financial incentives should be offered.
- Develop markets for biodiversity credits. Koala Friendly Carbon currently earns income through the sale of carbon credits. At current market prices, these carbon credits do not adequately reflect the full value of benefits being created.
- Implement methods for enforcing measurement of natural capital. These measures should take account of time value for natural capital, with older trees and forests often being more important in terms of supporting biodiversity.
- Encourage the financial sector to provide financial incentives that support activities to protect and restore natural capital, e.g. banks and insurance companies should provide interest rate and premium discounts for land managers implementing activities that regenerate and restore forests. Banks should also allow carbon credits or biodiversity credits (current and potential) to be used as security for lending. Over the long term, better care of nature will reduce the risk of financial organizations being left with stranded assets.
- Explore and encourage reforestation that considers the increased likelihood of wildfires. Green firebreaks, wetland restoration and cool-season burning will become increasingly important and should be considered for development and land management activities.

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CASE STUDY

Amazon Region Protected Areas turns 20: celebrating its greatest accomplishments

MARIANA FERREIRA, WWF-BRAZIL
MEG SYMINGTON AND LUCIA RUIZ, WWF-US

The vast Amazon biome helps stabilize the local and global climate, hosts at least 10% of the world's known species, and provides a home for around 47 million people. It sprawls across eight countries and one overseas territory, but the vast majority – at least 60% – lies within Brazil. This rich region holds the world's largest river basin and the highest concentration of biodiversity on the planet. Containing over 50% of Earth's remaining primary tropical rainforest, the Amazon is a precious resource for its inhabitants and for the people across the world who rely on it for food, water and clean air.

However, with approximately 17% of forests lost and a further 17% degraded, According to the Science Panel for the Amazon Assessment Report and Living Amazon Report, the Amazon region is approaching an irreversible tipping point. In 2022, deforestation increased 21% from the previous year, making it the most devastating year on record except for 2004. Compounded by recent droughts – a crippling scenario for one of the wettest regions in the world – these developments cast into sharp relief the fragility of even our most formidable ecosystems.

In 1998, the president of Brazil pledged to protect 10% of the Brazilian Amazon. The Amazon Region Protected Areas Program (ARPA) was launched in 2002 to deliver on that pledge. Eight years later, Brazil expanded its commitment to encompass 15% of the Brazilian Amazon. ARPA is the world's largest initiative for the conservation of tropical forests. In 2014, to guarantee the long-term sustainability of ARPA, WWF helped launch ARPA for Life, securing US$215 million of funding for a 25-year transition fund through an innovative conservation finance approach known as project finance for permanence, or PFP. Using the PFP approach, WWF works with government leaders, public and private sector donors, NGOs and others to secure necessary policy changes, conservation plans, and full funding for expenses related to properly managing conservation areas, which includes protected areas. PFPs are performance-based, with payments contingent on satisfaction of closing conditions and disbursement conditions that are agreed as part of the PFP design. ARPA's Transition Fund now supports 120 protected areas covering 62.5 million hectares.


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ARPA is the responsibility of and led by the Brazilian government through the Ministry of Environment, responsible for coordinating and monitoring the progress of the programme. The Brazilian Biodiversity Fund (FUNBIO) acts as the fund administrator and manages the financial resources of the Transition Fund. Implementation of the federal protected areas is the responsibility of the Chico Mendes Institute for Biodiversity Conservation (ICMBio), and state environmental authorities implement the state-run protected areas. The Program Committee, with a majority of members from the public sector, functions as the strategic governing body for ARPA. This Committee focuses on implementation and is responsible for strategic planning, monitoring and evaluation, and the analysis and approval of multi-year plans, among other activities.

The Transition Fund Committee, with a majority of members representing donors, including foundations and bilateral/multilateral cooperation, focuses on financing and oversees compliance with the objectives of the Transition Fund. Its responsibilities include, but are not restricted to, analyzing technical and financial results, validating compliance with disbursement conditions, defining the maximum volume of resources that can be allocated to the programme's biannual strategic plans, approving investment policies, and adjusting disbursement conditions. ARPA also has a Scientific Advisory Panel that functions as a technical-scientific advisory body with deep knowledge of the dynamics of the Amazon biome. The panel is dependent on the Program Committee, which appoints its members according to its needs.

ARPA distributes resources to protected areas only when objectives are met. Looking back across ARPA's 20 years, these are the most notable achievements:

1. **Created millions of hectares of new protected areas.** ARPA created 27 million hectares of protected areas in its initial years and went on to support the improved management of millions more. ARPA protected areas represent nearly 1.5 times the area of California, exceeding the Program's initial goal.

2. **Greatly reduced deforestation and associated carbon emissions.** Reducing deforestation in the Amazon rainforest, an important carbon reservoir, is essential for mitigating climate change. Between 2008 and 2020, the protected areas supported by ARPA prevented nearly 260,000 hectares of deforestation. This corresponds to an estimated 104 million tonnes of avoided CO_2 emissions – equivalent to the total emissions by American domestic aviation in 2020, or about 17% of emissions by the global domestic aviation sector.

3. **Preserved the Amazon's biodiversity.** By minimizing threats like deforestation across millions of hectares of standing forests, ARPA has safeguarded valuable diversity in the Amazon that may have otherwise been lost. ARPA accounts for deforestation reductions of 9% in strictly protected conservation units and 39% in sustainable use conservation units, in relation to non-supported sites. And, as deforestation skyrocketed between 2018 and 2021, deforestation in ARPA areas was less than half of what would have been expected without ARPA's support.

4. **Reinforced the balance of protection and sustainable use.** To meet the needs of people and forests, half of the areas ARPA supports are "integral protection areas," which strictly limit resource use. The other half are "sustainable use areas," which seek to balance conservation with the sustainable use of natural resources by local populations. For example, the Tapajós-Arapiuns Extractive Reserve is a sustainable use area created to protect residents' rights to their resources. There, communities practice family farming, community-based tourism, fishing and more – all with sustainability in mind. Açaí, Brazil nuts and honey are among the products extracted at the reserve, which is home to nearly 5,000 families.

5. **Led innovation in management and governance.** ARPA's effectiveness can be partly attributed to the Program's management and governance. By establishing continuous and long-term funding, ARPA was able to plan with long-term objectives. Management training helps ensure ARPA's team continues to effectively plan, execute and monitor its goals. Through the input and support of multiple stakeholders, including local communities, state and federal governments, civil society and donors, ARPA has secured success beyond political or economic changes in the country.

ARPA has evaluated and improved these management mechanisms, constantly developing novel approaches to adapt to an ever-changing Amazonian reality. ARPA for Life has also been a living model and inspiration for the establishment of PFPs in Bhutan, Colombia and Peru, as well as developing PFPs in additional nations. In 2022, ARPA celebrated its 20th anniversary, a major milestone for the largest tropical forest conservation programme in the world. Despite the many challenges, the holistic approach, together with FUNBIO's capable management, continues to deliver tangible results across millions of hectares of protected areas.


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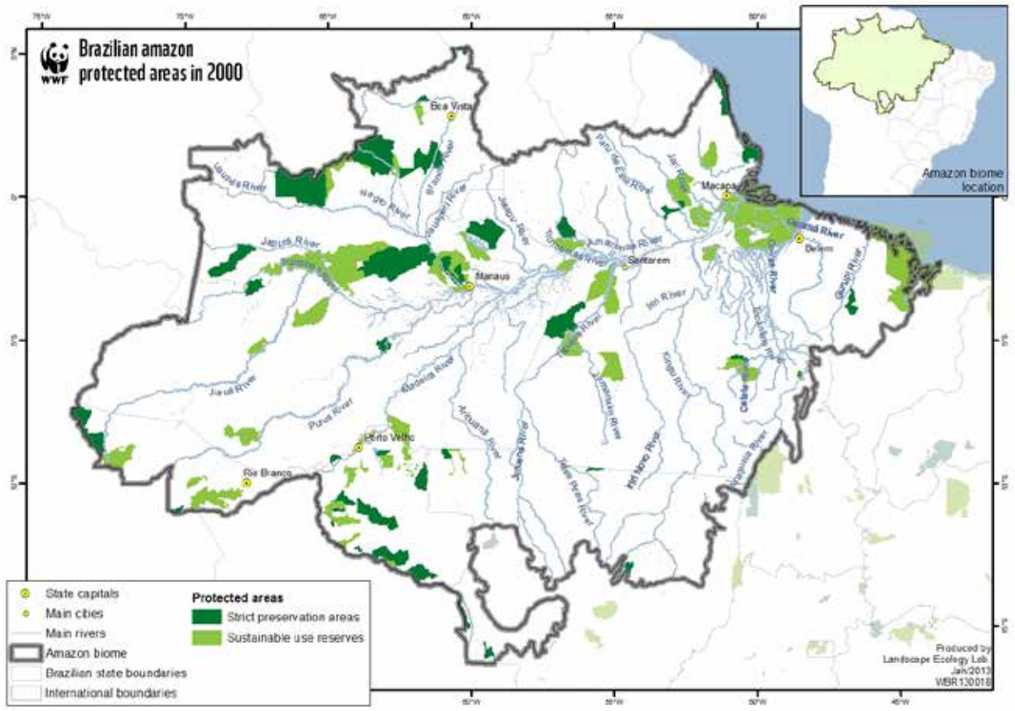
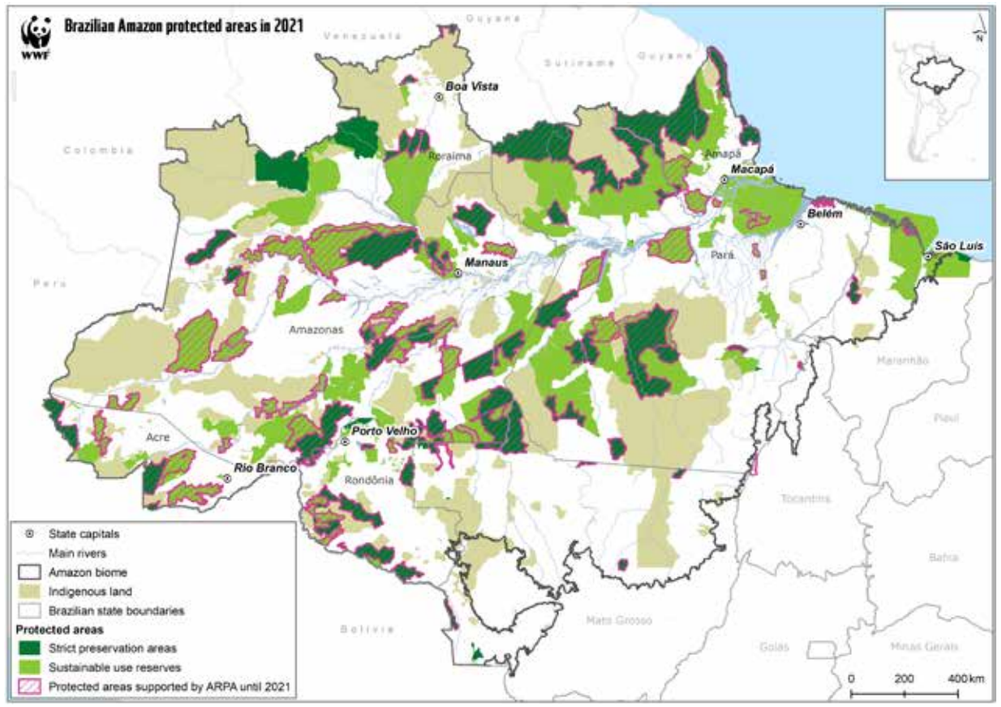
Case Study Figure 1: Protected Areas in the Brazilian Amazon. Before ARPA (2000) and in 2021





Source: WWF-Brazil

SCALING UP SUCCESS

Following the success of ARPA for Life, WWF is exploring how to replicate the PFP approach in other regions in Brazil, expanding protections beyond the Amazon into other critical ecosystems, strengthening territorial governance, contributing to climate mitigation, and bolstering sustainable livelihoods and bioeconomy.

DEEP DIVE

Do we need a new Global Nature Bank?

KAREN ELLIS,
WWF-UK AND COLLEAGUES

INTRODUCTION

Deforestation is largely driven by economic activity that delivers incomes to local producers and profits to national and global companies through global supply chains. The financial benefits to the producer greatly exceed the value in financial terms of leaving the forest standing. These are profitable investment opportunities, and as such, are easily able to access private finance (e.g. loans or equity investment) from banks and other financial institutions.[419] The dysfunctionality being that, the value of forest conversion only outweighs that of standing forest because the true value of the forest – to nature, people and climate – is not accounted for, a particular risk with regards to tropical forest biomes due to their contribution to climate stability.[420]

Stemming the financial flows that bankroll forest destruction is vital if the alternative forest finance mechanisms being tested at the moment (See section X) are to succeed. However, the economic models currently in charge of the global forest-agriculture system will mean compensating forested nations that could lose out as subsidies and finance flow pivot away from forest conversion. We lay out here some thinking around a potential alternative financial mechanism.

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THE ROLE OF THE PRIVATE SECTOR

The role of the private finance sector in enabling and incentivizing deforestation has come under increasing scrutiny, and a growing number of private financial institutions have made voluntary commitments aiming to reduce their financing of deforestation, such as through the FSDA.[421] However, the scale of these financial flows is enormous and represents one of the biggest barriers to halting deforestation. Public finance and aid flows for forests cannot compete with, or in any way come close to offsetting this huge tide of destructive finance.

It is hard to estimate flows of private finance underpinning deforestation, given the lack of traceability, transparency and accountability down supply chains. However, the estimates that do exist[422] suggest these financial flows are very large:

- Global Canopy estimated that financial institutions invested US$3.6 trillion in forest-risk companies in 2022.
- A 2021 study by Global Witness423 found that banks and asset managers based in the EU, UK, US and China had made deals worth US$157 billion with firms accused of destroying tropical forest in Brazil, Southeast Asia and Africa since the Paris Climate Agreement, and that these financial institutions obtained US$1.74 billion in interest, dividends and fees from financing the parts of agribusiness groups that carry the highest deforestation risk – primarily soy, beef, palm oil and pulp and paper.
- A study carried out for WWF calculated that for UK financiers alone, financial flows at risk of contributing to deforestation from Brazilian soy and beef and Indonesian palm oil supply chains stood at £200 billion in 2021.
- NGO Global Witness found that 360 asset managers participating in the Global Financial Alliance for Net Zero held forest-risk investments worth US$8.5 billion as of September 2022, a reduction of only around 3% in the size of forest-risk investments held in the year since COP26.

It is clear that voluntary commitments made by private companies to tackle deforestation have not worked. This is why the UK, the EU and the US are all considering new laws to try and curb the financing of deforestation.

Reducing private finance flows which are driving deforestation is therefore the top priority. However, this will have negative economic impacts on countries dependent on exploiting their forest assets. Thus, new financing mechanisms are needed to facilitate, incentivize and reward the protection and sustainable management of forests. This will also be crucial for the more than 1.6 billion people estimated to be dependent on forests for timber, food, fuel, jobs and shelter.[424] Often forests are located in developing or emerging countries which have a justified desire to continue to develop their economies, but which have often struggled to access the finance needed to support a sustainable development trajectory.

This arises for many reasons, including often relatively underdeveloped financial sectors and associated green financing mechanisms, a lack of data on environmental impacts and risks, and relatively high investment risks associated with developing countries which deter private investment generally, and sustainable finance flows in particular.[425] The lack of concessional finance to support sustainable development pathways has also been criticised, and there are growing calls for reform of the multilateral development banks to better support sustainable development trajectories.[426] UNDESA's *Financing For Sustainable Development Report 2023* highlights that global sustainable development prospects are diverging and that financing to support sustainable development pathways is relatively low and has fallen further in recent years for many developing countries.

The challenge is that we need financial flows to invest in the protection, restoration and sustainable management of forests in developing and emerging markets, of the scale that is only available from the private sector, but without the requirements for financial returns that private finance demands.

One proposal to address this challenge is the creation of a new "Global Environment Bank", to which the private sector would be required to contribute on an annual basis, at a level determined by a single, well-reported measure – perhaps by turnover, or profit, or perhaps by residual carbon emissions if reporting of such data allows this to be verified adequately – or indeed by exposure to deforestation.

Ideally we would use a metric that helped to disincentivize environmentally damaging investments, but the challenge with such measures is the lack of robust and comparable company data, and though progress on company disclosure requirements on their carbon emissions and nature risks and impacts is moving quite fast in some jurisdictions (e.g. through the Taskforce for Climate Related Financial Disclosures, the Taskforce for Nature Related Disclosures and the International Sustainability Standards Board) this is still at a relatively early stage, so data on these issues would be very patchy. Thus it may be easier, in the first instance at least, to simply base the "tax" or levy on the size of the company, as measured through a simpler and more well-reported metric such as turnover.

This could in effect be a "Nature Recovery Tax" – which could be seen as a necessary and relatively simple way to start valuing nature in our economic system, and to pay for the natural capital upon which our whole economy depends. If applied across the board, this tax could be set at a very low level for an individual company, yet it would still add up to a very large number across the whole economy.

The Global Environment Bank would then utilize the revenues generated to finance the ongoing protection of those natural assets located in the developing world that are generating the largest social good at the global level. Importantly, this would not require a *financial* return to be generated by the beneficiaries, which would remove a significant barrier to financing for many forested nations. But it would require some proof that protection or reforestation is effectively being provided. Thus ongoing financing would be reassessed on an annual basis to ensure those natural assets were actually being protected, e.g. using global satellite data backed up by some field data to provide ground-truthing and assess, for example, the extent and condition of wildlife, all paid for by the Global Environment Bank – and any failure to provide adequate protection and deliver the outcomes expected would reduce the finance being made available.

The amount paid to a particular forest community would need to be enough to cover not only the maintenance and enforcement costs associated with protecting those natural assets, but also the opportunity costs associated with their use, if it is to effectively incentivize their ongoing protection. This would in effect constitute a global, mandatory payment for ecosystem services scheme.

Companies could potentially be allowed to increase their contribution voluntarily in order to support the delivery of their own net-zero or nature-positive targets and commitments if they chose to do so, but it would be crucial for the basic contribution to be mandatory, and be applied across the board – ideally at the global level – as the more countries and companies that participate, the smaller the tax required. While this represents a small additional cost to business upfront, it will substantially reduce the costs it will face going forwards arising from the otherwise ongoing environmental destruction. Protecting a forest is relatively cost-effective compared to many other investments that will be required to support the net-zero transition, e.g. to develop new technologies.

RECOMMENDATIONS

We share this Big Idea thought piece as a way to start conversations about addressing the lack of finance for forests, raised in Section 2.1. A Global Nature bank could help close the forest finance gap by:

- Not requiring financial returns, with all the complex policy implementation, human and institutional capacity and data that requires.
- Raising far more finance than could ever be available through public/government/concessionary funding sources, and that can therefore provide strong enough incentives to overcome opportunity costs, and pay for the capacity-building needed to monitor implementation.
- Permitting nationally prioritized and locally designed forest management solutions to be developed, free from the stipulations imposed by capital and nature markets created in the Global North.


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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[427].

INTRODUCTION

Up to 80% of all deforestation and ecosystem conversion is caused by commercial agriculture and forestry,[428] 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.[429] 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.[430] Parties should now fully implement their commitments, including to reduce the global footprint of consumption[431], 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.[432] 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.[433]

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

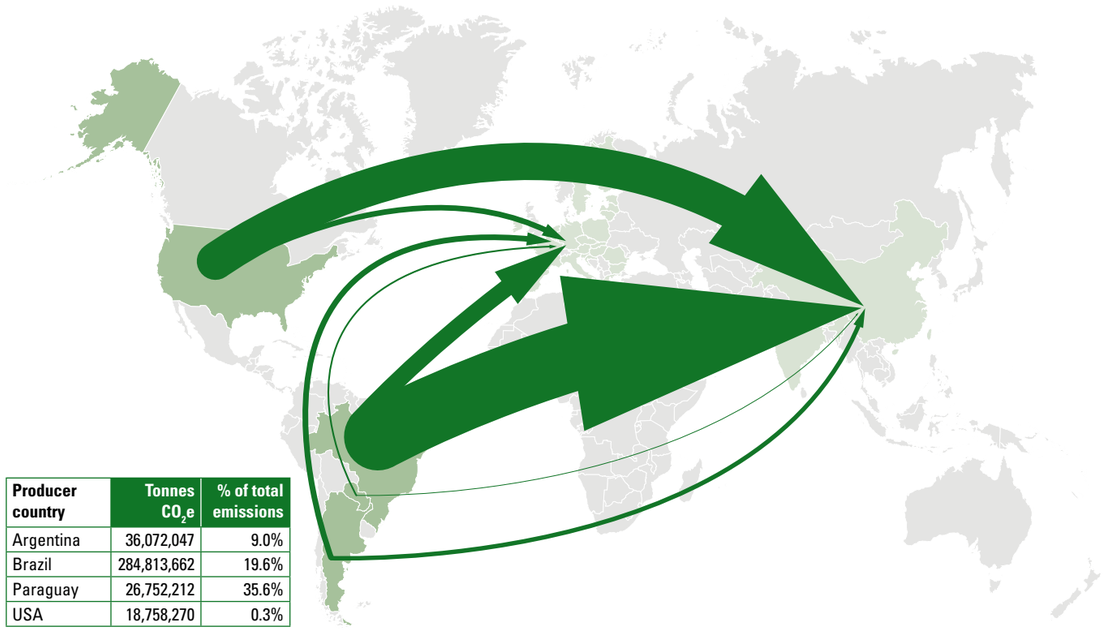
The major suppliers of soy, oil palm products, cocoa and coffee (i.e. those supplying at least 3% of the globally exported commodity) and the major importers (i.e. those importing at least 3% of global imports) are shown in Figure 3. The EU is the major importer of coffee and cocoa, second behind China 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.

