

An aerial photograph of a river meandering through a lush, dense green forest. The river is dark brown and reflects the surrounding trees. The forest is a vibrant green, with varying shades of foliage. A horizontal bar with a rainbow gradient is positioned above the text box.

FOREST PATHWAYS REPORT 2023

CASE STUDIES

Lead Authors

Dr Mary Gagen, WWF-UK and Swansea University. Nigel Dudley, Equilibrium Research. Dr Steve Jennings, Alauda Consulting Ltd. Hannah L. Timmins, Equilibrium Research. William Baldwin-Cantello, WWF-UK. Laura D'Arcy, WWF-UK. John Dodsworth, WWF-UK. Damian Fleming, WWF International. Hermine Kleymann, WWF International. Pablo Pacheco, WWF-US. Fran Price, WWF International.

Contributing Authors

Claudia Amicone, Fundacion Vida Silvestre Argentina. Irfan Bakhtiar, WWF-Indonesia. Osvaldo Barassi Gajardo, WWF-Brazil. Charlotte Benham, ZSL. Dr Ananta Ram Bhandari, WWF-Nepal. Ivaneide Bandeira Cardozo, Kanindé Ethno-Environmental Defense Association. Gijs Breukink, WWF-Netherlands. Colman O Criodain, WWF International. Tim Cronin, WWF-Australia. Cleo Cunningham, BirdLife International. Michael Davis, WWF-Australia. Damary Elage, Kanindé Ethno-Environmental Defense Association. Karen Ellis, WWF-UK. Cristina Eghenter, WWF International. Mariana Ferreira, WWF-Brazil. Rory Francis, WWF-Cymru. Shaun Hurrell, WWF-Sweden. Zhonghao Jin, WWF-China. Jean-Paul Obame Engone, WWF-Gabon. Israel Correa do Vale Junior, Kanindé Ethno-Environmental Defense Association. Lucia Lazzari, Fundacion Vida Silvestre Argentina. John Lotspeich, Trillion Trees. Liliana Lozano, WWF International. Tracey Lue, WWF-Canada. Robin McGhee, WWF-UK. Louise McRae, ZSL. Carmen Monges WWF-Paraguay. Taruhim M.C. Quadros, WWF-Brazil. Tim Rayden, WCS. Veronica Robledo, WWF-UK. Oscar Rodas, WWF-Paraguay. Lucia Ruiz, WWF-US. Felipe Spina Avino, WWF-Brazil. Meg Symington, WWF-US. Victoria Varela, WWF-Brazil. Daniel Venturi, WWF-Brazil. Bitate Uru Eu Wau Wau, Kanindé Ethno-Environmental Defense Association.

Advice and Review

Mike Barrett, WWF-UK. James Brampton, WWF-Greater Mekong. Nicola Brennan, WWF-UK. Luca Chinotti, WWF International. Jane Crabb, WWF-UK. Zhou Fei, WWF-China. Akiva Fishman WWF-US. Huma Khan, WWF International. Margaret Kinnaid, WWF International. Tomasz Pezold Knezevic WWF-CEE. Yeqing Li, WWF-China. Karen Luz, WWF International. Paul de Ormallas, WWF-UK. Per Larsson, WWF-Sweden. Neha Sinha, WWF-India. Jean Timmers, WWF-Brazil. Analiz Vergara Herdoiza, WWF-US. Rachel Wilson, WWF-UK. Brittany Williams, WWF-US. Mark Wright, WWF-UK. Lucy Young, WWF-UK. Yu Xin, WWF-China.

Editing and Design

Jonathan Gledson (www.millerdesign.co.uk): Infographics.

Evan Jeffries (swim2birds.co.uk): Copy editing and proofreading.

Matt Wood (madenoise.com): Design.

Sam Pollard, WWF-UK: Forest Stripes. In collaboration with the University of Reading, and University of Derby. showyourstripes.info

With grateful thanks to:

Richard Betts. Jon Drori. David Edwards. Ed Hawkins.