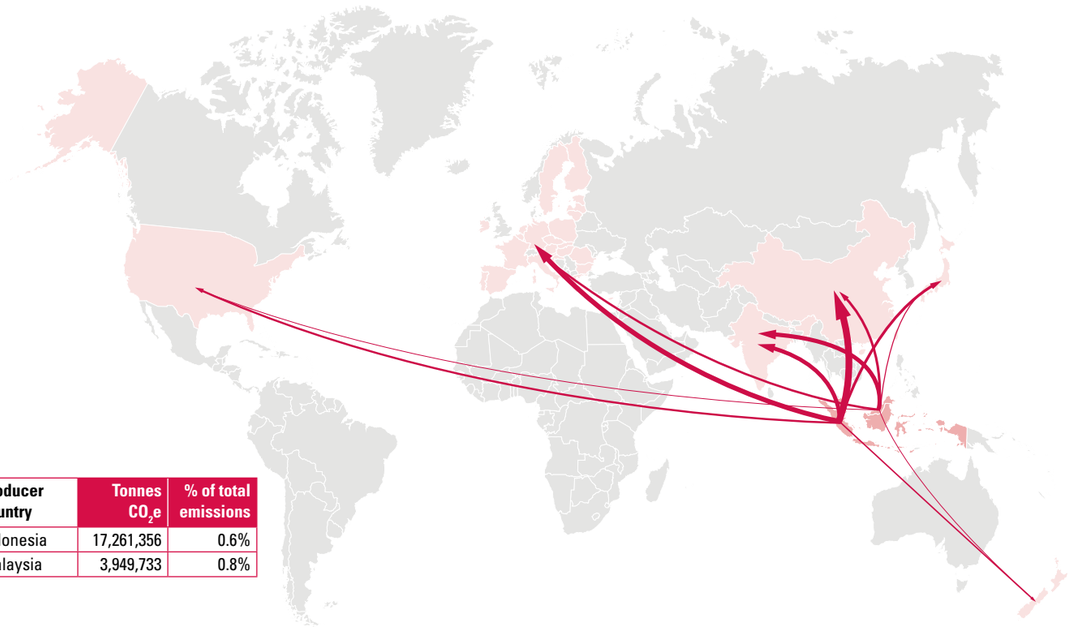
Importer nations are shown in lighter shading and producer nations in darker shading on the maps for soy, palm oil and coffee. On the cocoa maps no separate shading is used due to the complexity of the trade flows. The width of lines indicates the relative volume of traded commodities, with the GHG emissions 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



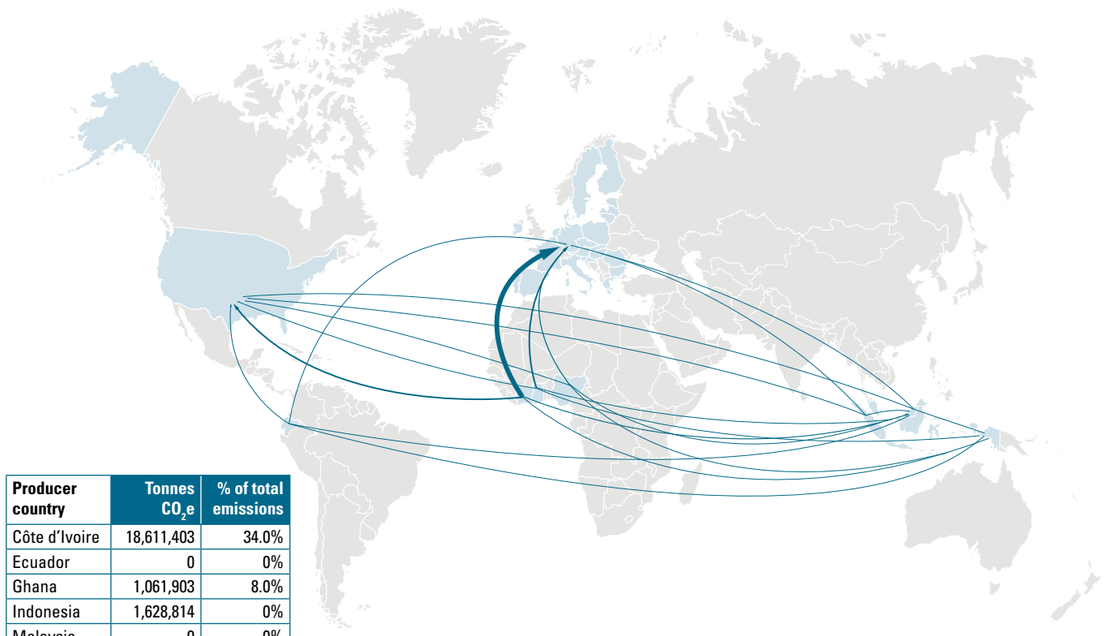
Producer country	Tonnes CO_2e	% of total emissions
Argentina	36,072,047	9.0%
Brazil	284,813,662	19.6%
Paraguay	26,752,212	35.6%
USA	18,758,270	0.3%

PALM OIL



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

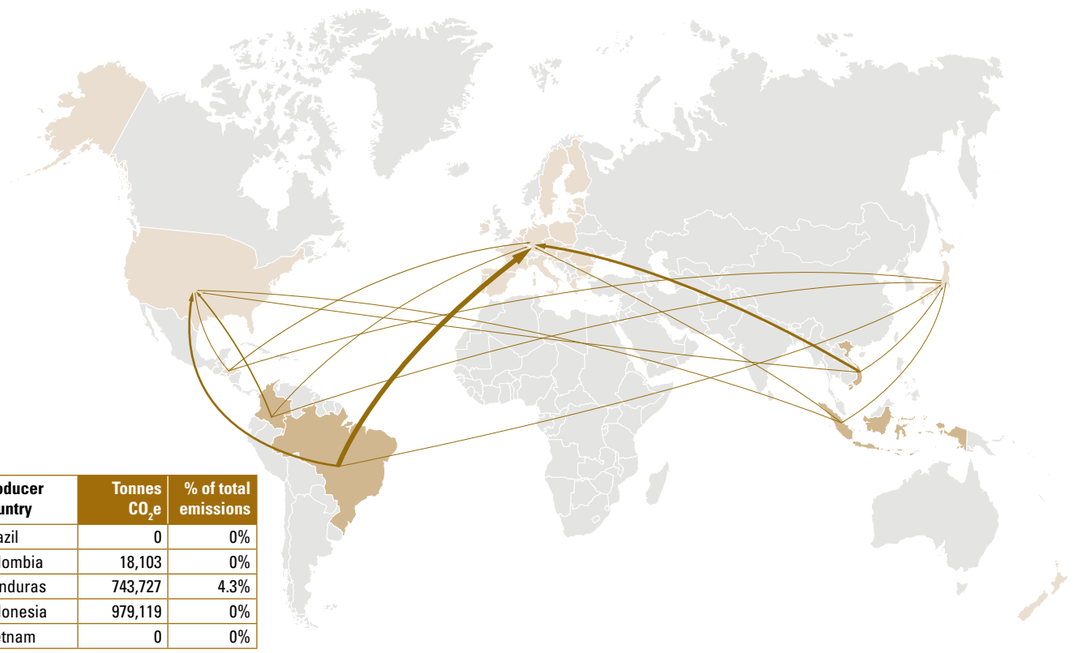
COCOA



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%

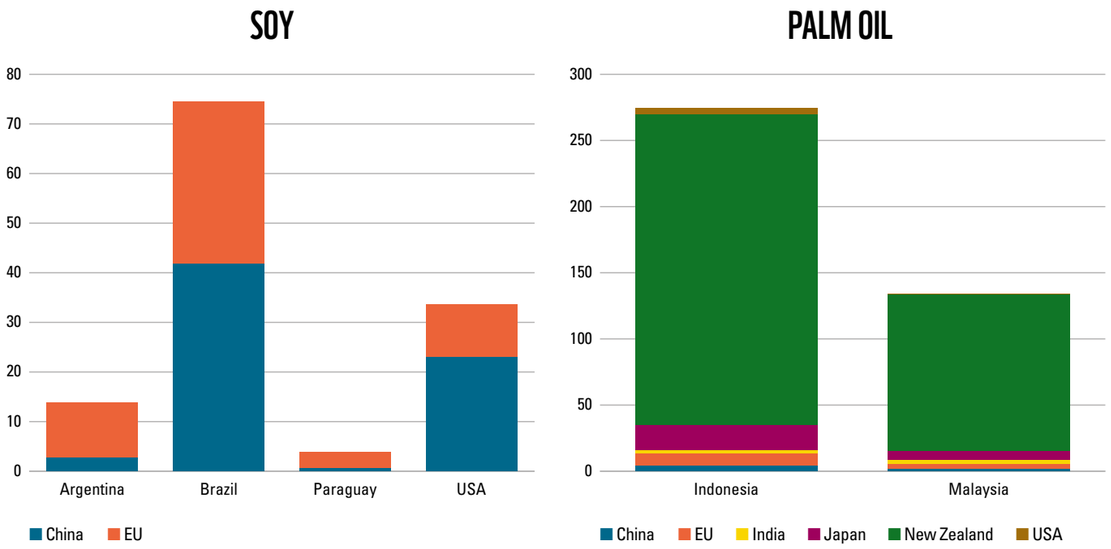
*Indonesia and Malaysia are both importers and exporters

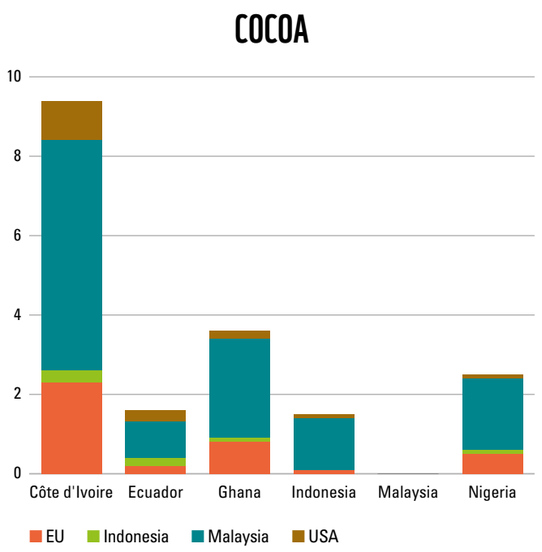
COFFEE

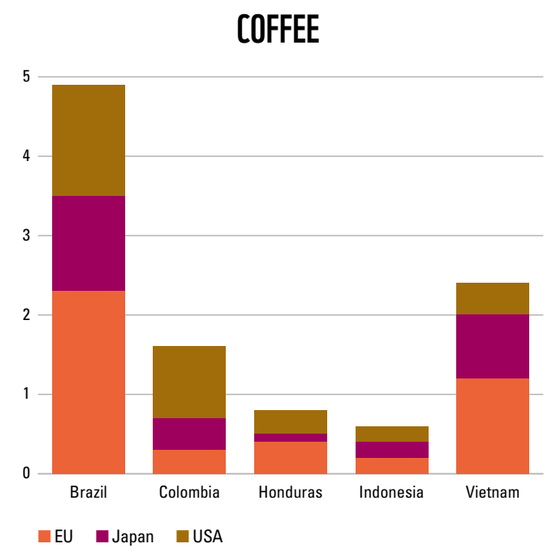


Producer country	Tonnes CO_2e	% of total emissions
Brazil	0	0%
Colombia	18,103	0%
Honduras	743,727	4.3%
Indonesia	979,119	0%
Vietnam	0	0%

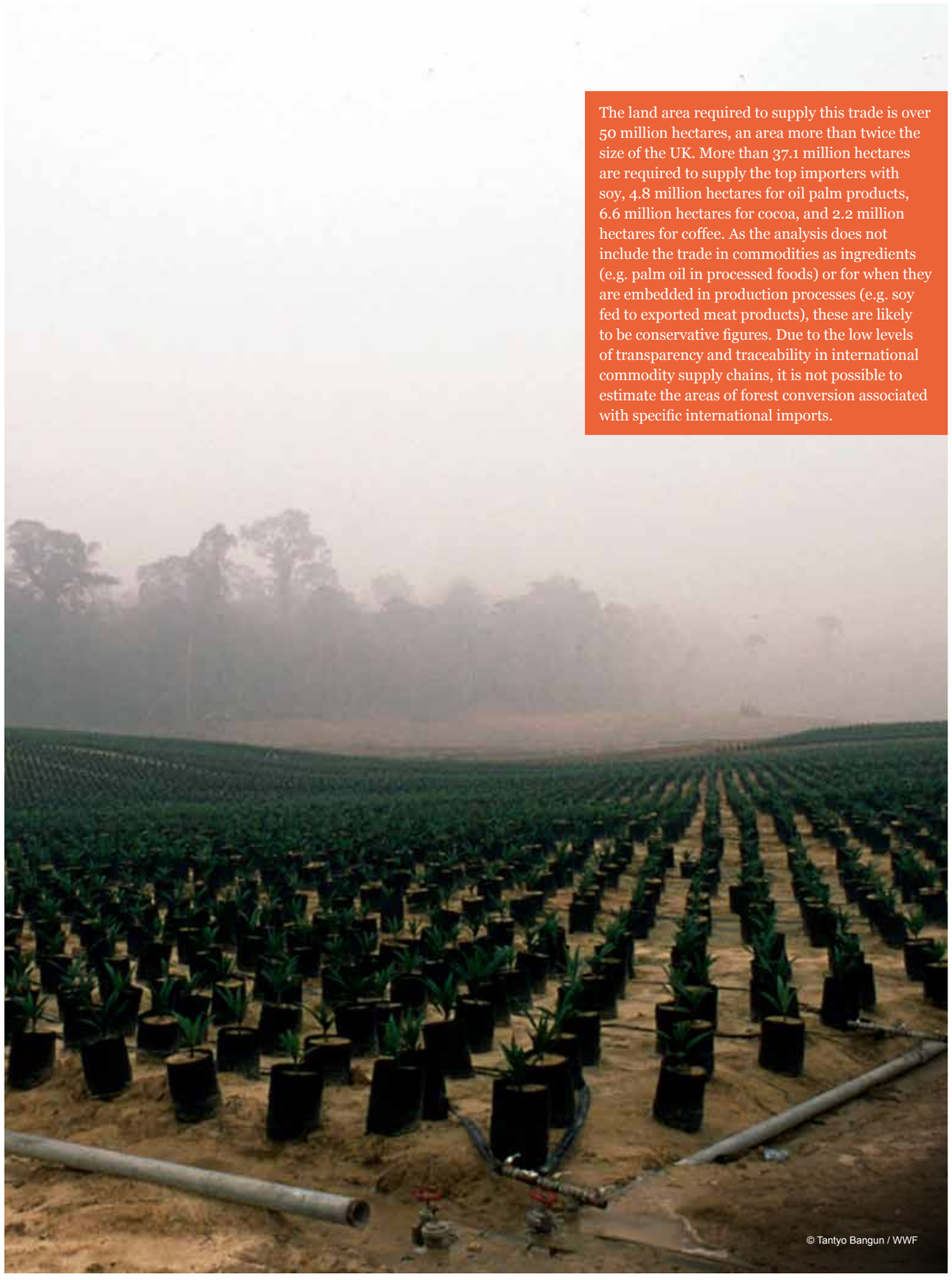
Figure 4: Trade flows between major producers and major importers of four deforestation and conversion-risk commodities, in kg imported per capita in 2021.







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.[434] 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.[435]

Other countries fall between these two poles. Argentina,[436] Ghana[437] and Malaysia[438] include land-use change within their national target, but do not have a specific target for land-use change emissions reductions. Ecuador,[439] Nigeria,[440] the USA[441] and Vietnam[442] 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.[443] 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.[444]

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.[445]


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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,[446] 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.

CASE STUDY

Community forest in the corridors: empowering communities and restoring forests

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INTRODUCTION

Community forestry is a dominant community-based forest management system in Nepal, in which local communities are authorized to use forest resources and are given the responsibility of protecting and managing them. Initiated in the late 1970s, community forestry became one of the major programmes of the government of Nepal in the 1990s. Currently, 23,59,577 hectares of forests, about 35% of the total forest area of the country, are being managed through 22,519 community forests. The forest area of Nepal has increased by 5% from 2000 to 2015, covering 44.7% of the country's land. Community forestry has been a significant contributor to this expansion of forest cover.[447]

In this case study we share how community forestry initiatives are supporting recovery of forests from degradation and the environmental impacts of extreme climate events.

THE KAMDI CORRIDOR

Nepal adopted a landscape approach to conservation in the 2000s, declaring the Terai Arc Landscape (TAL) as the first conservation landscape. The TAL, a global flagship and highly biodiverse transboundary landscape, stretches across about 5 million hectares in the sub-tropical Terai and Chure range. The forests, grasslands and wetlands within the TAL harbour numerous threatened species such as tigers, rhinoceroses, elephants, dolphins and crocodiles. The government of Nepal has developed a 10-year strategy for the TAL with a 50-year vision. The strategic plan identifies several corridors to connect protected areas and other land uses within the landscape for ecological connectivity to facilitate wildlife movement and the flow of ecosystem services.

The Kamdi corridor is one of the TAL's important corridors, allowing transboundary movement of wild animals by connecting Nepal's Banke National Park to India's Suhelwa Wildlife Sanctuary. It spans 66,700 hectares, of which 52,400 hectares are forests. Sal (*Shorea robusta*) and mixed hardwood forests and floodplain grasslands in the corridor are widely used by elephants, tigers, leopards, hyenas, leopard cats, sloth bears, sambars and gharials among other species. The major threats and challenges for conservation in the Kamdi corridor include conversion of forests to other land uses, overgrazing, over-extraction of fuel wood, poaching, extreme events such as droughts and extreme rainfall, sand and gravel mining, and linear infrastructure such as highways and irrigation canals.

THE RAPTIPIDIT COMMUNITY FOREST

Within the Kamdi corridor, the Raptipidit community forest covers an area of 492 hectares. Raptipidit community forest was handed over to local communities by the government of Nepal in 1996 and it is currently used by 563 households. The community forest was badly impacted by a huge flood of the Rapti River in 2014, which washed out most of the area of the community forest. In one 24-hour period in August 2014, 528 mm of rainfall was recorded in the West Rapti River basin, the highest value recorded in Nepal at the time. Climate change is expected to increase the frequency of such extreme precipitation events in the monsoon season in Nepal.[448]

After the flood damage, community forest user groups came together, stopped converting forest to other land uses, and started planting trees in the floodplains and in the degraded areas within the community forest. They planted native tree species, which are resilient to the local environment, and protected the forest plantations and natural regeneration by establishing temporary fencing around the plantation patches and by appointing forest guards. The fencing is used to protect plantations from grazing and human interference in the early stages of tree growth. Once the trees are established, the fencing is dismantled to allow free animal movement.

The Kamdi corridor saw an increase of 1,191 hectares of restored forest between 2015 and 2020. The success of the restoration serves as a lesson that community participation and close stakeholder coordination can yield positive results. Local communities are also reaping the benefits of the restored forests, including easy access to fodder, fuelwood, and other forest products. Supporting programmes have also benefited the communities, including alternative energy sources, using biogas instead of fuel wood, and sustainable livelihood initiatives such as fishery, vegetable farming, and skill-based training to reduce community dependence on forests for livelihoods.

This work was made possible by the Terai Arc Landscape Program, a joint initiative of the government of Nepal and WWF initiated in 2001 to implement a landscape approach to conservation, and in particular to support the dispersal of tigers between protected areas. Forest restoration was critical to this effort, and community forests played a vital part in it.

The restored corridor is now a thriving habitat for various wildlife species including tigers, leopards and elephants, and is being used by herds of elephants moving back and forth from Nepal to Indian forests. In 2022, local communities observed a herd of 35 elephants using the corridor for three days. In April 2022 the first evidence of transboundary tiger movement was found, via camera-trap images from Suhelwa which revealed an adult male tiger with the same right side and tail stripes as one photographed in Banke in 2018.[449]

Ayodhya Tharu, a forest watcher in Raptipidit community forest, could hardly believe his eyes when he saw the transformation of the once barren land into a lush green area along the Rapti floodplain of the Kamdi corridor. He recalled how the hundred hectares of land used to be completely bare, or submerged in water during the rainy season. Ayodhya has faced enormous challenges and worked tirelessly to nurture the land with the utmost care. And now, as he stood there, he couldn't help but smile and say, "The community's dream has come true. This is a great success, achieved through immense struggle and dedication."

From a conservation point of view, programmes like this have contributed to a near tripling of tiger numbers in Nepal according to official statistics, from 121 in 2010 to 335 in 2022.[450] Populations in other parts of Southeast Asia have remained below conservation targets over the same period.

Despite the successes, there are still challenges in protecting the forests from encroachment and loss of riverbanks due to flooding. Because of increased wildlife movement through the corridor, human-wildlife conflict is increasing. The current and growing challenges need to be properly and continuously addressed, such that the benefits gained by communities living in and around the corridors outweigh the costs. WWF promotes a holistic, integrated approach to moving from conflict to co-existence.

TECHNICAL SECTION 3.1

EMPTY FORESTS

"We must not let a forest full of trees fool us into thinking all is well"[451] *– 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.*[452]

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.[453] 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.[454] 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.[455]

Tropical forests are the most biodiverse of all terrestrial biomes in terms of vertebrate diversity, harboring more than half of global terrestrial vertebrate species.[456] 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.[457] If these trends continue, the tropical forests of the future could be much smaller, simpler and emptier than they are even today.[458]

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'.[459]

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.[460]

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.[461,462,463]

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.[464]

Meanwhile, the removal of management rights and marginalization of traditional forest owners, IPs and local communities, is not only driving forest loss and fragmentation[465,466,467] but also has further amplified overexploitation.[468] Miners and loggers, often brought in by companies, can also add to the toll on wildlife.[469] 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.[470,471]

Early iterations of the empty forest issue focused primarily on hunting by forest dwellers.[472] 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.[473]

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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.[474] However, more than 40% of (western scientific) studies on defaunation cite overexploitation as the leading cause, predominantly for large-bodied mammals in the tropics.[475] Wildlife is removed from forests for a number of reasons including subsistence hunting and trade in commercial meat,[476] 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,[477] 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.[478] Globally, the commercial wild meat trade is threatening more than 300 terrestrial mammal species.[479] 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.[480,481]

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.[482] 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,[483] and over half of all forest species threatened by overexploitation are African primates.[484] The loss of large-bodied wildlife has also recently

been shown to degrade ecological processes in tropical forests that sequester and store carbon.[485] 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.[486]

Despite Covid-19's demonstration of the potential risks from zoonotic diseases, illegal wildlife trade is estimated to have increased between 2020 and 2021.[487] Demand for the "ivory" casques of the helmeted hornbill has risen sharply in recent years;[488] the trade in live primates has steadily increased since 1995 with many suspected to be wild-caught;[489] social media platforms have enhanced the attraction and facilitated the acquisition of wild animals as pets;[490] 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.[491]

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.[492] Approximately one-third of the world's bird species are traded as pets or products.[493]

WHY IS DEFAUNATION A BIG PROBLEM FOR FORESTS?

The extinction of 97 genera of large animals during the Pleistocene offers us clues:[494] not only did these losses impact nutrient cycling in the Amazon, globally they had significant effects on the structure of different ecosystems,[495] seed dispersal and land surface albedo.[496] Large wild species contribute to pollination, herbivory and the production of soil organic matter.[497] Without seed dispersers, tree recruitment drops[498] and carbon storage is diminished.[499]

Elephants play a huge role in forest disturbance regimes and seed distribution; some large seeds require passage through an elephant gut to germinate.[500] 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.[501] 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.[502] 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.[503,504]

The spiritual and cultural values of empty forests are greatly diminished as many species have sacred values to particular human cultures,[505] and there is a strong argument to be made for the rights of biodiversity (species, ecosystems and the evolutionary potential) to a continued existence.[506]

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.[507] Moreover, we note that there is no reliable information on the scale of the international wild meat trade.[508]

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.[509] 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.[510] 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.[511] Advances are being made with the inclusion of forest quality and wildlife metrics into the Forest Declaration Assessment. The Forest Specialist Index[512] and the Spatial Monitoring and Reporting Tool (SMART)[513] 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.[514]


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DEEP DIVE

How selective logging can lead to forest loss, and what's being done about it

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WWF INTERNATIONAL

It is entirely understandable that those who are concerned with forest conservation at the global level focus primarily on forest clearance. The scale of deforestation worldwide, and especially in the tropics, represents an existential threat to humankind, because of its implications for climate change and the provision of essential ecosystem services. By comparison, concerns about declines in individual first-living species can seem of less importance.

However, on closer examination, there are many animal species whose depletion erodes the integrity of forest habitats; forest elephants and primates being just two examples. But here we will confine ourselves to wild tree species that are highly valued in international trade, either for their timber or for other products, and thus are removed selectively from their forest habitats. Examples are rosewoods (*Dalbergia* species and other genera), mahoganies (family Meliaceae but certain trees from other families are also known as mahoganies in trade), cumaru (*Dipteryx*) and ramin (*Gonystylus*), all of which are valued for their timber, while agarwood (*Aquilaria* and *Gyrinops*), lignum-vitae (*Guaiacum*), frankincense (*Boswellia*) and African stinkwood (*Prunus africana*) are all heavily traded for their aromatic or medicinal derivatives.

If these species are selectively harvested, why is their overexploitation a problem for forest conservation? Is it not better to allow communities to profit from them if the rest of the forest remains intact? Well, there are several reasons why we should be concerned.

First of all, forest tenure by local communities is often insecure, so that the communities who live in or close to the forest are not necessarily the ones who benefit from its exploitation. Often the benefits go to criminal gangs or corrupt entities who have usurped tenure.

More importantly, most of these species can be exploited sustainably, if the harvest is carefully managed. Measures such as setting minimum size, and leaving some mature trees to disperse seed, ensure the continued availability of the resource into the future. By contrast, overexploitation is analogous to a family that sells the family home to meet a short-term need. It generates income in the short term, but it leaves communities impoverished in the long term.

In addition, these species are an integral part of the forest ecosystem, and their removal erodes the integrity of the ecosystem. Many of them provide food or other benefits for both animals and people. Effectively, depletion of these species is a form of habitat degradation. Degradation, as we know, compromises the ecosystem services provided by forests; in that sense it is just as serious as complete clearance.

Finally, and most compellingly, these species are what makes intact forests a valuable economic asset. As such, the economic value of forests is largely lost once these valuable species are depleted, making alternative uses of the land more attractive in economic terms. Depletion of forest species is often a prelude to complete clearance.

Many of the mechanisms and measures that have already been developed and applied to forest conservation more broadly can also address the issue of selective removal of higher-value species.


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To begin with, it is crucial that we continue to focus on issues of forest tenure, so that those who live in or around the forest play a key role in deciding its future. If, as often happens in regions where governance is weak, outside interests are given a free hand to exploit forest resources, there is a much greater risk that they will focus on short-term profit, especially if those outside interests are organized criminal groups.

Secondly, credible certification schemes can add value to forest products, while ensuring that the harvest of the species that provide such products is rendered sustainable.

However, where the value of the species or its products is particularly high, especially when in international trade, further measures are necessary. Otherwise, it is hard for poor countries with weak governance to resist pressure from vested interests to exploit these species unsustainably for short-term gain.

The Convention on International Trade in Wild Fauna and Flora (CITES) was negotiated in 1973 but had its origins 10 years earlier. In recent years it has often been portrayed as a punitive instrument that curtails economic freedom and national sovereignty. But we should remember the motivation that lay behind it. In its eloquently concise preamble, it recognizes that, while "peoples and States are and should be the best protectors of their own wild fauna and flora", it is also the case that "international cooperation is essential for the protection of certain species of wild fauna and flora against over-exploitation through international trade". This is an excellent summary of the underlying *raison d'etre* of the Convention.

CITES listed a number of tree species in its Appendices from the outset. However, for the most part they were extremely rare species that were so near to commercial extinction that any further exploitation would be disastrous. Many were listed in Appendix I of the Convention, the 2% of the total number of species regulated by CITES that are so depleted that further commercial trade is banned. It is only in the last 30 or so years that CITES has begun to focus on species where there is still scope for viable commercial trade, but where the risk of overexploitation, driven by demand in international trade, is high. Such species qualify for listing on Appendix II, which comprises nearly all the 38,000 species whose trade is regulated by the Convention.

For such species, commercial trade is allowed if the specimens in question were legally obtained, and if an independent scientific authority has advised that the export will not be detrimental to the survival of the species; the so-called non-detriment finding. Thus, in 1994 at the ninth meeting of the Conference of the Parties (COP9), Afrormosia (*Pericopsis elata*), African stinkwood (*Prunus africana*) and one agarwood species (*Aquilaria malaccensis*) were listed in this Appendix. In 2002, at COP12, in the face of concerted opposition from some range states, bigleaf mahogany (*Swietenia macrophylla*) was listed in Appendix II, the most commercially important species listed up until that time. Ramin (*Gonystylus* species) was listed in Appendix II at COP13 in 2004, and the remaining key agarwood species (*Aquilaria* species and *Gyrinops* species) were also added that year.

Progress was slower in the decade that followed. However, in 2013, at COP16, in response to the crisis regarding illegal logging in Madagascar, all that country's rosewoods and palisanders (*Dalbergia* species), and ebonies (*Diospyros* species) were added to Appendix II. In 2016, at COP17, the entire genus of *Dalbergia* was listed in that Appendix, signaling an increasing tendency to list species at the generic level to avoid laundering of endangered species as non-listed lookalikes, a safeguard that is provided for in the Convention text, even when some of the species in question are not themselves at risk. At COP18, in 2019, cedro (*Cedrela* species, also members of the mahogany family) was added to Appendix II. Finally, COP19 in 2022 earned the nickname in some quarters of the "COP of the trees", when it added several genera of precious, slow-growing Latin American timber species to Appendix II: cumaru (*Dipteryx* species) and trumpet trees (*Handroanthus, Rhododendron* and *Tabebuia* species). African populations of three further genera were also added: *Pterocarpus* (which includes the species kosso, *Pterocarpus erinaceus*, already listed in 2016), *Khaya* species (African mahogany), and *Afzelia* species (doussie).

These listings, all of commercially important species, all in Appendix II, have raised the profile of timber in CITES. Whereas the Plants Committee, the plant science committee of the Convention, used to devote most of its time to discussions on ornamental or medicinal plants, timber species now occupy a major part of the meeting agendas. Producer groups, including those representing musical instrument manufacturers and users, and those engaged in the manufacture of aromatic products, are engaging with the Convention. On the other side of the divide, members of conservation NGOs who previously attended only the Animals Committee are often showing up at Plants Committee meetings. The Convention Secretariat, together with the International Tropical Timber Organisation, provides capacity and funding (the latter largely thanks to the EU) to assist range countries in implementing the listings. And, in a number of instances, trade from non-compliant countries has been suspended; Lao PDR for Indochinese rosewood (*Dalbergia cochinchinensis*), some West and Central African countries for kosso (*Pterocarpus erinaceus*), and Madagascar for its ebonies (*Diospyros* spp.), rosewoods and palisanders (*Dalbergia* spp.) being just three examples.

None of this is to suggest that all the problems concerning international trade in high-value timbers have been resolved. Some problems have arisen along the way, including the following:

1. **Listing a species too late:** It took four attempts over 10 years to get bigleaf mahogany listed in Appendix II. COP14 in 2007 rejected a proposal to list cedro, and it was 12 more years before another proposal was tabled and passed, by which time the most valuable species *(Cedrela odorata)* had been severely depleted.

2. **Delayed entry into force of listings:** The listing of bigleaf mahogany in Appendix II, when it finally did happen in 2002, was accompanied by an annotation delaying the entry into force for one year. Ostensibly it was to give countries more than the usual three-month window to prepare for implementing the listing, although really it was part of a compromise to get the necessary two-thirds majority vote at COP12. Some countries, notably Peru, exploited this window to engage in rampant overharvesting. Against that background, it is unfortunate that the listings of cumaru and trumpet trees agreed last year have a two-year delay for entry into force, especially since Peru is a country with a history of difficulties in implementation of timber listings. When big leaf mahogany was listed on Appendix II in 2002 with a delay of a year for entry into force, there were widespread allegations that Peru exploited the window to offload timber stocks whose harvest would not have complied with CITES rules.

3. **Annotations:** The option exists, when listing plants in Appendix II, to annotate the listing so that certain parts and derivatives are exempted. The norm for Appendix II timber listings is to exempt all parts and derivatives except logs, sawn wood, veneers and, sometimes, plywood. The intent is to capture the trade at the point of first export but to reduce the administrative burden for trade in finished products that are manufactured outside the range states. In practice, getting the balance right can prove difficult. When the entire *Dalbergia* genus was listed in 2016 it was considered necessary to include larger finished products within the scope of the listing because of their high value, while exempting musical instruments and other smaller worked items. However, the initial annotation was worded too inclusively and generated a lot of extra work with little conservation benefit, so that it had to be amended in 2019. More commonly the reverse can occur. A proposal by Thailand to list Indochinese rosewood in Appendix II was successful at COP16 in 2013 with the standard exemptions. However, Thailand had to come back to secure COP17 approval for listing all parts and derivatives of Indochinese rosewood because of the scale of illegal trade in Southeast Asia. In recent years, DRC started exporting sawn wood of afrormosia that was planed or had a tongue-in-groove joint on one edge, claiming that it was exempt under the annotation. This necessitated a narrowing of the annotation in 2019.

4. **Non-detriment findings:** As stated above, issuance of export permits for Appendix II species requires prior advice by an independent scientific authority in the country that the export will not be detrimental to the survival of the species, advice that is known as the non-detriment finding or NDF. In practice, permits are frequently issued with weak NDFs or none at all. In some cases, this has led to trade suspensions, and the EU also has a mandate in its legislation to refuse imports where it believes the NDF to be insufficient. However, many more cases go under the radar.

5. **Corruption and criminality:** Illegal export, transit and import of listed species continues because of organized criminal groups, and often because of the corruption or complicity of figures in authority, from rangers right up to senior politicians. The largest ever seizure of any CITES species was a shipment of 30,000m3 of rosewood from Madagascar that was seized by Singapore en route to China. A minister came from Madagascar to testify that the shipment was legal, despite the existence of a moratorium on exports, and the shipment is now in legal limbo. It is not unknown for prosecutors in Madagascar who are deemed "overzealous" in their pursuit of illegal logging kingpins to be removed from their posts, while environmental human rights defenders have frequently been imprisoned on trumped-up charges.

6. **Reluctance to use the compliance mechanisms available under CITES:** One of the strengths of CITES is its compliance mechanisms, which allow for all trade in CITES-listed species or trade in certain species of concern to be suspended when there is evidence of non-compliance. In practice, however, parties to CITES, acting through the Convention's Standing Committee, are reluctant or slow to apply such measures, by which time much damage can already be done.

So where do we stand now? Nobody is suggesting that CITES is the silver bullet for preventing illegal or unsustainable trade in high-value timbers. As with all harmful commodity trade, there is no single measure that can achieve this; rather a suite of measures is needed. But CITES has demonstrated its capacity to evolve and has proved its worth as one of the key weapons in the fight against unsustainable trade in timber and other forest products. Thus, it contributes to forest conservation more broadly.

DEEP DIVE

The dark side of the timber trade

JOHN DODSWORTH,
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INTRODUCTION – SCALE

Forests are home to approximately 80% of the world's terrestrial biodiversity[515] and support some 1.6 billion people worldwide, who rely directly on forests for food, shelter, energy and income.[516] The formal (legal) forest sector contributed over US$1.5 trillion to national economies across the world in 2015;[517] it directly employs just over 18 million people, and supports a further 45 million jobs through indirect employment across the supply chain.[518] However, illegal logging continues to threaten the world's forests, perpetuating corruption, fuelling social conflict, and depriving governments of revenue.

According to Interpol the illegal timber industry is worth almost US$152 billion a year,[519] and accounts for up to 90% of tropical deforestation in some countries. It causes serious economic, environmental and social damage, and in some cases fuels conflict. Illegal logging undermines the livelihoods of millions of people who depend on forests for their survival, disincentivizes timber enterprises from operating within the law, and erodes the natural resource bases of countries that depend on these ecosystems.

The impact of illegal logging is far-reaching, with devastating environmental, social and economic consequences. It is responsible for deforestation, habitat loss, species extinction, and is often the initial foray into wider land conversion for agriculture. Illegality in the timber sector can take many forms, including but not limited to the logging of protected species (e.g. CITES listed), harvesting and transportation of logs from countries that have national log export bans, logging in protected areas, misrepresentation of logging permits, and overharvesting and not respecting the rights of local communities. This list is by no means exhaustive but provides a snapshot of forms of illegality that aid and abet activities that undermine emergent forestry sectors. Illicit proceeds from forestry crime may also be used to fund conflict, as well as support other organized crime types such as drug trafficking and arms, thus undermining countries' ability to develop.

GLOBAL SHIFTS IN THE TIMBER SECTOR

In the last 20 years there have been significant shifts in the timber sector: a report from Chatham House notes that while some advances had been made in addressing the illegal timber trade, progress has been slipping. This regression has been attributed to three main factors. Firstly, new markets have emerged for high-value timber that have less stringent policies relating to timber legality.[520] Secondly, forests are increasingly being cleared for agricultural commodities to meet global demand. As much as half of all tropical timber traded internationally now comes from forest conversion, of which nearly two-thirds is thought to be illegal.[521] Thirdly, small-scale production has increased in many countries, and these operations often sit outside the scope of policy and regulatory measures, and are often incorporated into larger timber operations.

Corruption

The Chatham House report describes how "low wages, inadequate capacity and insufficient training provide an enabling environment for corruption and abuse of power as well as for the pursuit of informal sources of personal revenue"[522]. This enabling environment is entrenched in illegal logging operations, with a wide range of people involved at all stages of the supply chain, from field officers to high-level representatives (e.g. to obtain logging permits, to avoid controls, and to export and import illegal timber). An Interpol report from 2016 notes that the forestry sector estimates the annual global cost of corruption to be worth some US$29 billion.[523] Given the forest industry is a key income-generating sector, the leakage of funds outside of official channels is a significant loss. As an UNCTAD report from 2019 notes, "Illegal logging and illicit trade in timber undermines sustainable economic growth, economic development and environmental conservation…[and] not only puts the livelihoods of forest-dependent communities at risk, but also undermines legitimate commerce within the forestry sector by distorting timber markets and reducing profitability".[524]

In summary, corruption is considered one of the main blocks to progress in reducing illegal logging. An example of the scale of the illegal profits that it can bring is with rosewood, the most trafficked wildlife species, with sellers making up to US$50,000/m^3 and with a value increasing 700 times between the criminal logger and end buyer. [525] The timber sector attracts corruption as it remains a profitable sector with high margins and international markets to export to, and continuing demand for high-value tree species.

CRIME CONVERGENCE - MEETING OF BAD ACTORS

The illegal wildlife trade and illegal logging operations are closely interlinked. Illegal wildlife and timber often move through the same geographical hotspots, and traffickers use the same trading and shipping methods. A UN report notes that the same transnational criminal syndicates are behind both illegal wildlife trading and forest crimes.[526]

This convergence has been seen in links between the illicit narcotics trade and links with illegal mining and the illegal timber trade in Latin America. This shows the co-dependencies between organized criminal groups, who use legal trade routes to move their illicit cargoes and utilize the global financial system to move funds around the world, often behind shell companies and offshore companies.

THE TRUE COST OF ILLEGALITY

As discussed, the illegal timber trade is estimated to be worth up to US$150 billion[527] a year, with one report noting that "Illegal logging [is] responsible for a loss of public assets in developing countries in excess of US$10 billion annually to which must be added an additional US$5 billion annually in lost taxes and royalties".[528] These numbers are likely to be at the lower end of the scale. This compares to the total official development assistance (ODA) commitments by members of the Development Assistance Committee (DAC) in 2022, which was US$204 billion.[529] This highlights the size and scale of the financial losses that could otherwise support countries to develop equitably and support standing forests. However, these illicit financial flows generate significant profits for organized criminal groups and corrupt government officials, undermining global, regional and national initiatives to protect and support forest economies.

STEPS TO ADDRESSING ILLEGALITY

There is global recognition of the vital role forests play in global climate, biodiversity conservation and livelihood generation for countless IPs and local communities, in addition to the climate mitigation they provide by storing hundreds of gigatons of carbon. However, the illegal timber trade continues to threaten the planet's large forest basins (including the Amazon, Congo and Southeast Asian tropical forest biomes), with further impacts elsewhere including within Asia, South America and temperate and boreal forest biomes. This threat converges with other serious organized crime to limit opportunities for forested nations and territories to fully involve green and just forest economies in their sustainable and equitable development.

Therefore the following points are of utmost importance:

Strengthened law enforcement – Timber ministries and associated government departments must ensure adequate training and resources are allocated to allow for effective investigations and enforcement to address the illegal timber trade. A number of countries have instituted digital timber legality assurance systems which, if properly implemented, can play an important role in controlling illegality and corruption.[530] Governments should also invest in control technologies such as wood ID testing,[531] remote monitoring by satellites and drones, tracking devices that can be embedded in trees, roadside surveillance cameras that monitor logging trucks, etc.

Coordination between government departments and export countries – Forestry crime is not just a conservation issue but has ramifications far beyond forests for economic growth, equitable growth, climate action, and wider health of governance within the country. Coordination between countries' financial intelligence units and forest authorities will be crucial to ensure that investigations do not end at the point of seizure of the cargo: instead, "following the money" can start at that point to trace where the money has gone, and seek to prosecute or freeze assets.

Ensure forest crime is seen in the same bracket as serious organized crime – The reality at present is that forest crime is not prioritized in the same way by countries. However, as outlined above and by new research, forest crime and more broadly environmental crime can no longer be viewed as just a conservation issue. The UN reports that illegal logging accounts for between 15% and 30% of global timber trade, and rises to 50% to 90% of the trade from tropical countries.[532] Therefore the illegal timber trade remains a low-risk, high-reward sector and it will require national, regional and international collective action to shift that balance to ensure that forests are protected and sustainable forest sectors are able to thrive.

The private sector needs to step up efforts to avoid illegal wood – Steps need to be taken to ensure that companies (as well as government officials and other actors) can more easily assess, understand and manage the most significant risks associated with timber procurement. There are a great deal of resources that have been developed to support these ends: a good example is WWF's new Wood Risk Tool,[533] which consolidates inputs from several respected, independent international organizations focused on conservation and anti-corruption to provide a reliable and convenient source of information about risks related to tree species and country of origin. The private sector can also play a vital role by pursuing and promoting best practices in due diligence, including but not limited to the use of digital traceability systems, wood ID testing,[534] and robust third-party certification.

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[535] 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[536], 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,[537] with a similar number loosely defined[538] as "forest dependent".[539] 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.[540] More specifically, the poorest segments of societies around the world are principally engaged in non-timber forest product extraction.[541] 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.[542]

Given the diversity of people who are to some extent[543] 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.[544] 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.[545]

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.[546] 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.[547] 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,[548] and local knowledge of forests.[549] Ecological knowledge is particularly rich among Indigenous Peoples, of whom an estimated 200 million are forest-dependent[550] and who are found to be among the (economically) poorest people across all geographies.[551] Indigenous ecological knowledge not only contributes significantly to the western scientific understanding of forests,[552] but it is also becoming increasingly recognized as being part of the solution to our global biodiversity and climate crises.[553] Indigenous lands account for less than 22% of the world's land area but contain an astonishing 80% of the world's biodiversity[554] and hold 35% of the world's remaining "intact" forests.[555] Yet the rights and tenure security of IPs and local communities to use forests is often threatened, sometimes violently.[556]

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[557] (see Box 1) and cocoa in Côte d'Ivoire, Ghana, Cameroon and elsewhere – and most of them continue to live in poverty.[558] 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.[559] 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[560,561,562] in economies where exploitation of forest resources is the norm for economic growth, often artificially supported by forest-harming subsidies.[563]

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[564] are highlighted as means to support forest peoples in protected areas through job creation and income generation schemes.[565] 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.[566] Similarly, payment for ecosystem services (PES) schemes are obvious candidates for providing value from forests for local communities[567].

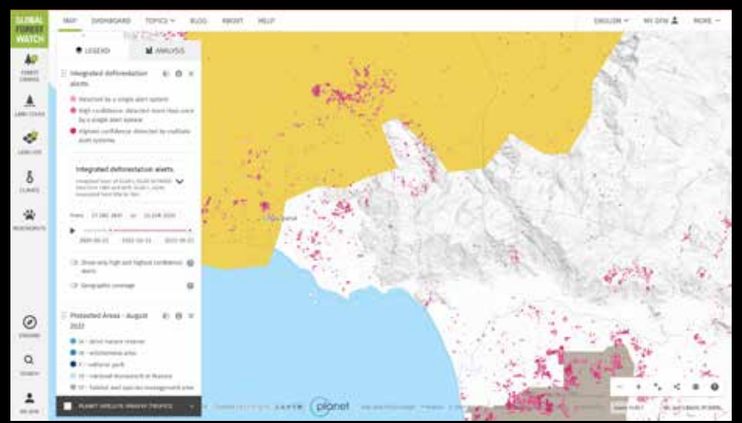
There are likely to continue to be trade-offs between people, climate and nature as we move towards not only our 2030 forest goals, but also towards fuller implementation of the Sustainable Development Goals and climate targets. Policies and practices which seek co-benefits for forests, people and climate 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[568] (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,[569] and 36% of oil palm related deforestation (Figure 6).[570] The area cultivated by smallholders has seen a massive expansion,[571,572] Sumatra in particular has a strong smallholder presence[573] and some of the highest rates of deforestation in Indonesia[574] (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[575]

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.[576]



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.[577] Many smallholders are under political pressure to develop land.[578] Pushed out to marginal land, smallholders often clear and plant on peat swamps[579] or steep banks – planting such unproductive land is devastating for conservation and generates poor returns for farmers.

Smallholder palm is highly unregulated,[580] 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.[581] The EU's new regulation aims to eliminate deforestation and degradation from consumer goods;[582] this may exclude non-legal smallholders but could also improve smallholders' positions in the global marketplace.[583]

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TREE STORY

Walnut: trees that feed us

When we think of trees, we don't always think of food. But in fact there are thousands of trees whose nuts, seeds, sap or leaves are eaten, from the mangos and durians of tropical Asia, to the hazelnuts, almonds, olives and apples of Mediterranean and temperate climates, to the syrup from maples in northern North America. This section focuses on one of the many trees that feed us, the walnut.