Miles Richardson. The Forest Declaration Assessment Partners.

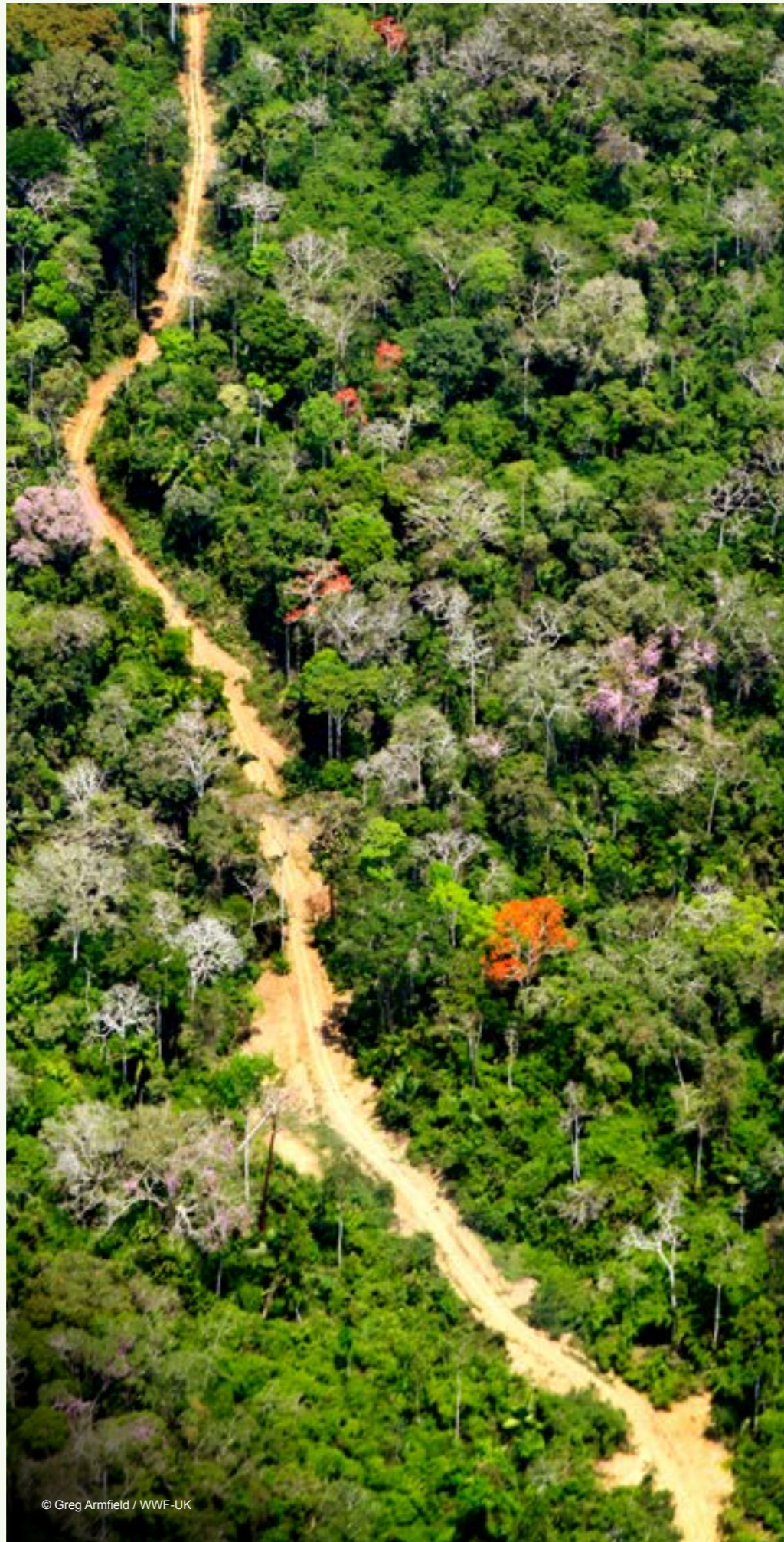
How to cite this report: WWF (2023) The Forest Pathways Report. Gagen, M.H., Dudley, N., Jennings, S., Timmins, H.L. Baldwin-Cantello, W., D'Arcy, L., Dodsworth, J.E., Fleming, D., Kleymann, H., Pacheco, P., Price, F., (Lead Authors). WWF, Gland, Switzerland.