AN ANCIENT FOOD

People have been eating walnuts for at least 9,000 years, making them one of the oldest – if not *the* oldest – tree food known.[584] Written records indicate that walnuts were being cultivated in Persia (modern-day Iran) at least as early as 2,000 BC, where they were highly prized and reserved for royalty.[585] Different species of walnut were being consumed in the Americas at a similar time.[586]

Walnuts are the edible seed of trees of the genus *Juglans*. The most commonly cultivated species is the Persian or English walnut, *Juglans regia*. This is a large, deciduous tree, reaching a height up to 25-35m and occasionally reaching a girth of 2m.[587] Trees typically live for 100-200 years, but the oldest are believed to be 1,000 years old.[588] Mature trees in cultivation typically yield 50-100 kg of walnuts each year.

Today, most walnuts are grown in orchards, with selected varieties often grafted onto rootstock of other *Juglans* species, with the nuts mechanically shaken from the trees. However, in central Asia, families still temporarily leave their homes in the autumn and move into walnut forests to collect the harvest.

Walnuts are high in protein and fat and rich in several minerals, particularly manganese, and in B vitamins.[589] Today, 3.5 million tonnes of walnuts are produced each year, from countries as diverse as China, the USA and Iran,[590] and the international trade in walnuts is valued at US$2.3 billion.[591]

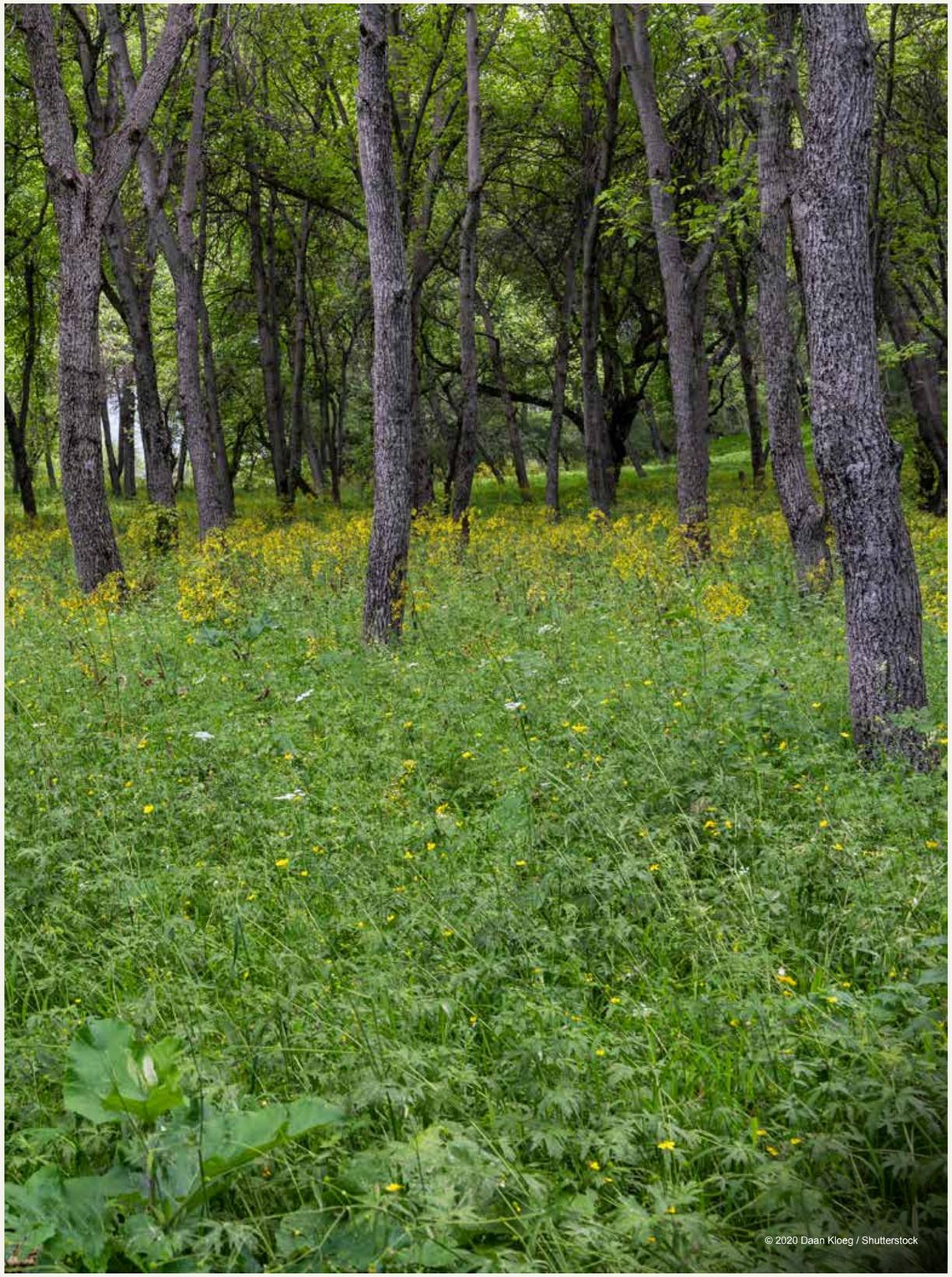
MYSTERIOUS ORIGINS...

Ancient cultivation and trade in walnuts means that the natural range of the species is unclear, but it is probably native to Southern Europe, West and Central Asia.[592] It was previously thought to have originated in the mountains of Kashmir, Tajikistan and Kyrgyzstan, however, fossil evidence indicates that it was introduced to Central Asia as little as 1-2,000 years ago.[593] Intriguingly, this interpretation echoes a local legend in Arslanbop in Kyrgyzstan, the location of one of the world's largest walnut forests. According to the legend, the walnut forests in the area were established by Arslan-Bop, the 11th century founder of the Uzbek village that bears his name.

... AND DISTANT IMPACTS

As well as providing nuts, walnut timber has exceptional color and grain, and was the timber of choice for fine cabinetmaking in Britain from the end of the 17th century through the middle of the 18th century. However, stocks began to dwindle through overexploitation, and a French prohibition on its export in 1720 meant that cabinetmakers had to look for an alternative. Mahogany (*Swietenia* spp.) was chosen as the luxury timber of choice, resulting in rapid overexploitation of mahogany in the Caribbean and Central America.[594] Timber traders began to seek further sources of mahogany in Mexico, the Caribbean, Central America and the Brazilian Amazon. In recent decades, the mahogany trade became a significant driver of deforestation in the Brazilian Amazon, with loggers creating access roads sometimes hundreds of kilometers into forested areas, degrading the forest and allowing entry into previously remote and inaccessible forest that enabled people to create agricultural plots and pastures.[595]

So, while cultivated walnut trees continue to nourish us with their nuts, a demand for their timber inadvertently caused environmental destruction elsewhere, a situation not dissimilar to the outsourced deforestation driven by modern western diets (see Section 2.2).



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[596]

BACKGROUND

Protected areas (national parks, nature reserves etc.) are, if properly resourced and managed, proven cornerstones of successful biodiversity conservation.[597,598] 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.[599] Area-based conservation is critical to mitigating current threats to forests from land conversion (which can involve illegality)[600] and from forest degradation.[601]

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.[602] 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.[603] 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).[604] 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.[605] Governments are struggling with identification and recognition of OECMs, although more than 800 are already listed on the World Database of OECMs.[606] OECMs can provide a new opportunity outside of protected areas to advance the conservation impact agenda.[607] 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,[608] with a target under the CBD Global Biodiversity Framework (GBF) of reaching 30% by 2030 (30x30). Most additional areas will probably be OECMs.[609] Estimates for total forest protected areas are approximate. In 2009 the best estimate was 13.5% of global forests;[610] by 2014 the UNEP World Conservation Monitoring Centre estimated 20.1%,[611] but in 2015 FAO again suggested slightly less,[612] and in 2022 FAO estimated 18%[613] – 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.[614,615] Many site selection methods have been developed, e.g., Key Biodiversity Areas,[616] software such as Marxan,[617] systematic conservation planning,[618] and gap analysis.[619] There is a growing focus from conservation professionals on the most endangered forests.[620] The oldest and least disturbed forests usually have the highest conservation values, and many definitions exist – primary, old-growth, intact[621] 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,[622] 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,[623] 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".[624] There is no global assessment of management effectiveness in forest protected areas. Improving effectiveness[625] – 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.[626] 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.[627]

How to measure success?

There is experience in site-level management effectiveness assessment with tools like the Management Effectiveness Tracking Tool (METT),[628] as well as a growing range of social impact measures.[629,630] Challenges remain in measuring biodiversity outcomes at global scale,[631,632] although many local studies exist.[633,634] 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.[635] 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.[636] There is evidence that healthy, diverse forests will be more resistant to climate change than degraded, fragmented forests,[637] and that healthy ecosystems will be more conducive to allowing movement of species due to climate change.[638] 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.[639]

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.[640,641] 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.[642] 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.[643]

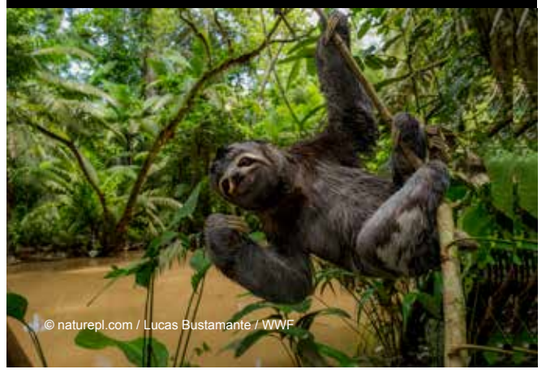
How do protected areas help against the current picture of forest threats?

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,[644] and also decreased[645] 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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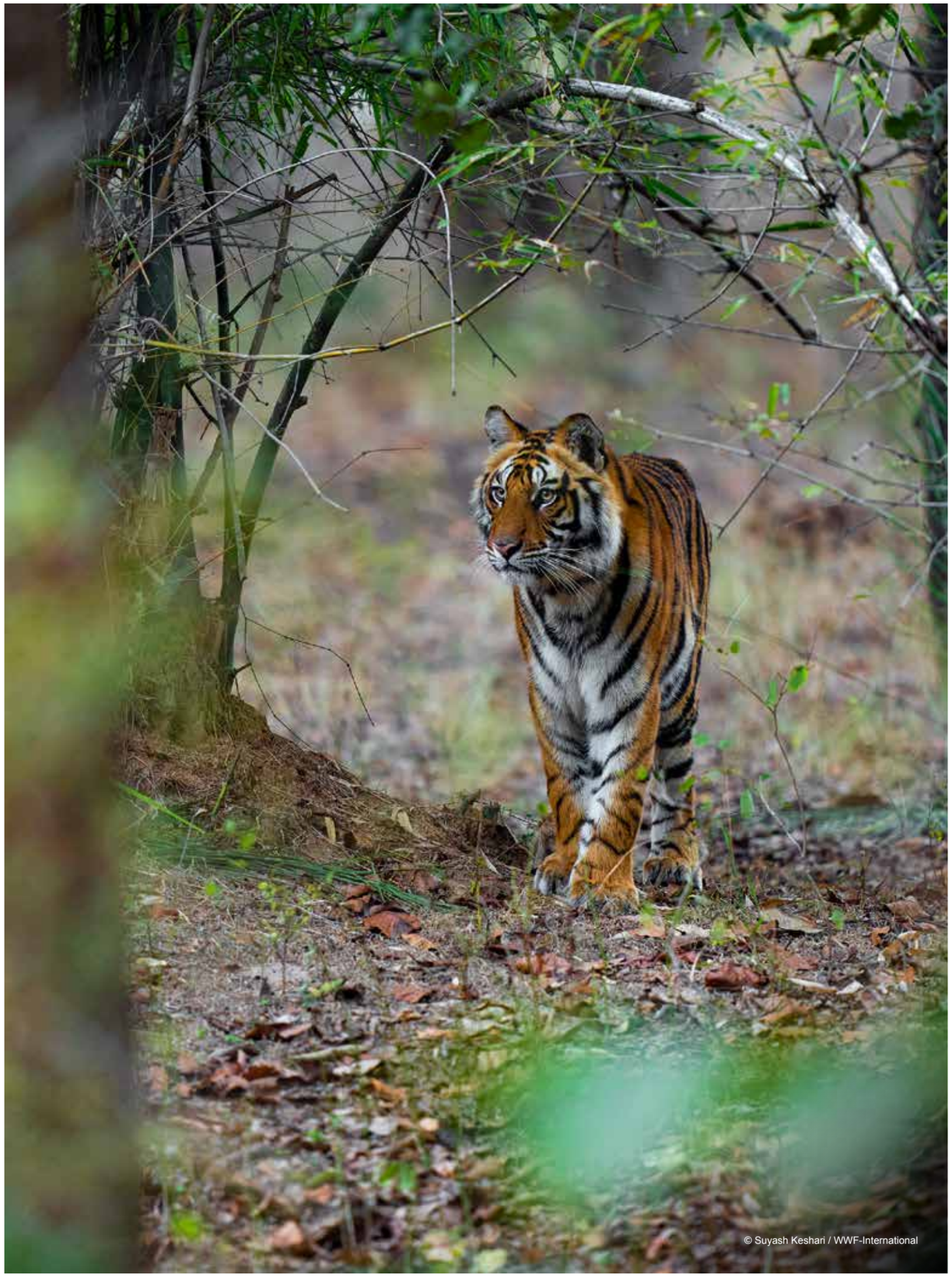
Is there a third way?

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.[646] 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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CASE STUDY

The recognition of customary forests in Indonesia: opportunities and challenges

CRISTINA EGHENTER, WWF INTERNATIONAL
WITH AN INTRODUCTION BY IRFAN BAKHTIAR, WWF-INDONESIA

BACKGROUND – FORESTS IN INDONESIA

IRFAN BAKHTIAR, WWF-INDONESIA

One of the greatest impacts on tropical forests comes from the environmental and forest losses caused by the intensification of land-use to meet global demand for agricultural commodities, among which palm oil is dominant. Within Indonesia, wildfires resulting from unsustainable management of agricultural commodities became a large contributor to carbon emissions between 2000 and 2005. National GHG emissions were estimated at 1.8 $GtCO_2$-eq in 2005, an increase of 0.4 $GtCO_2$-eq compared to 2000. Most emissions (63%) were caused by land-use change and wildfire in peatlands and forests, with fossil fuel burning accounting for around 19% of total emissions.[647]

Since the early 2000s, a great deal of land conversion has occurred, in particular for the development of oil palm plantations, either by large private companies or by smallholders. In 2019, the Indonesian government (via the Ministry of Agriculture) released data on oil palm, reporting that it covered 16.38 million hectares.[648] This figure is close to that released by an independent organization which identified the area of oil palm cover in Indonesia in the same period as reaching 16.8 million hectares.[649]

The spotlight on deforestation has prompted the Indonesian government to make efforts to reduce the deforestation rate. Regulations include a moratorium on granting natural forest and peat exploitation permits, which began in 2011, and a moratorium on granting palm oil plantation permits implemented in the 2018-2021 period. These have had an impact on reducing deforestation rates in the last decade. In the 2020-2021 period, Indonesia recorded a deforestation rate of 120,000 hectares, a quite significant decrease compared to the 2000s, or even compared to 2018-2019, which still reached 462,000 hectares.[650] In addition to moratoria, populist policies such as the expansion of social forestry and recognition of customary forests are believed to be important factors in reducing the deforestation trend in Indonesia. Currently, the total area designated to IPs and local communities is 5.1 million hectares, including 1.1 million hectares of Indigenous and local community lands.[651] However, several NGO reports indicate that there is potential for increased deforestation rates in Papua[652] and Sulawesi due to mining and agricultural activities.[653]

CUSTOMARY FORESTS IN INDONESIA

CRISTINA EGHENTER, WWF INTERNATIONAL

The report *The State of IPs' and Local Communities' Lands and Territories* (2021)[654] shows that "at least 32%, or ~38 million km^2[655], of global land and associated inland waters is owned or governed by Indigenous Peoples and local communities, either through legal or customarily-held means." Moreover, the same report indicates that 65% of Indigenous and traditional territories are in natural or semi-natural conditions with zero to low levels of human modification.

With the new Kunming-Montreal Global Biodiversity Framework (KM-GBF) agreed at CBD COP15 in December 2022, countries committed to conserving 30% of the globe's land and waters. This ambitious goal cannot be achieved unless the areas and territories traditionally conserved, restored and sustainably used by IPs and local communities are also recognized and appropriately supported. While in some regions advances have been made, in other regions more needs to be done by states to acknowledge the conservation contributions of local custodians of biodiversity, and report them as part of achieving KM-GBF targets 1,3 and 22, among others.

In an IPBES report (2019), it is similarly recognized that "at least a quarter of the global land area is traditionally owned, managed, used or occupied by IPs".[656] Moreover, it is also recognized that biodiversity is declining less rapidly in IPs' lands as compared to other lands. This is due to the different level of threats but also the knowledge and governance systems of IPs and local communities that have effectively sustained healthy ecosystems. A recent study found that deforestation across the tropics is lower in IPs' lands.[657] In the *Global Assessment Report on Biodiversity and Ecosystem Services*,[658] IPBES reaffirms the need to pay attention to critical "levers" to generate transformative change including promoting justice and inclusion in conservation and inclusive decision-making on biodiversity.

Indonesia is one of the so-called mega-biodiverse countries. It is also home to an estimated 60 million IPs, according to the Alliance of the Indigenous Peoples of the Archipelago (AMAN), whose knowledge, governance institutions, practices and innovations have helped maintain the ecosystem functions and biodiversity of the country.

INDIGENOUS CONSERVATION IN INDONESIA

Indonesia is one of the world's most biologically and culturally megadiverse countries. Many areas of high biodiversity are conserved and managed in sustainable ways by IPs who have a close bond with their territories and have developed effective governance systems. These areas are a source of cultural and spiritual identity, and the foundation of their livelihoods. For Indigenous communities, conservation is neither just an environmental management category nor does it only have economic value. Indigenous conservation is about a holistic governance of the land, waters, forest and other resources; protection, sustainable use and restoration; and linking social, cultural, ecological and livelihood dimensions critical to the present and future of the community.

Governance for conservation in Indonesia has seen an evolution over the last two decades towards finding a more inclusive and collaborative model of protected area management. The groundbreaking example of Kayan Mentarang National Park – the first National Park in Indonesia to be managed collectively with Indigenous communities since 2002 – confirmed that diverse and viable governance alternatives do exist that ensure some degree of participation and inclusion of local rights-holders. However, there are still legal, administrative and financial challenges for a full and effective implementation of collaboration.

In 2011, a symposium was organized by civil society organizations in Indonesia together with the ICCA Global Consortium to explore the concept and practices of ICCAs (Indigenous territories and Community Conserved Areas) in Indonesia. The event became a catalyst for the emergence of a broad alliance of organizations and individuals sharing a similar commitment to community and Indigenous rights in natural resource governance and conservation. This is how the Working Group ICCAs Indonesia (WGII)[659] was born to document and promote the recognition of the contribution of community conservation practices, and advocate appropriate policies to protect and support their livelihoods and conservation in Indonesia. WGII has set up a voluntary registry for ICCAs, supported by a peer-review mechanism for verification. Members of WGII have supported communities to map and register over 11 million hectares of Indigenous and traditional territories on a voluntary national platform, and over 460,000 hectares of areas distinctively protected and conserved by IPs and local communities, spread across 13 provinces and the five big islands of the archipelago. Updated data is regularly provided to government agencies.

In a little over 10 years, WGII has managed to become the single most important advocacy platform for ICCAs and Indigenous conservation in Indonesia. WGII is actively engaging with government agencies at local and national levels, and is supporting IPs and local communities in documenting their practices and associated knowledge for conservation, sustainable use and restoration.

WGII has helped promote the stories and values of Indigenous communities practicing conservation as part of their lives and ethics (e.g. *Fifty Indigenous Leaders' Voices for Nature and People in Indonesia – ICCAs*).[660] Stories include the practices of communities like the Ammatoa Kajang of Bulukumba, South Sulawesi, who have been protecting *Borong karamaka* or sacred forests for generations; and the *Tana' Ulen* of Dayak Kenyah people in North Kalimantan, communal forest reserves protected by customary councils. These stories illustrate examples of holistic governance of ecosystems and biodiversity in Indonesia. IPs and local communities conserve a vast range of habitats, biodiversity and ecosystem services through their own zoning systems and regulations. **75% of registered ICCAs are forest ICCAs, and the majority of ICCAs (60%) are overlapped by protected areas.** In the absence of a national-level legal framework for the recognition and support of Indigenous conservation, insecurity of status is still a threat to ICCAs. The fact that the majority are part (but not necessarily recognized) of national parks or other protected areas managed by the government means that there is still a high risk of conflict between Indigenous communities and the government. Only initiatives promoting dialogue between local government and traditional authorities can mitigate this threat and help find a shared solution for the governance of the area.

Models of collaborative management of protected areas are still experimental and local in Indonesia. Where and when they exist, these models strive to address growing development needs and identify governance arrangements that could work at local levels and in particular circumstances. For example, in the Kayan Mentarang National Park (KMNP), the Alliance of the Indigenous Peoples of the KMNP, or FoMMA, managed to negotiate with the park authorities an integrated zoning plan that takes into consideration the communities' land and resource use together with the standard regulations of the national park.

What is needed is a solid framework at national level to ensure that the inclusive evolution of conservation governance is systematic, consistent and sustainable, and that the conservation contributions, roles and rights of IPs and local communities are recognized and supported. The development of such a framework would be very much in line with the new KM-GBF adopted at CBD COP15 in December 2022, speaking specifically to Target 3. The recognition of ICCAs and more inclusive models of conservation and governance of natural resources are critical for the future of biodiversity in Indonesia and elsewhere.

When the late Anye Apui, Customary Chief of Bahau Hulu in North Kalimantan Province (Indonesia) visited the small village of Batu Puteh in Kinabatangan, Sabah (East Malaysia), the local leaders told him: "They took the forest from us. Do not let them do that to you if you still have forest in your village. Forest is life." Local leaders were sharing their experience of seeing their land along the Kinabatangan River extensively converted to oil palm plantations over the last 20 years with only pockets of forest left.

That was not the first time Anye Apuy had witnessed the economic, social and environmental costs of industrial oil palm plantations and logging operations in Kalimantan. Development and conversion had often left behind only cleared land and fragmented forests in the lowlands and just memories of once-thriving hunting grounds, with no significant economic gains for local communities.

When Brunei, Indonesia and Malaysia signed an MoU for protecting and sustainably managing the forests of the Heart of Borneo in 2017, they took an important step to protect the mountainous interior and critical watershed for the entire island of Borneo. They recognized that healthy ecosystem functions are the foundation of sustainable development. Similarly, in Papua, the government committed to maintaining the 70% natural forest cover of the island.

Anye Apuy had lived through a period of rampant logging along the main rivers of the interior of Borneo in the 1970s (and even lost the small wealth he had accumulated while he was employed to transport the logs downriver). He had visited communities in Sarawak where timber concessions had encroached upon and devastated Indigenous territories. Like many Indigenous leaders, he was determined to protect the land and forest for his people and future generations. The exploitation of timber can be an important economic resource for a country, but it is not long-lasting, while the price to be paid is long-term. Moreover, other environmental, economic and social costs of deforestation are mostly "externalized" and borne by those whose livelihoods are most dependent on the forest and its resources, like IPs. As Anye Apui and other Indigenous leaders used to say: "This (timber) is not the kind of gold that is good for us, we need to protect our land and forest, forest is life for the Dayak IPs."

Millions of hectares of forests, wetlands, lakes and coastal areas in Indonesia are governed by IPs and local communities. Since the early 1990s when the community mapping movement known as "counter mapping" started in Indonesia, more than 11 million hectares have been documented by their custodians and registered on the platform of the voluntary agency for the Registration of Indigenous Territories, or BRWA, funded by the Alliance of the Indigenous Peoples of the Archipelago (AMAN). Collections of stories like *Celebrating Territories of Life in Southeast Asia*[661] and the ICCA Global Consortium report on *Home – Territories of Life*[662] are examples of the critical contributions of IPs and local communities to effective and inclusive governance of forests, and why it is vital to recognize their stewardship.[663]

At policy level, over the last 10 years opportunities have opened up for the recognition of the rights of IPs over their territories and forests in Indonesia. In 2013, a fundamental Constitutional Court ruling (no. 35) declared that **customary forests** or forests claimed, cared for, governed and managed by IPs are not *hutan negara* or state forests but a separate and rightful category of forest land. This ruling was a major factor in forest and land tenure reform in Indonesia. The national government had launched an initiative to enable land redistribution and land titling for 12.7 million hectares, and thus empower small-scale farmers and Indigenous communities. Customary forest is one of the schemes under the land reform.

However, the recognition of customary forest is contingent upon sub-national legislation at provincial and district levels that recognizes and protects the rights of IPs and their territories. So far, several districts and provinces have issued regulations for the recognition and protection of IPs' rights. This is the case of Malinau District, North Kalimantan, where the customary land of Anye Apui's people was the first territory to be recognized by the district head in 2019. More lands were registered and formally acknowledged subsequently for a total of over 1,500,000 hectares in Malinau. The success of the process reflects the effective collaboration that the local government, communities and civil society organizations entered into to work together on documenting, registering and verifying Indigenous lands for recognition.

However, progress on the formal recognition of customary forests has overall been extremely slow in Indonesia. Against a potential of millions of hectares, so far only 153,000 hectares of customary forests have been verified and have received legal certificates of tenure from the Ministry of Forestry and Environment. The bureaucratic, complex and lengthy procedure, combined with what appears to be a "de-prioritization" of the customary forest scheme (especially those forests overlapped with protected areas or areas that appear too vast to be effectively managed) are hampering progress and making it difficult and costly for IPs to obtain legal status for their customary forests. This has also been exacerbated by the ratification of the Job Creation Law No.11 of 2020. The law has the potential to weaken environmental assessment and public consultation for approval of new investment in ways that make it easier for land-grabbing by corporations. Customary forests and Indigenous territories are at risk of becoming even more invisible and marginalized in decisions about land use.

It is important to continue the documentation of forest areas inhabited and managed by IPs and to publish the data to ensure that the information is received and acknowledged by both the public and the government, especially decision-makers.

It is also important to ensure that a proper and fair process of consultation and FPIC is set up and conducted, and all decisions that might impact the livelihoods and lands of IPs and local communities are made in an inclusive and participatory way with the relevant rights-holders.

Shared governance schemes where all rights are recognized and protected, and fair benefits accrue to all rights-holders, could represent a win-win sustainable and inclusive alternative for long-term sustainable forest management. Sustainability is contingent on equitable arrangements.

The future of healthy forests in Indonesia depends on advancing the formal recognition of customary forests and the holistic governance by their custodians where ecological, social, cultural and economic systems are inextricably linked. This governance model combines management effectiveness and equity in sharing costs and benefits, but its significance goes beyond that. Forests are paramount to the identity, security and resilience of the community for present and future generations: "*There is no Dayak community without forest*," as IPs in the interior of Borneo often say.

The following measures could be taken to promote effective and just forest conservation and sustainable use in Indonesia:

- Ensure the full, fair, gender-responsive and effective participation of all actors who are engaged, supporting and/or leading conservation, especially the Indigenous Peoples and local communities, who have been practicing conservation and sustainable use of forest resources for a long time.
- Promote whole-of-government and whole-of-society approaches in forest policymaking.
- Ensure the recognition of traditional forest conservation practices of Indigenous Peoples and local communities, including the associated systems and knowledge that enabled sustainable forest governance.
- Support documentation of traditional knowledge and regulations related to sustainable forest resource use.
- Ensure full and fair implementation of FPIC for the gazettement of protected and conserved areas (such as nature reserves), including all productive forest-related activities, especially in areas that overlap with claims of traditional and Indigenous areas and territories.
- Promote fair and gender-responsive shared governance schemes in the management of protected areas.

CASE STUDY

Roads in Elephant Land: towards mitigation of highway expansion impacts in Lumding Elephant Reserve, Assam, India

WWF-INDIA

INTRODUCTION

India has an estimated population of 30,000 wild Asian elephants, which move in and out of protected areas. India also has a network of elephant reserves and at least 150 identified elephant corridors – areas that are meant to maintain land use conducive to elephant survival and movement. However, an elephant reserve is not a protected area. Elephants are protected under Schedule 1 of the Indian Wildlife Protection Act, 1972, which is the country's highest legal protection.

The state of Assam in northeast India is estimated to have about 2,700 elephants. The Lumding Reserved Forest in Assam is part of the Dhansiri-Lungding Elephant Reserve, and is connected with other elephant habitats and forests.

One of the major threats to the Lumding Reserved forest, and others like it, is the rapid expansion of infrastructure. India is developing rapidly, and currently has the second largest road network in the world. This is still growing fast, with a target of over 30km per day. Highway construction is a national developmental priority, and along with new roads, several existing highways have been widened and upgraded, railway lines are being converted to broad gauge and double lines, faster trains are being introduced, and power transmission lines are also covering larger areas. WWF-India is working to mitigate impacts of linear projects, especially when they cut through animal habitats and movement corridors.

This case study details WWF-India's work in advocating for implementation of mitigation measures for a variety of taxa along a recently widened national highway that cuts through this elephant reserve. The aim is to maintain elephant movement and prevent wildlife casualties.

THE PROBLEM

Conservationists and ecologists have been raising the issue of linear infrastructure mitigation (sometimes also called "green infrastructure") for several years. This has led to some positive changes. In 2016, the Wildlife Institute of India (an autonomous body under the Ministry of Environment, Forest and Climate Change, government of India), in collaboration with the National Highways Authority of India (the official body which looks after development, maintenance and management of national highways, under the Ministry of Road Transport and Highways, government of India) released guidelines called "Eco-friendly measures to Mitigate Impacts of Linear Infrastructure on Wildlife" which are meant to be followed for all linear infra development planned through wildlife habitats and movement corridors. In 2019, the Ministry of Road Transport and Highways released a set of principles for road construction. One of these is: *"To have minimum impact of highways on the protected eco-sensitive area, the implementing agency should consider to spare sanctuaries/National Parks at the planning stage and wherever possible take a bypass/detour."*

The Doboka-Silchar National Highway (also called NH 27) passes through the Lumding Reserved Forest. The road was upgraded into a four-lane highway by the National Highway Authority of India (NHAI). It is the only national highway that connects the central part of Assam to the southern part, the Barak valley through the Dima Hasao district of Assam.

WHAT WAS DONE?

In India, while reserved forests have some level of protection and restrictions on change of land use, they are not in the same category as protected areas. This makes them vulnerable to denotification and changes of land use. WWF-India has been advocating for the conservation of the biodiverse Lumding Reserved Forest for several years. A joint survey between WWF-India and the Assam Forest Department was conducted in 2009. In this survey, 37 mammal species were recorded, including Asian elephant, Bengal tiger, clouded leopard, gaur, dhole, smooth-coated otter, western hoolock gibbon and five other species of primates. In addition, over 150 birds and 100 species of butterflies, more than 300 Angiospermic and 18 Pteridophytic plant species were also recorded from the Lumding Reserved Forest.

WWF-India has been active in the area, and considers Lumding an important part of the landscape for elephants as well as other fauna and flora. We started engaging in advocacy at various levels to ensure the highway would include mitigation measures. This included conducting a study on the best mitigation measures for the area, and preparing a report which was shared with state and central-level authorities. This led to WWF-India being put on a joint committee with the Forest Department, government of Assam, which suggested measures adapted from our recommendations. These measures were put in place and their effectiveness is now being monitored.

In 2009, the Assam Forest Department invited WWF-India and NHAI officials to discuss the expansion of the National Highway through the Lumding Reserved Forest. As a follow-up to this meeting, WWF-India prepared a report on the impact of the highway and proposed mitigation measures for it. This report, titled *Impact of the proposed upgradation of NH54E within Lumding Reserve Forest, Nagaon South Forest Division, Assam* was taken by WWF-India to various levels of the government. Following this, WWF-India published a more comprehensive report, *Ensuring safe access to wildlife in Lumding Reserve Forest, Assam, India: Mitigating the impacts of upgradation of Doboka-Silchar National Highway*. This was further submitted to the Director General of Forests and Special Secretary and the Inspector General, Project Elephant at the Ministry of Environment, Forests and Climate Change, government of India. Proposed mitigation measures included underpasses for elephants, culverts for smaller animals, and landscaping that allowed wildlife to have a clear view of crossings.

At the state level in Assam, WWF-India presented the report to officials in the NHAI. In December 2011, the Principal Chief Conservator of Forests (Wildlife), Assam organized a tripartite meeting with NHAI, WWF-India and the Forest Department in Guwahati. At the meeting, it was agreed that the site would be visited and proposed measures would be discussed. This visit led to a series of joint recommendations and follow-up visits. By March 2012, several officials of the government at both state and central levels had further recommended the suggestions and asked for implementation.

MITIGATION MEASURES

The key mitigation measures suggested and implemented were:

- Culverts of a particular size (2m for small animals).
- Opaque barricades along the highway to prevent light pollution.
- Fencing to prevent animals from traversing very steep slopes.
- Several major underpassess, of suitable size, and an additional underpass with enough space on either side of the main structure.
- The highway was leveled so that additional challenging slopes were not created.

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IMPORTANT PARTIES

This work required multi-level advocacy and several follow-ups. WWF-India identified the stakeholders and met them regularly.

The important parties included the Forest Department in the state of Assam, the National Highways Authority of India, the Ministry of Environment, Forests and Climate Change, government of India and the Ministry of Road Transport and Highways, government of India.

The NHAI stressed that too many changes were not possible because the Detailed Project Report had already been approved by the Government of India, so negotiations were carried out for the best possible outcome.

ACHIEVEMENTS

We advocated for the justification of mitigation measures for a large linear project whose execution had already been decided in an elephant reserve in a biodiversity hotspot. The main challenge was to ensure safe passage for elephants, and also to decrease wild animal mortality. Continuous follow-ups ensured that momentum on the issue was maintained; measures were discussed in a joint forum and then implemented.

WWF-India set up six camera stations at underpasses/ bridges with the support of the forest staff. These camera traps produced the first photographic evidence of elephants using the underpasses provided on the Doboka-Silchar National Highway within the Lumding Reserved Forest. Apart from elephants, photo evidence demonstrated that barking deer, large Indian civet, gaur, sambar, capped langur, yellow-throated marten and wild boar are using the underpasses. This was possibly the first focussed initiative for inclusion of large mammal underpasses along a national highway in India.

LESSONS LEARNED

Some of the key learnings from our work so far include:

- Biodiversity assessments help make a case for the potential losses an area can face.
- Reports based on on-ground studies should be made on time. These reports need further advocacy – they need to be taken to the appropriate levels and then followed up.
- Once mitigation measures are made, monitoring during construction and after construction is important to understand the efficacy of mitigation measures.
- Despite the challenges, it is important to continue dialogues with planners, to explain the still nascent discipline of wildlife impact mitigation.

CASE STUDY

Fostering Indigenous people's stewardship and monitoring of the Amazon Forest

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BITATE URU EU WAU WAU, ISRAEL CORREA DO VALE JUNIOR, DAMARY ELAGE,
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Tropical forests are under ever-greater pressure. Innovative solutions and urgent action are needed to ensure that they can continue to provide critical ecosystem services while meeting the growing demands of humanity. Protected areas, including Sustainable Use Protected Areas and Indigenous territories, play a great role, providing protection for biodiversity and serving as a reservoir for future forest restoration efforts. To date, more than 17% of the Amazon rainforest has been destroyed – an area the size of France.[664] For a place that's home to 10% of the world's known species, as well as 47 million people including millions of IPs, the devastation is incomprehensible.

IPs and local communities in Latin America and the Caribbean manage between 330 and 380 million hectares of forest,[665] an area more than three times the size of Colombia. Those forests store more than one-eighth of all the carbon in the world's tropical forests[666,667] and house a large portion of the world's endangered animal and plant species. Almost half of the large wilderness areas in the Amazon Basin are in Indigenous territories.[668] Brazil's Indigenous territories have more vertebrate species than its non-Indigenous protected areas.[669]

Despite its richness, the Amazon is threatened by increasing deforestation, degradation, overexploitation, climate change and wildfires, all posing great risks for biodiversity, regional and global climate, as well the livelihoods of the communities that depend on these ecosystems.

The Indigenous territories form a barrier against the advance of deforestation. In practically every Latin American country Indigenous and traditional communities' territories have lower deforestation rates than other forest areas, a feature found across the tropics.[670] Even though the Indigenous territories cover 28% of the Amazon Basin, they only generate 2.6% of the region's forest-related carbon emissions.[671] IPs in the Amazon are at the forefront of conservation, but also at risk due to illegal activities that often go undocumented and unreported.

For instance, the Uru-eu-wau-wau Indigenous territory, an area almost the size of Wales, is considered one of the most important Indigenous territories in Rondônia state, given its rich biodiversity and important freshwater sources. It is also a hotbed for environmental crime, especially deforestation and land grabbing.

INDIGENOUS COMMUNITIES MONITORING THE AMAZON

In this context, at the end of 2019, four Indigenous communities from the state of Rondônia in the Brazilian Amazon and the local NGO, Kanindé Ethno-Environmental Defense Association, approached WWF-Brazil for support to better monitor and defend their territory. They asked WWF-Brazil to help develop a technology-assisted forest monitoring programme that could improve their safety and facilitate wider legal and political campaigning, to defend their territory and support forest stewardship. From this, WWF-Brazil, the communities, Kanindé, and several Indigenous associations co-designed and co-developed an integrated participatory forest monitoring programme that brings together field-based and remote sensing data through drones, smartphones, satellites and direct action in the monitored areas. Monitoring is paired with support for advocacy and communication to defend their territory and the Amazon forest.

The current threats to the Amazon, together with a lack of transparency, highlight the importance of empowering local communities with the tools and knowledge needed to actively monitor the forest and effectively report threats to their territories. Innovative, integrated monitoring technologies can expand forest monitoring on a larger spatial scale, especially if such technologies are used in a participatory way, enabling local communities and younger generations to monitor and conserve the forest resources they rely on. In 2021, Kanindé and WWF-Brazil, together with Solved Soluções em Geoinformação Ltda, started working on the Kanindé Deforestation Monitoring System (SMDK), an early warning satellite alert system.

Together we have designed multilevel forest monitoring programmes that combine science and technology with traditional knowledge and local governance, to track and report illegal activities. The partnership operates at multiple scales and integrates diverse data sources and technologies to inform both analysis and action. In particular, there are two primary levels of monitoring and advocacy.


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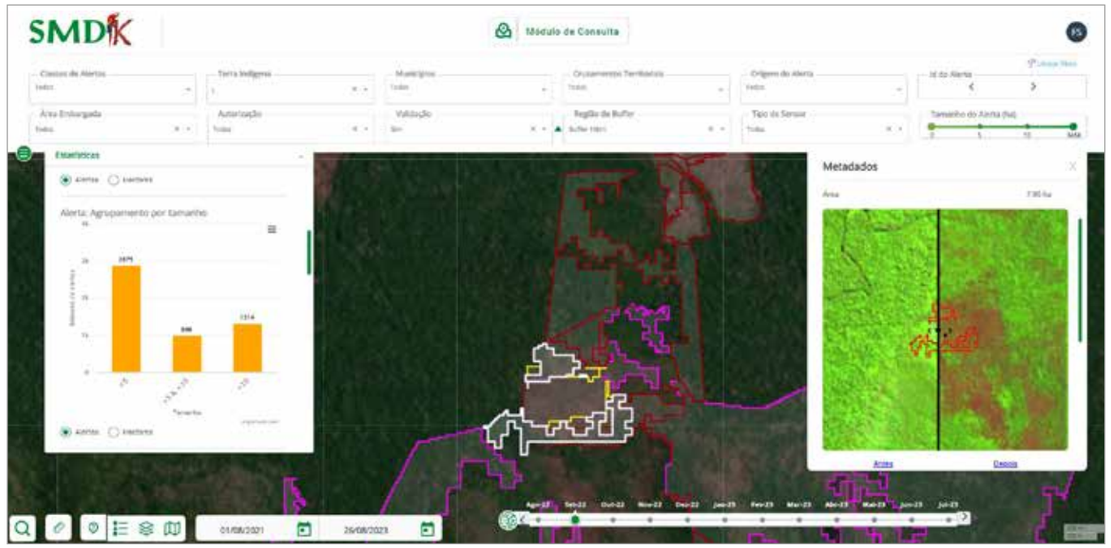
The first is at the regional level where satellite data, as well as optical and radar imagery, is brought together into the SMDK system to produce alerts and reports on various issues, such as deforestation, degradation and forest fires. The SMDK early warning alert system is built entirely on the use of free technology, including inputs from public orbital images and free software, primarily Google Earth Engine and field information. The system covers 22 Indigenous territories, plus a buffer of 10 km around each territory, totaling 6.4 million hectares in the state of Rondônia.

The objective of the SMDK is to carry out permanent participatory monitoring of invasions and deforestation in Indigenous lands throughout the state of Rondônia, counting, in some areas, on the support of Indigenous field monitors to validate alerts and complement the information. The SMDK started its operation in August 2021, and up to April 2023 it generated reports for over 1,350 validated alerts. The total area of validated alerts registered in this period was around 20,000 hectares. The five Indigenous territories where the project was supported by Indigenous field monitors (Pacaás Novas, Uru-Eu-Wau-Wau, Sete de Setembro, Rio Branco, and Igarapé Lourdes) correspond to 25% of the total valid alerts registered by SMDK. For these areas, the validation team produces summary reports of areas that have suffered pressures, within the last 30 days, for possible field validation operations by the Indigenous monitors.

The second level is on-the-ground forest monitoring in these five Indigenous territories; where teams of Indigenous field monitors use drones and mobile phones to monitor their territories, validate the satellite alerts, and better document the threats. To begin, SMDK satellite and other spatial data are analyzed by Kanindé GIS officers to identify hotspots of deforestation. From this, the group creates reports based on variables like the frequency of deforestation events and community proximity to identify where to focus the limited physical, financial and technical resources on the ground. Indigenous monitors field teams then review the local reports, and decide where to prioritize their patrols. Once in the area they collect additional information through drones and mobile phones equipped with the SMART app (Spatial Monitoring and Reporting Tool).[672] Once field data has been collected, whether drone images or information collected through SMART, this information is synthesized at Kanindé's remote sensing center into a report to assist the legal and advocacy arm of the project. This team of both Indigenous and non-Indigenous lawyers, policy experts and communications professionals then decides how and whether to utilize this analysis in court, communications campaigns, international policy discussions, or otherwise.



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For deforestation and other illegal activities to decrease, it is necessary to create a pathway for effective action by law enforcement and government agencies that have jurisdiction over Indigenous territories. Government agencies need to be impelled to fulfill their institutional role. Civil society organizations must pressure these bodies with greater intensity than before, presenting complaints about invasions, deforestation and other crimes that have occurred in Indigenous territories, and monitoring the progress of these complaints. The use of multiple technologies has boosted the capacity of local Indigenous groups to effectively monitor and protect their territories, by gathering high-resolution maps, drone photos, and geographical coordinates that serve as stronger evidence to enable further legal action or to plan immediate responses. In addition, technology can reduce the risks faced by frontline environmental defenders. For instance, it can enable them to monitor and document deforestation and to raise the alarm from a safe distance, avoiding direct confrontation with illegal loggers, thus increasing their safety and ability to defend the Amazon.

Supporting traditional communities to use technology paired with local Indigenous knowledge can play an important role in empowering those often-voiceless groups to be able to collect data effectively and share their local knowledge through the use of appropriate conservation technologies. For this to work it is imperative to integrate traditional local knowledge with science while jointly constructing and implementing participatory forest monitoring programmes. Our project was designed explicitly to be collaborative and inclusive, in which Indigenous communities drive the forest monitoring goals and programme design and actively contribute to data collection, analysis and subsequent decision-making. Community forest monitoring programmes using technology need to be not merely participatory but also collaborative, attentive to local context, and inclusive of diverse actor groups and types of knowledge. We have included different age groups and gender in the project development and implementation. Also promoted is Indigenous peer-to-peer learning and knowledge exchange between Indigenous groups so they can learn from each other's experiences and train future monitors in all project aspects, from drone flying and maintenance to data collection, analysis, and safety strategies. Indigenous field monitors have received training on a "holistic" approach to security and protection strategies for human rights defenders, as well as human rights training.

The SMDK platform is still in its beta phase, however, it is already capable of swiftly producing consistent reports on deforestation and degradation in Indigenous lands and surroundings, supporting the verification and detection of illegal activities, ultimately helping to avoid deforestation in those areas. This information is supplemented with information gathered by Indigenous field monitors with drones and the SMART app, and paired with legal advocacy and strategic communications aimed at increasing enforcement, reversing the trend of illegalities in Indigenous territories, and bringing greater attention to the necessity to protect the rights of IPs as the best way to promote well-being, sustainable development and conservation in the Amazon forest. So far, the information gathered by the Indigenous monitors has helped local organizations in several cases to make legal complaints to the relevant authorities. On some occasions, the local Indigenous monitor teams have managed to conduct joint field operations with government authorities' support which have resulted in equipment seizures and arrests in the area, proving that SMDK can help to pressure the government into action. The drone pictures and videos also help to bring attention to their struggle in international fora such as the United Nations Climate Change Conference, COP26,[673] as well as in the national and international media with the launch of the documentary *The Territory*.[674]

The challenges facing communities in adopting forest monitoring and their success in forest stewardship are not primarily social in nature but rather logistical, political and systemic. They require change from diverse actors across scales. Greater access to climate finance and policy reforms to support forest stewardship in the Indigenous territories are urgently needed to revert the current deforestation trends. They can provide cost-effective options for mitigating and adapting to climate change, conserving biological and cultural diversity, reducing poverty and food insecurity, and avoiding social conflict. It is important that organizations and donors understand the complexity and costs of this long-term participatory integrated action, commit to supporting it, and strengthen their collaboration with IPs and local communities to improve the overall governance of their territories, protect the forest and secure their collective tenure rights.

Videos:

Using drones to tackle deforestation | WWF

The Territory | National Geographic

© Odair Leal / WWF-Brazil

TREE STORY

Baobabs: last tree standing

There is a legend in Africa that says when God gave the hyena the gift of a baobab tree the hyena was so disgusted he threw it down with its roots in the air, thus explaining the weird shape.[675] Although the African baobab was only "discovered" for Europeans in 1749 by the 21-year-old French explorer Michel Adanson,[676] it had been known, used and worshiped by Africans for millennia.[677] Baobabs give fruit, their bark can be stripped and regrow like a cork oak (although there are limits to what the tree can survive),[678] and their vast and sometimes hollow trunks are used for water storage by some communities. Milk, flavorings, spices, protein and oils are extracted, while roots, bark and leaf extracts have antiviral and antimicrobial properties, including against malaria.[679] The baobab provides invaluable shelter for communities and has been used as tombs. These are some of the most extraordinary trees on the planet.

There are six or seven species in Madagascar and just one in both Australia and Africa (*maybe*: taxonomists are still debating).[680] The oldest can survive over 2,000 years,[681] making them the longest-lived flowering plants on Earth, and they are among the largest trees on the planet, sometimes exceeding a hundred feet in girth. Their origins and dispersal remain mysterious. Although humans helped distribution of baobab within Australia,[682] there is a dispute about how they arrived, with some scientists thinking seeds floated from Madagascar[683] while others believe they were carried across by early human settlers.[684] They have been widely planted in India, the Caribbean and elsewhere.

The very sacredness of the baobab has preserved it in many areas, and in large parts of Africa they are the only trees left when forest has been cleared, standing up starkly in an otherwise empty landscape. In the Lafarge quarry near Mombasa, Kenya, baobabs have even been left on "islands" up to 30 meters tall amid pits dug for limestone extraction.

But today, especially in Madagascar, the baobab is in deep trouble, often unprotected or still at risk even if nominally within a national park or nature reserve. Habitat fragmentation can lead to a decrease in seed production,[685] and the extinction of a giant tortoise that used to eat and excrete the seeds may also have slowed reproduction for some species.[686] Protected areas throughout the island are under pressure. The 210,000-hectare Menabe Antimena protected area is one of the last dry forests in the country, but in large areas only the baobabs remain as land is stripped out illegally for agriculture, with trees cleared, and used for as little as five years before declining soil fertility leads to abandonment.[687] Climate change poses additional risks, with four of Madagascar's species expected to face severe range reductions in the next few decades,[688] while recent efforts to improve the protected area system will be undermined if baobab distribution shifts outside the boundaries.[689] Even around the iconic Avenue of the Baobabs in Morondava cultivation is changing the hydrology and impacting baobabs.

The baobab is therefore a touchstone; hugely important ecologically and culturally, the survival of some species is on a knife edge. Decisions taken in the next few years will decide if Madagascar's baobabs become specimen trees in the arboreta of the world, relics within a transformed landscape, or whether they continue to exist as forest trees in a rich and thriving ecosystem.

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.[690] Plantation forests cover another estimated 131 million hectares, 44% of which are non-native species.[691] 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.[692] Degraded, logged-over tropical forests are exposed to drying with increased levels of risk to wildfires, which over time increase in frequency,[693] with hotter forest fires impeding the forest's ability to recover, destroying seed banks.[694] Increased levels of pests, loss of critical seed dispersers such as birds, and subsequent droughts can all hamper further regenerations.[695] These impacts are often cumulative, e.g. in boreal Scandinavia, climate shifts are pushing defoliating moths north and killing birch trees,[696] and drier winters are supporting higher populations of reindeer[697] 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[698] have been subject to serious challenge, due to overestimation of soil carbon gains,[699] misassumptions that naturally non-forested lands are suitable for afforestation,[700] and misunderstanding of global carbon cycle dynamics that are under flux due to climate change.[701] 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.[702]

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.[703] Much of the American myth of untamed wilderness is now known to be made up of secondary forest.[704] There are even suggestions that this regrowth may have caused noticeable reductions in atmospheric CO_2 levels.[705] 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.[706] Records for temple forests in Japan stretch back 2,000 years,[707] and forest restoration in India even further.[708] 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.[709]

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[710,711] and development of forest landscape restoration.[712] 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.[713] 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.[714] This can happen spontaneously, in areas of agricultural abandonment[715] and as a result of climate change.[716] 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.[717,718] Some of the increase may be regrowth following natural disturbance (e.g. fires, windblow) or after short-term deforestation. Some changes may be temporary.[719] Much of the increase is in the northern hemisphere, but important examples exist in the tropics, including the Atlantic Forest of Brazil,[720] Argentina and Paraguay, and parts of Central America.[721] While the regenerating forests will not be exactly the same as felled forests, and secondary forests will generally have lower genetic diversity,[722] 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.[723] Silvicultural issues are important; there are many practical challenges to establishing trees.[724] 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.[725]

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.[726] Plantations can, if properly managed, supply high quantities of timber, pulp and fuel, along with some ecosystem services[727] such as flood control. But they will only support a fraction of the biodiversity associated with a natural forest.[728] 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,[729] 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.[730] Problems can be aggravated by efforts to meet UNFCCC or CBD goals,[731] if forest "restoration" or afforestation occurs in grasslands[732] or savannahs[733] with important biodiversity.[734] Bonn Challenge targets have encouraged some governments to focus on quantity of trees rather than forest quality.[735,736,737] Certain efforts to identify suitable reforestation areas, e.g. by the World Resources Institute,[738] have been criticized for including important grassland areas.[739]


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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.[740] Grassland species are declining in some areas.[741] With the major decline of South America's herbivore guild,[742] grasslands require livestock to replace grazing regimes of extinct or missing mammals and protect against forest encroachment.[743] 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.[744]

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,[745] limiting growth and threatening the permanence of any carbon sequestered.[746] Restoration strategies need to take account of projected changes. Fire ecology is changing dramatically in Australia, for instance.[747] 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.[748] 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.[749] 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[750] 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,[751] 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.

CASE STUDY

Financing the transition to sustainable forest conservation

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Trillion Trees[752] is a joint venture between Birdlife International, the Wildlife Conservation Society and WWF. The partnership was created in 2016 to identify innovations and pathways across the critical landscapes we work in with stakeholders to accelerate and scale the protection and restoration of forests to tackle deforestation and bend the curve for biodiversity. The partnership works to support rights-holders, conservationists, governments and key stakeholders across some of our most critically important forests globally, seeking to enable a just transition for IPs and local communities while providing sustainable benefits for people, nature and climate.

While addressing the climate crisis depends primarily on a rapid transition away from fossil fuels, the protection and restoration of forests will play an increasingly important role in climate mitigation,[753] adaptation and biodiversity conservation.

Investing in forests delivers on multiple global multilateral agreements and aligns with important governmental and corporate priorities. Indeed, through their commitments to a net-zero economy and nature-positive approaches, both **the public and private sectors are driving demand for large-scale forest landscape restoration**, which can restore biodiversity, improve human well-being, and deliver climate benefits.

They are right to do so; high-quality forest restoration alone can deliver 20% of the total climate mitigation potential from nature-based solutions (NBS).[754]

However, the finance needed to mobilize this is enormous. Delivery of the Bonn Challenge's 350 million hectares of forest restoration has been estimated to require US$30-80 billion **each year** to 2030. This scale of investment can only be achieved by combining public funds (international and domestic) and private capital. To stimulate the flow of private capital requires investment models, based on nature-based outcomes, that can generate returns.

There is clear evidence that land and forest restoration can deliver returns.[755] But therein lies the challenge: investing in restoration can appear risky, with opportunities often in countries with a higher country risk classification.

Restoration is a long-term undertaking, as natural habitat is gradually re-established, and environmental and social benefits can take time to materialize, so patient capital is needed. Financial flows that are needed are similar to infrastructure projects where most of the capital is needed up front, to work with rights-holders to agree and allocate land for restoration and create the right conditions for regrowth and maintenance. This perceived riskiness of early-stage financing and a lack of mechanisms by which to de-risk these landscapes are hindering private investment.

At Trillion Trees, our own experience has validated that of many others: whenever amid a global consensus of the value of NBS, mobilizing early-stage financing is difficult without public financing assurance, e.g. through blended financing.

There is some evidence of this changing thanks to the leadership of some key visionary companies seeking to look beyond carbon and taking a broader NBS approach to supporting the restoration of landscapes. But pace is needed, with efforts such as the Science Based Targets initiative and the Taskforce on Nature-related Financial Disclosures seeking to provide a framework through which companies can play a key role in enabling change at a landscape level.

The planet, however, **does not have the luxury of the time it will take for nature-based financing to normalize these risks**. It is crucial therefore to 1) create viable investment pathways for the ecosystem benefits derived from restored ecosystems, 2) accelerate the global pipeline for forest restoration at landscape scale, and 3) prepare the communities in those landscapes to engage in these opportunities as equal stakeholders.

As McKinsey noted in 2021, "***Innovative financing mechanisms are needed to aggregate supply and bridge the time gap before NCS (Natural Climate Solutions) projects generate cash. So are subsidy and grant schemes, to help land-use sectors change agricultural and forestry practices, and to aid blended finance instruments in de-risking early-stage investments."***

To create investment pathways and accelerate the pipeline, Trillion Trees and other partners are seeking ways to unlock financing to help ensure promising restoration initiatives are identified, where governments play a leading role in creating the enabling conditions for action, and decisions on land use, benefit-sharing and management are always taken with the full and equitable participation of IPs and local communities.

Trillion Trees is piloting a Reforest Catalyst to help support promising restoration initiatives from our own portfolio to access nature-based investments. UNEP (United Nations Environment Programme) has launched the Restoration Seed Capital Facility and the Factory, to provide low-interest capital to investors interested in pursuing restoration-related investments, while building the capacity of eco-preneurs across a pipeline of project-level investment opportunities. WRI (World Resources Institute) has the Landscape Accelerator programme, and TNC (The Nature Conservancy) runs the Natural Climate Solutions Accelerator Grant Program, while WWF seeks to support NbS approaches at multiple levels through the NbS Origination Platform and the NbS Accelerator. All seeking to provide grant funding to kick-start innovative and scalable approaches. More such initiatives are urgently needed, supported by innovative funders.

CASE STUDY

HIFOR: A new international financing mechanism for high-integrity tropical forests

FORESTS AND CLIMATE CHANGE PROGRAM,
WILDLIFE CONSERVATION SOCIETY

The High Integrity Forest (HIFOR) Investment Initiative aims to create a new climate and biodiversity asset class to help finance the protection of high-integrity tropical forests – those that are least degraded by human impacts.

FRESH INVESTMENTS ARE NEEDED IN HIGH-INTEGRITY FORESTS

High-integrity forests[756] provide the highest levels of many of the environmental services that forests are noted for. For example, they are the main location of the land sink, the process by which healthy ecosystems absorb around 30% of anthropogenic CO_2 emissions each year, independent of any restoration or regrowth. The cumulative effect of this sink has kept the Earth more than 0.5°C cooler than it otherwise would have been. In addition, high-integrity forests in the tropics also cool the Earth significantly by altering land surface energy and moisture exchanges.

Higher ecological integrity correlates with higher biodiversity as well – for example supporting higher numbers of forest-dependent species, ensuring lower extinction risk, hosting higher genetic diversity, and bringing a lower risk of ecosystem collapse. High-integrity forests are also better able to cope with climate change and other stresses. Other values that are elevated in high-integrity forests include carbon stocks, regulation of local and regional hydrology, decreased risk of zoonotic disease spillovers, and contributions to the livelihoods and cultures of IPs and other local communities.

Because they are remote, high-integrity forests are often wrongly perceived as unthreatened, but they face substantial and growing risks – hence their protection represents a critical conservation priority. For example, from 2017 to 2021 the extent of high-integrity tropical forest declined by 3.1% per year, mostly through degradation to medium or low-integrity forest, with concomitant losses in their ecosystem service and biodiversity conservation roles. Infrastructure expansion, logging, agriculture, fires, mining and hunting all drive this trend.

High-integrity forests are increasingly recognized as a global policy priority. At UNFCCC COP27 in Sharm El-Sheikh, the Forests and Climate Leaders' Partnership – a "coalition of the willing" of 27 countries and the EU – identified high-integrity forests as one of six action areas for accelerated implementation.[757] The Kunming-Montreal Global Biodiversity Framework of the Convention on Biological Diversity, signed by 196 countries in 2022, places the protection of ecological integrity at the heart of Goal A and calls for explicit plans to protect high-integrity ecosystems as part of Action Target 1.[758]

One of the key factors allowing severe threats to high-integrity forests to persist is inadequate financing for conservation measures on the ground, and for building greener local economies. The cooling that high-integrity forests have provided through their carbon uptake alone has had an estimated impact on the global economy in the trillions of dollars, but the value of the forests that provide that cooling is currently priced at zero. Existing climate financing mechanisms for forests, including REDD+, don't explicitly focus on high-integrity forest areas, because the threats to them are generally too distant to "count" in carbon offset markets or be prioritized by national REDD+ strategies; both approaches require interventions to influence net land-use change emissions rather than to maintain the net absorption of CO_2.

THE HIFOR APPROACH

The HIFOR Investment Initiative aims to directly correct this market failure by introducing a new asset – the HIFOR unit – that represents a tonne of net CO_2 absorption in a high-integrity tropical forest that is under effective management. The unit also embodies:

- A "biophysical cooling" effect (separate from CO_2 absorption) that adds an extra 50% to its cooling value;[759]
- High biodiversity value that correlates strongly with measures of forest ecological integrity;[760]
- Social benefits associated with ensuring that payments for these ecosystem services benefit local communities, including IPs.

HIFOR may be thought of as finance for "preventive care" for healthy forests to guard against threats that are expected to grow in the medium term and beyond. As such it is distinct from other forms of forest climate finance, like REDD+, which are designed as "urgent care" funding for forests that are already suffering substantial deforestation and degradation or are imminently threatened. With forests, as with a public health care system, both urgent and preventive care are needed.


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Importantly, HIFOR units are not intended as carbon offset credits, which are the units issued by REDD+ projects and programmes. In the context of what is referred to as "beyond value chain mitigation",[761] HIFOR unit purchasers can claim that they are contributing quantitatively to global climate change mitigation, and making a contribution to biodiversity conservation, but cannot count their claim against a corporate net-zero commitment. Some corporations count their purchases of REDD+ credits against their net-zero claims, since those credits represent emission reductions that would not have occurred without the project/programme interventions. HIFOR offtake purchasers will pay for maintaining the ongoing ecosystem service of CO_2 absorption in a well-managed, high-integrity forest, which also embeds biodiversity conservation and other environmental services. This set of services has no carbon offset market value – hence our focus on creating a new asset class. Initial indications are that there is a significant interest in this type of asset, and research is now underway to build a clearer picture of the scale of demand.

HIFOR IS CURRENTLY BEING DESIGNED AND PILOTED

The Wildlife Conservation Society is leading the practical development of the HIFOR model, including work with partners on the development of an initial set of HIFOR pilots. The first of these is in the adjoining Mamirauá and Amanã Sustainable Development Reserves, Brazil, through a memorandum of understanding with the Amazonas State Environment Secretariat. Work is underway to:

- Elaborate a technical collaboration agreement for HIFOR implementation;
- Conduct stakeholder consultations with resident communities;
- Facilitate the development of the first HIFOR offtake purchase agreements.

Discussions have also begun to identify an initial pilot site in the Congo Basin and more generally to map the potential applicability of the HIFOR Initiative in the region.

Informed by this work on the ground, a set of detailed project documents is being developed.[762] For example, a detailed technical methodology is being developed that will allow a project proponent to design a project, report in a credible way the volume of HIFOR units that it produces, and have this audited by an independent body. Options for a future HIFOR governance system are also being discussed, drawing lessons from other payment for environmental services models so that transparency, scientific rigor, accountability, market credibility, and processes for continuous improvement can be built in from the start. The aim is to build a robust and highly scalable model that (a) is open to the widest possible range of managers of tropical forest, including IPs and local community groups, and (b) delivers long-term benefits and improved conservation outcomes to as large a proportion as possible of the world's remaining high-integrity tropical forests.

The Atlantic Forest, a rich and diverse tropical forest

CASE STUDY

Collaborations for Atlantic Forest conservation and restoration

TARUHIM M.C. QUADROS, DANIEL VENTURI, CLAUDIA AMICONE, LUCÍA LAZZARI, CARMEN MONGES AND OSCAR RODAS, WWF-BRAZIL

stretching across Brazil, Argentina and Paraguay, is at serious risk. Originally covering 140 million hectares, nearly 8% of the South American continent, the forest is a crucial global biodiversity hotspot,[763] home to 7% of Earth's plant species and 5% of its vertebrate species,[764] a transboundary botanical refuge that holds more than 20,000 plant species[765] including Brazilian rosewood (*Dalbergia nigra*), araucaria (*Araucaria angustifolia*), and vibrant bromeliads and orchids. The Atlantic Forest is also a sanctuary for vital forest specialist species including jaguar, the golden lion tamarin (*Leontopithecus rosalia*) and the South American tapir (*Tapirus terrestris*), with endemic species including the woolly spider monkey (*Brachyteles spp.*), alagoas antwren (*Myrmotherula snowi*) and black-fronted piping guan (*Pipile jacutinga*).

But today the Atlantic Forest is on the brink of extinction due to widespread deforestation by human activities. It faces significant threats from conversion and degradation, and 76% of the original forest cover in the three countries has already been lost.[766]. Centuries of impact have also caused severe degradation. The Atlantic Forest in Brazil now has only 12% of its original forest cover remaining as primary forests,[767] the rest having been converted into agriculture, pastures and urban areas.

A third of South America's population rely on the Atlantic forests' ecosystem services, with the forest providing a vital source of freshwater for local communities and major cities like São Paulo, while also supporting agricultural production. Forests also play a significant role in South American culture. Indigenous communities are intertwined with the Atlantic Forest, the stewards of the land.

We urgently need to safeguard the remaining forest, while restoring forest cover. As well as providing resources and water security to 154 million people, restoring the forest offers a pathway to sustainable development, placing people at the center of the solution to help mitigate climate change, improve water resource management, and reverse biodiversity loss.

The Atlantic Forest transboundary movement aims to strengthen governance and give society a greater voice, transform behavior and incentivize public policies to protect and restore the forest. Collaboration between multiple actors – bringing together public agencies, scientists, local communities and conservation institutions – has helped to build a participatory movement which reinforces restoration as a pathway to the sustainable development of a green forest economy.

© Preserve Muriqui

Woolly Spider Monkey
(Brachyteles spp.)

© Adriano Gambarini / WWF-US

Araucaria
(Araucaria angustifolia)

© naturepl.com / Luiz Claudio Marigo / WWF

Jequitiba rosa tree
(Cariniana legalis)

Case Study Figure 1: Atlantic Forest original boundaries, with current forest cover information in green.

Source: MapBiomas

GLOBAL AMBITIONS AND THE ATLANTIC FOREST

The Trinational Atlantic Forest Pact was recognized as one of the 10 World Restoration Flagships of the UN Decade on Ecosystem Restoration. Restoration is focused on applying the principles of all three Rio Conventions; addressing biodiversity, climate change, land degradation, desertification, and drought in a unique restoration solution.

The governments of Brazil, Argentina and Paraguay are committed to the integration of restoration and conservation goals into national agendas. Brazil has the potential to develop restoration as a green development pathway, generating up to 2.5 million jobs by 2030 if it effectively implements restoration to the NDC target of 12 million hectares.[768]

In the densely populated Atlantic Forest regions, policy efforts play a crucial role in discouraging deforestation and degradation, and incentivizing natural ecosystem recovery. Legislations and regulations are in place to protect and conserve the forest. However, civil society engagement in governance was key to their establishment.

There is now an urgency to enforce protective legal instruments and policies to reverse the extensive degradation and recover forest functionality. In Brazil, Argentina and Paraguay, legislation defines illegal deforestation and requires its recovery and that of key degraded conservation areas. This designation means there are an estimated 11.95 million hectares to be restored, if nations conform fully with the legislation across the entire Atlantic Forest. This recovery requires effective implementation to promote large-scale forest restoration, and appropriate enabling conditions. Several encouraging examples of political willingness and effective regulation provide evidence that, with multi-stakeholder collaborations, restoration can lead to positive social, biodiversity and climate outcomes, and that large-scale ambitions are achievable.

The Trinational Pact has created a positive conservation and restoration effort in the Atlantic Forest, and has delivered impact while strengthening institutional arrangements and advocacy for the biome: we estimate that the more than 390 institutions involved have already achieved around 1 million hectares under restoration, created 126,000 jobs, supported improved lives for more than 4,400 families, and engaged 7,500 children in environmental education programmes.

In terms of biodiversity, several fauna and flora species have benefited from habitat conservation and recovery. The jaguar was almost extinct locally in the Upper Parana in the 2000s, and now has a stable population with an estimated group of 93 individuals in the Brazil-Argentina corridor.

These long-term collaborations, with science supporting evidence, account for several examples of restoration delivering climate, biodiversity and social benefits.

FOREST FINANCE FLOWS

The Reflorestar Program is an example of an effective public policy to scale restoration which recognizes the role of governments in the restoration agenda. The sub-national programme in Espírito Santo state (Brazil) promotes Atlantic Forest restoration through legal regulation, with incentives for farmers to engage in conservation and restoration by promoting payment for environmental/ ecosystem services (PES). The programme also plays a role in encouraging sustainable agroforestry systems, so that farmers can adopt restoration with socioeconomic benefits. The state has committed to the '20x20' initiative, to restore at least 80,000 hectares of degraded land (a Bonn Challenge goal). The programme is structured to bring local communities, farmers, landscape actors and government together to increase forest cover and secure water provision. Its structure reflects past lessons learned in Espírito Santo, which was the first state in Brazil to institute a PES State Programme, and a fund to ensure the financial flows needed for implementation – the Espírito Santo State Water Resources Fund (FUNDAGUA). FUNDAGUA and the State Water Resources Policy established a minimum percentage of oil and gas royalties which had to be invested in PES actions,[769,770] providing a secure flow of finance to the forest scheme. Currently, the Reflorestar Program is financed by FUNDAGUA and the World Bank. Over eight years it has supported 3,800 local landholders and has conserved and restored 20,000 hectares of forest, thanks to funding totalling US$10 million. The Reflorestar Program reinforces the potential that a state can achieve by establishing public policies to incentivize nature conservation mechanisms and forest finance flows.

SOCIOECONOMIC BENEFITS

Local communities play an essential role in the Atlantic Forest; they are the rights-holders and they are permanently engaged with the land. In Paraguay, the MATE Project is an agroforestry model supporting restoration of the forest and the development of sustainable livelihoods. Local communities are leading restoration and supporting biodiversity with agro-farming of the mate herb, a native Atlantic Forest species highly valued for producing tea. The project has strengthened the productive independence of the rural and Indigenous populations, especially women and young people, by training them and facilitating their work in an Atlantic Forest area with very high local and international demand for mate. The goal is to generate opportunities for the cultivation and industrialization of yerba mate and medicinal plants, alongside other Atlantic Forest species, under a sustainable management approach. The project is boosting the local green economy via sustainable agriculture, giving added value to production via rural families and promoting access to local and international markets delivering products which can be guaranteed to be safe, environmentally and biodiversity friendly, and climate-smart.

In Argentina, initiatives for restoration have encompassed enhancements in water accessibility for rural households in the Atlantic Forest area. These improvements have led to better water availability and quality, benefiting lives as well as enhancing rural productivity.

THE PATH TO THE FUTURE

The outcomes mentioned here represent only a small portion of Atlantic Forest opportunities. A tremendous conservation and restoration task lies before the Atlantic Forest nations, and it demands immediate action and engagement. There is an urgent need to scale up existing smaller-scale action. The forest is a cultural legacy that must be sustained with solutions encompassing scientific and traditional knowledge bases. Restoration and conservation policies for the Atlantic Forest must provide legal foundations for the active involvement of traditional communities in the decision-making process.

Achieving successful and extensive implementation of the Atlantic Forest Trinational Pact will also require overcoming barriers to restoration. This means creating favorable conditions for the restoration supply chain, and public engagement is a vital component of successful implementation at scale.

The importance of the Atlantic Forest extends beyond its borders, and the biome's global context impacts actions in each country. International players also need to encourage business engagement, focusing on enhancing sustainability within supply chains that have a footprint in the forest. New deforestation regulations (e.g within the EU) demonstrate how global pressures can shape and reinforce green markets in sourcing countries like Argentina, Brazil and Paraguay.

The Atlantic Forest's rich biodiversity, vital ecosystem services and role in human survival make its restoration a non-negotiable priority. Policymakers must recognize that restoring this unique biome is essential to combat biodiversity loss and climate change. Actionable recommendations include fostering strategic restoration incentives to encourage private landowners to actively participate, integrated land-use planning, accounting for restoration within gray infrastructure development, establishing and enforcing effective protection within the restored forest, and incentivizing public awareness campaigns to foster collective responsibility. Collaboration with communities and existing multi-stakeholder governance must also be ensured.

In a world of urgent environmental challenges, policymakers must act decisively to restore the Atlantic Forest. This is not just an ecological imperative; it's an investment in a brighter, greener and more sustainable future for all.

CASE STUDY

Bringing Forests Forward: a pathway to corporate action

TIM CRONIN
FORESTS FORWARD GLOBAL LEAD, WWF-AUSTRALIA

Forests Forward is a signature WWF 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.

Through Forests Forward, WWF works with a consortium of leading global companies with impacts and dependencies on forests – including HP, IKEA, SIG, Costco Wholesale, International Paper and many more – to halt and reverse forest loss.

WHY IS CORPORATE ACTION ON FORESTS SO CRITICAL?

It's crunch time. Private sector ambition, action and accountability are imperative for addressing the underlying drivers of forest loss, especially the failure of markets to comprehensively recognize and account for the goods and services provided by forest ecosystems.

While public and private sector *commitments* to halt and reverse forest loss gather momentum, there remains a gap between talk and action. The Glasgow Leaders Declaration on Forests and Land Use, and subsequent Forest and Climate Leaders Partnership, are encouraging examples of steps in the right direction. However, the world now needs practical and scalable solutions for reversing deforestation and promoting sustainable forest management, while supporting communities and economies to thrive.

Private sector leadership – with inspiring examples that capitalize on the full value of forests to underpin business success – can be game-changing to help stimulate the global action required.

WHAT IS THE OPPORTUNITY?

We are seeing more and more regulatory and disclosure requirements, supply chain volatility, consumer expectations and new business opportunities associated with climate change and nature. Consequently, the environmental costs and benefits associated with forests are increasingly factored into the bottom line.

Forests Forward convenes, catalyzes and co-designs private sector partnerships to support the global transition from an economy built on extraction, exploitation and degradation, to one built on conservation, stewardship and regeneration. Forests Forward seeks to accelerate this transition by demonstrating and enhancing the *business and economic case* for forest conservation, restoration and improved forest management.


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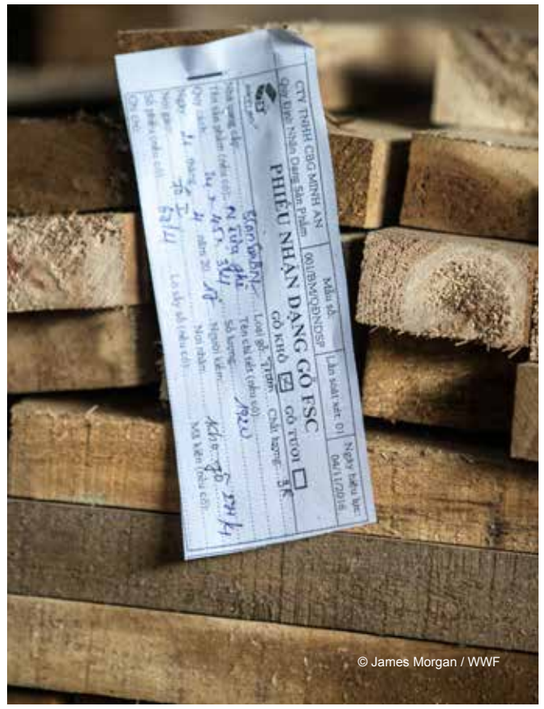
HOW DOES FORESTS FORWARD WORK?

Forests Forward adopts a structured and systematic approach to unlocking private sector **commitment**, **action** and **collaboration,** with a focus on three broad action areas: i) sustainable forest management, ii) responsible sourcing, and iii) investment into flagship forest landscapes.

First, Forests Forward's corporate partners **commit** to removing deforestation and forest degradation from their production and trade. Second, they **act** to implement ambitious, time-bound targets to deliver these commitments. Third, they **collaborate** with like-minded peers to overcome shared challenges and transform industry practice. Working hand-in-hand, Forests Forward provides expert advice on target setting, action planning and prioritization; convenes and facilitates collective problem-solving and advocacy; and shines a light on innovative solutions to inspire others to follow.

Specific activities and initiatives featured within the programme – which leverage the breadth of expertise in the WWF network and integrate with other global initiatives and trends – include deforestation-free production and trade, voluntary forest certification, community forestry, Science-Based Targets for Nature, payments for ecosystem services, nature-based solutions for climate change, blended finance, and joint advocacy for enabling public policies.



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WHO PARTICIPATES IN FORESTS FORWARD?

Forests Forward partners with nearly 30 companies that have significant impacts and dependencies on forests, and that are committed to taking a leadership position on accelerating the transition to a net-zero and nature-positive future. They include players ranging from major global corporations such as HP and SIG who are going beyond their own supply-chain commitments to mobilize major private sector finance into landscape-scale programmes, to local agroforestry associations in the Amazon collaborating to restore degraded forest; from iconic global retailers such as IKEA who are raising the bar for traceability and transparency, to tropical forest concessionaires in the Congo Basin who are increasing the value of responsible forestry through accounting for ecosystem services.

It's becoming clear that strong corporate leadership on forests can be a driving force to complement, demonstrate and accelerate government commitments on nature.

WHERE IS FORESTS FORWARD DEMONSTRATING IMPACT?

Forests Forward works with companies across many sectors with dependencies on many different forests, as well as with forest managers within them. We place a particular emphasis on many of the most valuable, yet vulnerable, forest ecosystems on the planet and mobilize private sector finance towards them. The programme prioritizes action and investment to transform the economics and governance of forests and land use within global frontiers of deforestation and forest degradation.

Examples of significant, integrated landscape approaches where Forests Forward is mobilizing private sector finance at scale include the Atlantic Forest in Latin America and the Congo Basin in West-Central Africa.

HP: a positive imprint on the tech sector and beyond

Building on more than a decade of collaboration with WWF, HP Inc. aims to be forest positive: to *more than* address the forest impact of every piece of paper run through HP printers around the world by 2030. The technology company is going beyond its own supply chain by investing in large-scale forest preservation and restoration around the world – raising the bar for high-quality nature-based solutions.

Working with WWF in Brazil, Peru, China and Australia and collaborating with other Forests Forward partners, HP aims[771] to restore, protect and improve the health of more than 400,000 hectares (more than 1 million acres) of ecologically valuable and threatened forests.

HP is also piloting a new methodology, developed by WWF, to comprehensively calculate its forest footprint – and this methodology could be adopted by other companies to provide further benefits for forests.

Agroforestry and sustainable forestry in the Peruvian Amazon

It's not just about the largest companies: Forests Forward is also showing that the combined efforts of local companies and associations in biodiversity-rich landscapes around the world are vital to demonstrating the practical solutions to stem forest loss and degradation worldwide.

In Peru,[772] five agroforestry cooperatives plus a wood production company have committed to promoting the responsible management of forest resources and restoring ecosystems degraded by mining and illegal logging – helping to conserve Madre de Dios's world-renowned biodiversity, while supporting local communities.


© Pierina Bellota / WWF-Perú

DEEP DIVE

Seeing more than wood in the trees: increasing the value of responsible forestry through ecosystem services

GIJS BREUKINK,
SENIOR ADVISOR RESPONSIBLE FORESTRY, FORESTS FORWARD, WWF-NETHERLANDS

To preserve our forests, we need to recognize their multiple values and develop financial instruments that include the true total value of forest systems. Besides strict protection, we need to manage production forests sustainably – but for that to happen, incentives need to be in place.

WWF is working across its offices with forest managers who see more than wood in their forests and piloting approaches such as payments for ecosystem services that aim to increase the business case for responsible forestry.

NOT SEEING THE FOREST FOR THE TREES

More than half (54%) of the world's forests are managed either wholly or partly for production.[773] Many of these forests are managed unsustainably or are prone to degradation, which often leads to deforestation and conversion to other land uses.[774]

Sustainable forest management has led to considerable improvements in the way we regard and treat our production forests. Positive examples include improved inclusion in forest management decision-making processes, more set-aside areas alongside production units, and reduced levels of forest degradation in harvested forests – for instance through the implementation of reduced impact logging in tropical and pan-tropical forests.

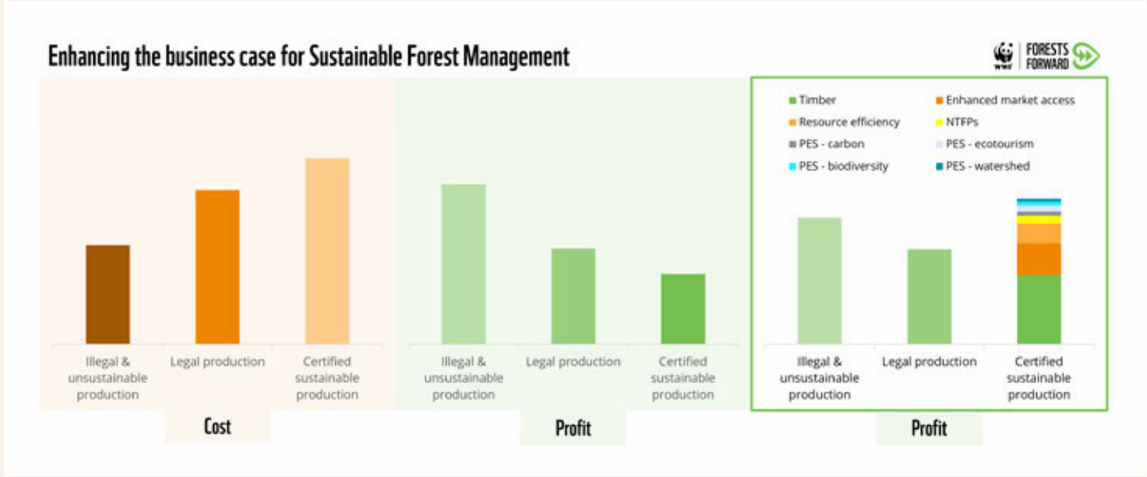
Progress towards an increase in sustainable forest management globally has been supported by the widespread presence of enabling frameworks and certification systems. However, such progress has been uneven, and the rate of forest loss is accelerating in tropical low-income countries where coverage by forest management plans remains low and forest certification insignificant.[775]

The sad truth of our time is that forest finance systems and harmful subsidies ensure that it is often more profitable to convert forests to other land uses (such as agriculture) than it is to manage them for preservation (e.g. through community or sustainable forest management). Furthermore, the production costs for certified operations are much higher than those that operate uncertified or informally [see Figure 7]. On top of this, there are few price premiums paid; everyone wants FSC-certified products, but no one wants to pay the real cost.

Today, only about 13% of the world's forests are certified.[776] If we want sustainable forest management and certification thereof to be a viable option for the majority of forests managed globally, we need to work on strengthening the business case for sustainable forest management.

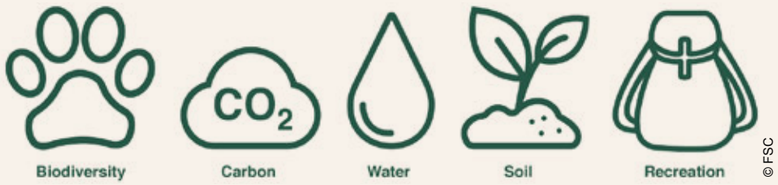
In order to incentivize the sustainable management of forest resources, a shift from a single-revenue approach to full-value forest management and stewardship is needed. Additional approaches include increasing access to markets, diversification of timber products, and expanding to non-timber forest products [see figure 7 below]. WWF's work is also showing that payments for ecosystem services can be a viable approach to pursue, and helps improve the business case for those that manage their forest resources responsibly.

Figure 7: Enhancing the business case for Sustainable Forest Management



PAYMENTS FOR ECOSYSTEM SERVICES

Ecosystem services[777] are the benefits that people obtain from nature. Forests provide society with a wide range of benefits, from reliable flows of clean water to productive soil and carbon sequestration. In FSC-certified forests, valuable ecosystem services are protected; in 2018, FSC introduced a procedure[778] to demonstrate and communicate the positive impact of responsible forest management on ecosystem services. It is also important to note that higher levels of ecosystem services are found in forests with more tree species.[779]



Types of ecosystem services

By verifying these positive impacts, the FSC Ecosystem Services certification aims to facilitate payments for ecosystem services and provide access to other benefits.[780] This aims to ensure that those who responsibly manage forests and those who take action to preserve forest ecosystem services get the increased business value they deserve.

THE FUTURE OF PAYMENTS FOR ECOSYSTEM SERVICES

Ecosystem services represent a topic of growing interest to companies, not only through a carbon lens but through a biodiversity lens too. Increasingly, companies are becoming aware that simple tree planting is insufficient to claim effective restoration of forest ecosystems, recognizing that forestry projects must go beyond "business as usual" to secure all the co-benefits that only a multifaceted project can provide. As such, WWF believes that payments for ecosystem services (PES) – including the support of concrete actions for the management and improvement of a forest's biodiversity and other services – is a viable pathway to enabling sustainable forest management at scale.[781]

We note that transitions to full-value sustainable forest management practices for our global forests are also going to be dependent on the full implementation of land tenure rights for the IPs and local communities whose practices are associated with better outcomes for forests across the tropics.[782]

We can't just capitalize on one ecosystem service, either; forests are multifunctional and provide so much more than wood or fixing carbon. So we also need to find ways of securing value for all of the ecosystem services forests offer. As with the pilot project examples [see boxes], WWF will continue to test and prove this concept with the aim of increasing the value of standing forests.

In order to take this work to scale, the following needs to be addressed:

- **Creating new funding opportunities** – Today the PES market mainly focuses on carbon projects. Funding from the private sector may increase if the PES market demonstrates more innovative and multifaceted projects that generate greater and more diverse benefits, particularly for biodiversity and carbon services. A better connection between the supply of payments and the supply of multiservice projects can occur in different ways, such as through a call for projects, the creation of a dedicated fund or market mechanisms (e.g. biodiversity credits), and others.
- **Capacity building** – There is genuine interest in the subject of carbon and biodiversity among companies, but to capitalize on this better education is needed on the role of ecosystem services and how to quantify and value them. For forest PES projects to be credible and risk-free, training must be provided to foresters and financiers. Those willing to set up PES initiatives must rely on financiers who understand the political, technical and financial benefits of the tool, plus forestry actors who understand the requirements of this new source of financing. Many FSC-certified forest managers have shown an interest in the Ecosystem Services procedure; some are already engaged and building experience.[783]
- **PES toolboxes** – The development of practical tools is needed to guide foresters on establishing projects that guarantee a benefit to the funder/buyer, to market projects, to calculate a payment on solid bases (additionality, validated methodologies), and to monitor and evaluate the benefits in a credible way.[784]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BIODIVERSITY PROTECTION AND EMISSION REDUCTION IN A TROPICAL FOREST CONCESSION, REPUBLIC OF THE CONGO

Through its signature corporate engagement programme for forests, Forests Forward,[785] WWF is working with a forest concessionaire, Interholco, in the Congo Basin, to diversify its streams of income underpinning the sustainable management of its FSC-certified forests. Interholco is working to bring ecosystem services to market in the following ways:

Carbon: The forest concession is being managed according to reduced impact logging (RIL) principles and emission reductions are being assessed following the VERRA approved RIL-C methodology and set-aside methodologies.[786] The company aims to generate credits on the basis of the reductions realized and bring those to market.

Biodiversity: The forest was granted FSC Ecosystem Services certification for biodiversity, based on vast populations of great apes and forest elephants effectively protected within the concession and for maintaining forest integrity. Now, the company is seeking sponsors to increase biodiversity protection measures.

Payments for these services combined with the traditional business model (timber) will help companies such as these to serve as new models for multifunctional forest management.

More information

Investment opportunity


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CONNECTING ECOTOURISM AND BIODIVERSITY TO SUSTAINABLE FOREST MANAGEMENT IN ROMANIA

In Maramures, Romania, WWF is working with the Strâmbu Băiut Forest Directorate in a unique biodiverse mosaic landscape that includes a Natura 2000 site and UNESCO primeval forest. Together with local communities, they aim to better protect these areas and are exploring a payment for ecosystem services scheme to fund this conservation. The Forests Directorate received FSC Ecosystem Services certification for Recreation and Biodiversity:

Recreation: A local entity has been set up comprising the Forest Directorate, local community groups and WWF to develop ecotourism in the region, increasing the business case for sustainable forest management and improving local livelihoods.

Biodiversity: These forests are also home to some of the largest populations of large carnivores in Europe. The same entity is seeking investments to improve wildlife protection and promote human and wildlife coexistence. These two pathways are designed to create a diverse income stream and help create local employment[787].

DEEP DIVE

Lessons from Colombia's forests

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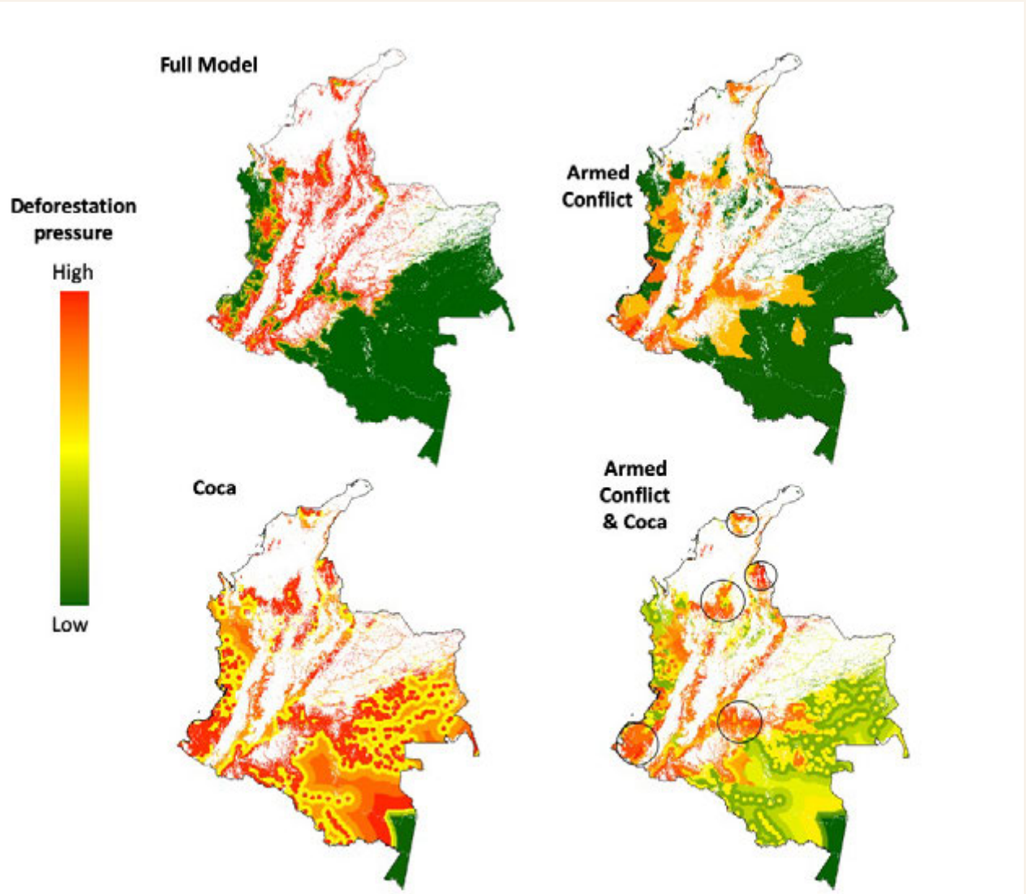
More than half of Colombia's territory is covered by forests. Whether it's mangroves, humid tropical forests, dry forests, montane cloud forests or riparian forests, these precious ecosystems host over 55,000 flora and fauna species[788] and have been protected for hundreds years by IPs and local communities. However, Colombia has experienced a long internal armed conflict that has been mostly played out in its forests. Colombia's environmentally strategic forested territories have been under significant threat and impacted by degradation and deforestation due, among other factors, to the complex conflict dynamics.[789]

Map 1: Conflict and environment convergence in Colombia



Source: Pablo Negret for Mongabay Latam (2019)

DEFORESTATION AS A COMPLEX PHENOMENON

The drivers and underlying causes of deforestation in Colombia have been thoroughly documented in the past years. Colombia's environment and conflict history are intertwined. We cannot hope to understand one without the other, and this conflict-environment angle is slowly becoming better assessed and addressed by decision-makers and stakeholders, as well as receiving proper consideration in national[790] and international[791] media.

This shift in appreciating the country-specific context for Colombia's forests can set a valuable example for global forest goal instruments, such as the Forest and Climate Leaders Partnership (FCLP) country packages. A copy and paste approach to addressing forested nations' challenges will always hamper the success that we need in order to meet the globe's forest goals, one nation at a time.

Colombia's foregrounding of its own unique context has been crucial in the efforts to address deforestation in the country, which have already resulted in effective action, with deforestation rates across the country finally decreasing.[792]

The conflict-environment context has also contributed to a more nuanced and comprehensive analysis of drivers and underlying causes of deforestation, as some dynamics are misleading if considered out of the conflict context.

DEFORESTATION DRIVERS, HIDDEN IN PLAIN SIGHT

Traveling across Colombia to witness deforestation hotspots, direct drivers are all too evident. Large-scale clearance for cattle-ranching pastures, often of low and inefficient productivity, is easily visible; as is poorly planned infrastructure development, and expansion of the agricultural frontier. But these visible landscape systems disguise bigger underlying causes. Cattle ranching in some Amazon states for example (given it is the main cause of deforestation in Colombia and is responsible for more tree loss than coca, illicit logging or illegal gold mining)[793] is actually camouflaging other more significant factors: land grabbing, historical processes of colonization, armed conflict, and narco-trafficking.[794]

To describe deforestation and degradation in tropical forested nations internationally, as we so often do, without acknowledging this all-too-common foundation of internally and externally driven socioeconomic pressures, sets us on a path to failing to address the drivers of forest loss, before we have even attempted to intervene in them.

COLOMBIA'S POST PEACE AGREEMENT FORESTS

Since the Peace Agreement in 2016, Colombia has suffered an exponential peak in forest loss due to transformation of land mainly for cattle pasture.[795] The Peace Accords, although a positive step towards a peace-building process for the country, also ended a long-lasting mandate from the Revolutionary Armed Forces of Colombia (commonly known as FARC) to control territories through the protection of forests. Since then, and due to a lack of strong state presence and rule of law, other insurgents and criminal groups have taken advantage of that political vacuum and a new economic opportunity to position their operations for new land-use activities such as land grabbing and extensive unsustainable cattle ranching systems. Various studies have found an increase in the deforestation rate both within protected areas and associated buffer zones in the years following Colombia's peace agreement.[796]

In the post-agreement years, land has also been cleared by these groups for coca growing, laundering money, illegal gold mining and logging.[797] An understanding of the complex dynamics of illicit activities is critical when aiming to design effective solutions to tackle deforestation.

Adding to these complexities, many displaced communities and conflict victims have been forced to clear land for remunerative uses and seek livelihood options in remote forested areas (many of those inside forest reserves of National Natural Parks).[798] In other areas, deforestation has been incentivized by cultural perceptions of local development, as forests are sometimes perceived as obstacles to economic growth, and an impediment to improved social status, which culturally in some communities can be defined by the amount of cattle you possess or the area of cleared land you own.[799] Moreover, for several communities across the country, clearing forests has been falsely perceived and legally misinterpreted as a route to obtain land rights of vacant territories.[800] So whether deforestation is caused by illicit, informal or legal avenues, it highlights how important it is to assess this phenomenon considering demographic, economic, political, institutional and cultural factors.

THE ROAD TO SUCCESS

So how does civil society operate in such a complex and dynamic post-conflict environment to achieve the aims of conservation?

For over four decades, WWF-Colombia has been one of the leading organizations in the country supporting the transformation of social and economic systems across forested areas. An inclusive approach has proven how conservation models and community-based forest governance can become an empowerment tool for communities to guarantee sustainable economic alternatives and multiscale comprehensive actions (like the FLEGT project (Forest Law Enforcement, Governance and Trade) that WWF has led with the Colombian government and main donor embassies which also strengthened regulatory frameworks to address main deforestation drivers).

Projects such as “Strengthening Forest Governance in Colombia”[801] have strengthened capacities of 150 families in local communities in key forested regions through valuing standing forests. This approach has secured around 4,000 hectares of sustainably used forests through the development of supply chains for non-timber forest products such as acai, cacay, cacao, moriche and jagua, and a responsible use of legally sourced timber.

The organization has also established bottom-up processes for effective local governance such as a national network of community-based monitoring, sharing practices and lessons learned between communities experiencing deforestation in different areas of the country. One of the most recognizable legacies of WWF in this agenda has been the support provided to IPs and local communities in all five regions ofColombia to develop a robust and inclusive framework for social and environmental safeguards for REDD+ projects.[802] With financial institutions, agro-industrial corporations and retailers, WWF-Colombia has established strategic partnerships to support those sectors to incorporate forest and climate criteria into their policies and portfolios. Through their national policy advocacy efforts, they have been able to contribute to some of the most innovative financial mechanisms like the recently approved GCF-WWF Heritage Colombia programme[803] led by National Natural Parks and the Ministry of Environment in Colombia, a US$145 million public-private effort that will secure financing in perpetuity for the sustainable management of key ecosystems, avoiding 46 million tonnes of emissions and benefiting almost 17 million people in Colombia.

As for conflict-environment approaches, WWF-Colombia, alongside peace and environment partners, has widely reported the dangers that environmental defenders face daily when tackling deforestation,[804] and has been one of the leading organizations tackling the impacts of mining in the most affected region in Colombia,[805] and in the country’s adhesion to the Escazu’s Agreement. The latter has resulted in 13 new policy instruments, 3,000 people trained in sustainable management of forests, the declaration of four new protected areas (covering 500,000 hectares), eight municipalities with new territorial planning processes, and more than US$1 million in sales of 15 businesses that are low deforestation risk. Currently, the office is leading the creation of an Amazon Alliance to reduce the impacts of gold mining and associated illegal activities in the region.[806]

As for cattle ranching,[807] WWF-Colombia has partnered with the UK government and the biggest retailer company in Colombia, Grupo Exito, to build new business models for sustainable cattle ranching systems and contribute to a more transparent and traceable beef supply chain. WWF has also supported projects across the country for ranchers to transform their inefficient cattle ranching systems to silvopasture approaches. Finally, by securing a strong and long-lasting partnership with the Colombian government, WWF-Colombia is directly contributing to President Petro’s new Contention Plan Against Deforestation,[808] and to the reestablishment of environmental rule of law in deforestation hotspots and conflict-affected areas.

LESSONS TO CONSIDER – HOW CAN THE COLOMBIAN CASE CONTRIBUTE TO THE FCLP PROCESS?

Peacebuilding as a way to tackle deforestation

There is now a detailed warfare ecology literature that speaks to the complex positive and negative indirect impacts of conflict on nature and biodiversity around the world.[809] With armed conflict having occurred in more than 60% of the world’s biodiversity hotspots over recent decades,[810] ignoring the conflict context when considering our future forests is likely to hamper success.

Colombia’s approach to addressing deforestation through the construction and strengthening of social and environmental dialogues with IPs and local communities instead of heavily militarized and securitized interventions is one of the critical lessons learned that FCLP membership can consider when designing and/or supporting country packages where conflict dynamics are a driver. Understanding deforestation as a socio-environmental process that takes place both inside and outside the forests, rather than simply as a biophysical process or security matter,[811] will allow initiatives to be designed considering cultural identity and people’s livelihoods, as well as political intricacies and conflict dynamics (which vary widely depending on the region).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Connectivity at the center

Colombia has seen increasing and significant attention paid to its Amazon forests in recent years. This region has now become a competitive ground for donor funding and other public/private resources. Although it is positive to see finance flowing to this important biome, this has also resulted in fragmented and duplicative interventions on the ground that can overwhelm communities and hinder long-term sustainability.

Interested interventions should keep in mind:

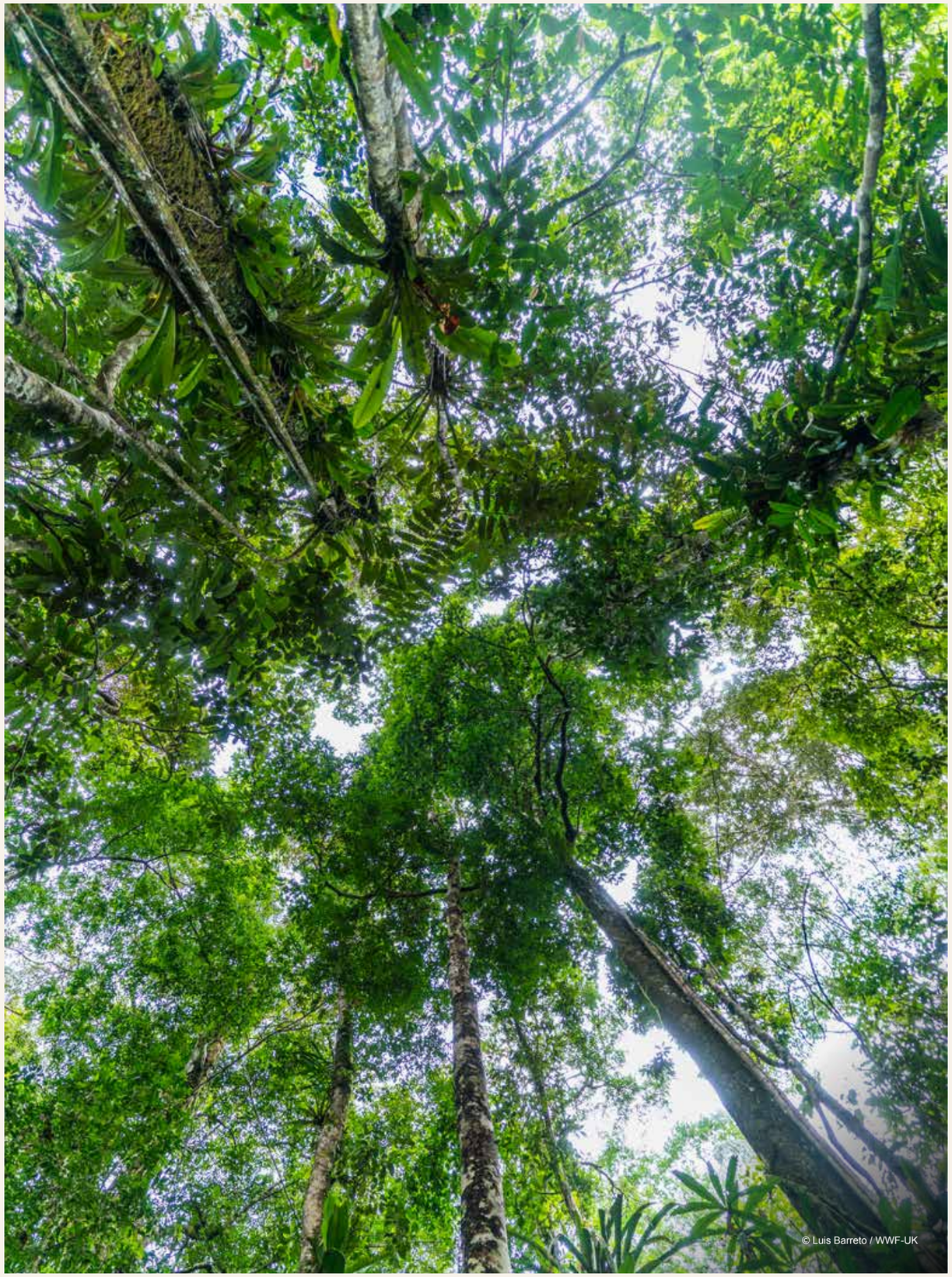
1. **Connectivity with other key ecosystems** – As mentioned above, Colombia is a country with a variety of forests, and the high attention paid to the Amazon forests has neglected efforts in other key environmental and biodiversity regions where deforestation, conversion of non-wooded land, and conflict dynamics are exacerbated (like the tropical forests in the Pacific region, or the flooded savannas and riparian forests in the Orinoquia region). When investing in the Amazon region, it is key to understand how this connects to existing initiatives, and how this can impact other forest states or buffer ecosystems, as this lack of comprehensive approaches can lead to deforestation leakage. Building capacities through skillshares and lessons learned from communities in different forest states within a country[812] and between conflict-affected countries is a positive step towards transformational action (maximize impact of traditional knowledge, best practices and peacebuilding processes).

2. **Connectivity between forests and cities** – As many of the solutions promoted for sustainable livelihoods rely on the development of supply chains and markets for non-timber forest products and sustainable timber products, or ecotourism projects, the prosperity of those will depend on how well connected they are to nearby urban centers and main commercial cities across the country.[813] The lack of infrastructure, access to markets, public services, traceable supply chain systems, and rule of law hinders the possibility of those communities to secure a sustainable and competitive economic alternative. More attention needs to focus on those urban settlements and their market dynamics and differentials, as this is where most of the population in those areas live. So interventions should acknowledge this economic geography, and embrace the role of cities and intermediary urban settlements in forest protection and sustainable use.

International leadership

Colombia has historically been a leading country in international environmental and sustainability frameworks. As one of the founding countries of the SDGs agenda, and a key leader under the AILAC Group under UNFCCC, Colombia has promoted an active and constructive participation for the achievement of the 2030 goals. It was the first nation to achieve the 30x30 goal, and it holds one of the greenest and most inclusive Constitutions in the world.

Even if this still has significant gaps when translated into local action (as Colombia is still one of the most unequal countries in the world, and fragmented armed groups have been surging across all regions of the country), Petro's new government represents a key political opportunity in the predominantly left-wing movement of governments in South America to drive the needed change for more environmental ambition. The recent Amazon Summit joint statement reaffirmed the role of *forests as centers of sustainable development and sources of solutions*, and Colombia could play a role in leading by example translating this into a robust and comprehensive country package that can inspire other countries under the FCLP framework.



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.[814]

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.

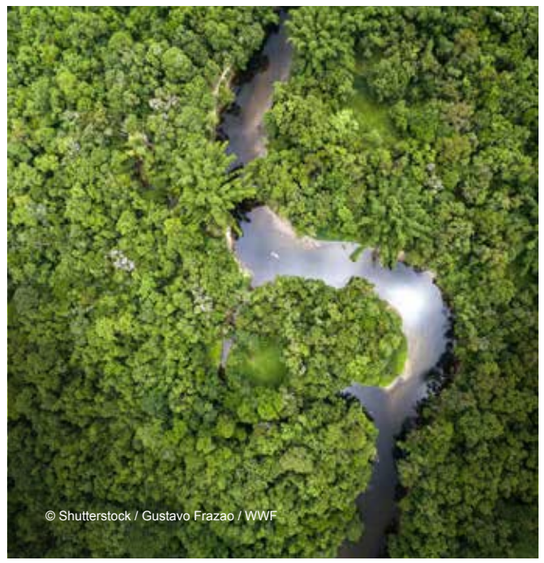
Year on year we are failing to make progress towards global forest goals. Where systems of financing, governance, stewardship and management are making gains, they are not enough to push against the continuing incentivization of forest conversion, and forest-harming subsidies. We face a sustainable forest 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.

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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,[815] Belgium,[816] Denmark,[817] France[818] and Switzerland,[819] the Netherlands,[820] and for one sub-national study in Wales.[821]

Import data from the UN COMTRADE database[822] 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.[823]

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.[824] 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[825] 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)[826] and the PAS 2050-1 framework,[827] 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.[828] 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.[829]

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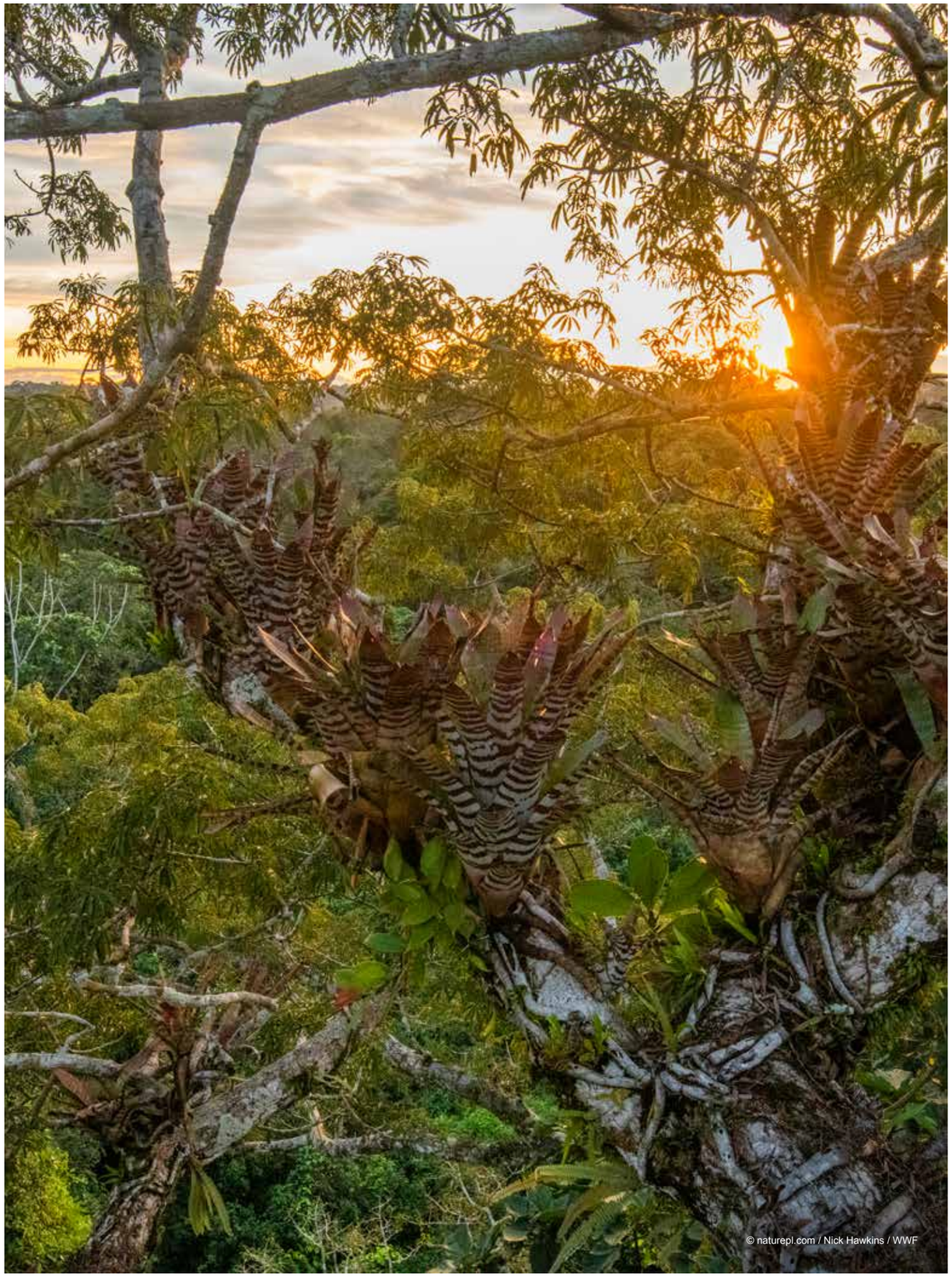

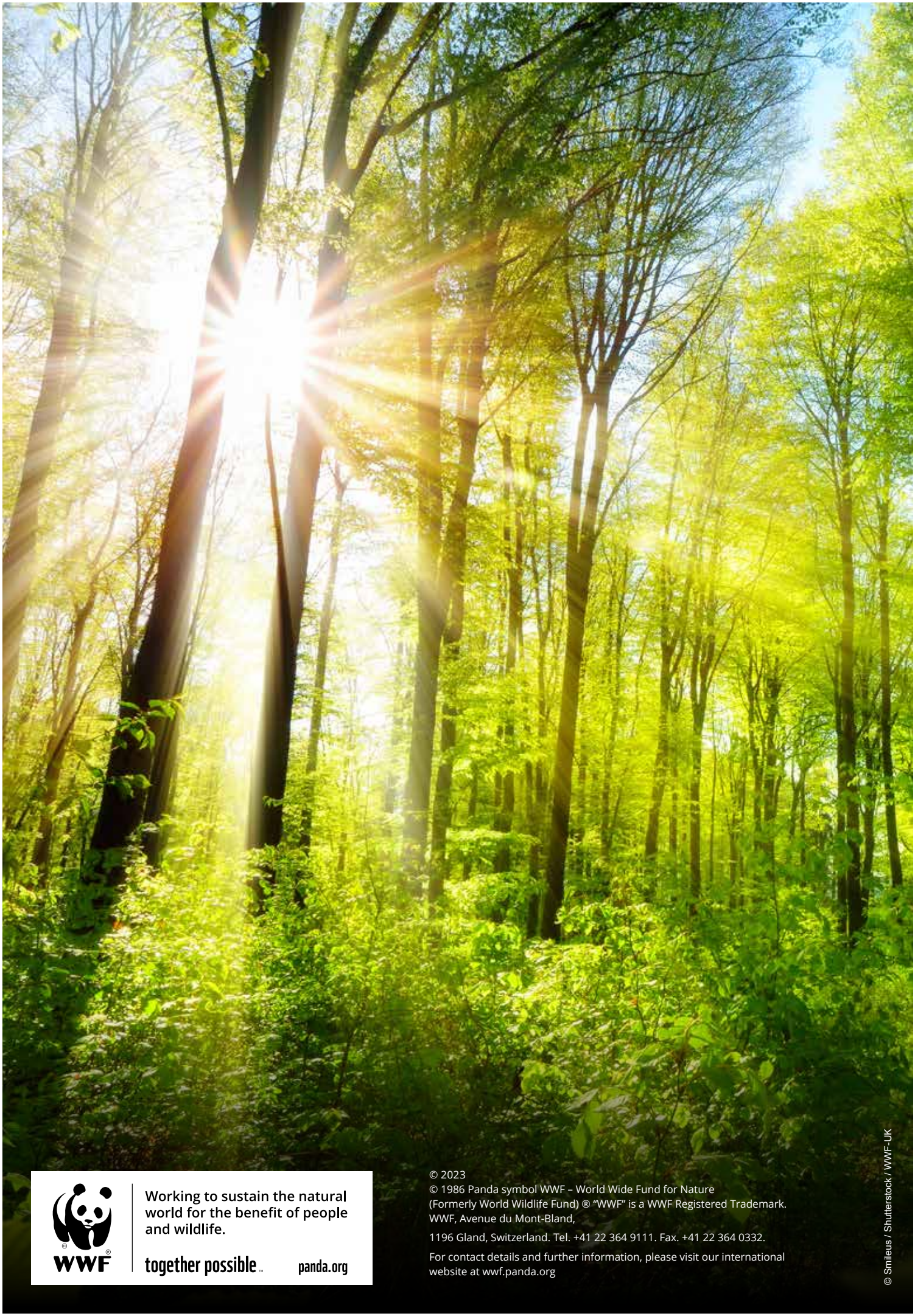

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