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.

© Brent Stirton / Getty Images

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)



© Greg Armfield / WWF-UK

CONTENTS

CASE STUDIES

Wonderful Welsh woodlands and blazing a restoration trail in Wild Ingleborough **4**

Koala-friendly carbon **10**

Amazon Region Protected Areas turns 20: celebrating its greatest accomplishments **14**

Community forest in the corridors: empowering communities and restoring forests **18**

The recognition of customary forests in Indonesia: opportunities and challenges **20**

Roads in Elephant Land: towards mitigation of highway expansion impacts in Lumding Elephant Reserve, Assam, India **24**

Fostering Indigenous People's stewardship and monitoring of the Amazon Forest **28**

Financing the transition to sustainable forest conservation **32**

HIFOR: A new international financing mechanism for high-integrity tropical forests **34**

Collaborations for Atlantic Forest conservation and restoration **36**

Bringing Forests Forward: a pathway to corporate action **40**

CONCLUSIONS AND RECOMMENDATIONS 44

ANNEX 1: METHODS 48

REFERENCES 52

CASE STUDY

Wonderful Welsh woodlands and blazing a restoration trail in Wild Ingleborough

Failing forests just isn't an option.

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).¹

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



© Joseph Gray / WWF-UK



© Rory Francis / WWF Cymru

methods, recovery of the unique patchwork habitats of Ingleborough will support a return of the rich diversity that has been lost.

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 Strategy² 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,³ 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 grants⁴ 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.⁵ 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.⁶

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 statistics⁷, 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,⁸ 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.⁹ 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),¹⁰ 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 2023,¹¹ which will provide for the introduction of a Sustainable Farming Scheme¹² 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-Cymru¹³ 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 Scheme¹⁴ 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,¹⁵ 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.



© Rory Francis / WWF Cymru

Celtic Rainforests

Another high-profile initiative to protect and restore Wales' woodland heritage is the Celtic Rainforests project.¹⁶ 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.



© Mary Gagen/ WWF Cymru

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 86,000¹⁷ 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.¹⁸ 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.¹⁹ 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,²⁰ 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.



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.²¹
- 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.²²
- 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.²³ 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).²⁴ 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.



© Shutterstock / rickyd / WWF

CASE STUDY

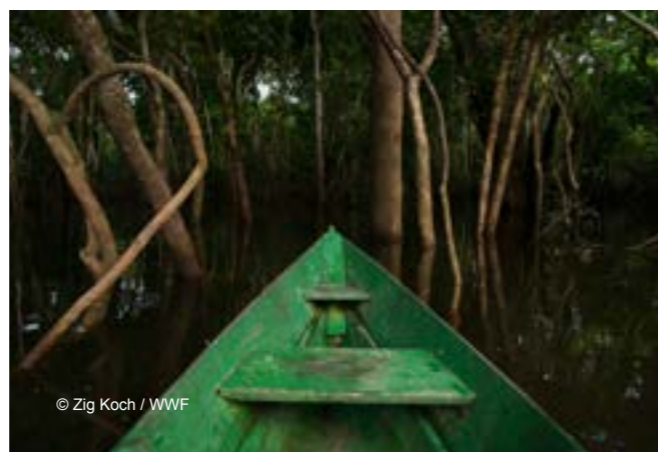
Amazon Region Protected Areas turns 20: celebrating its greatest accomplishments

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.



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:

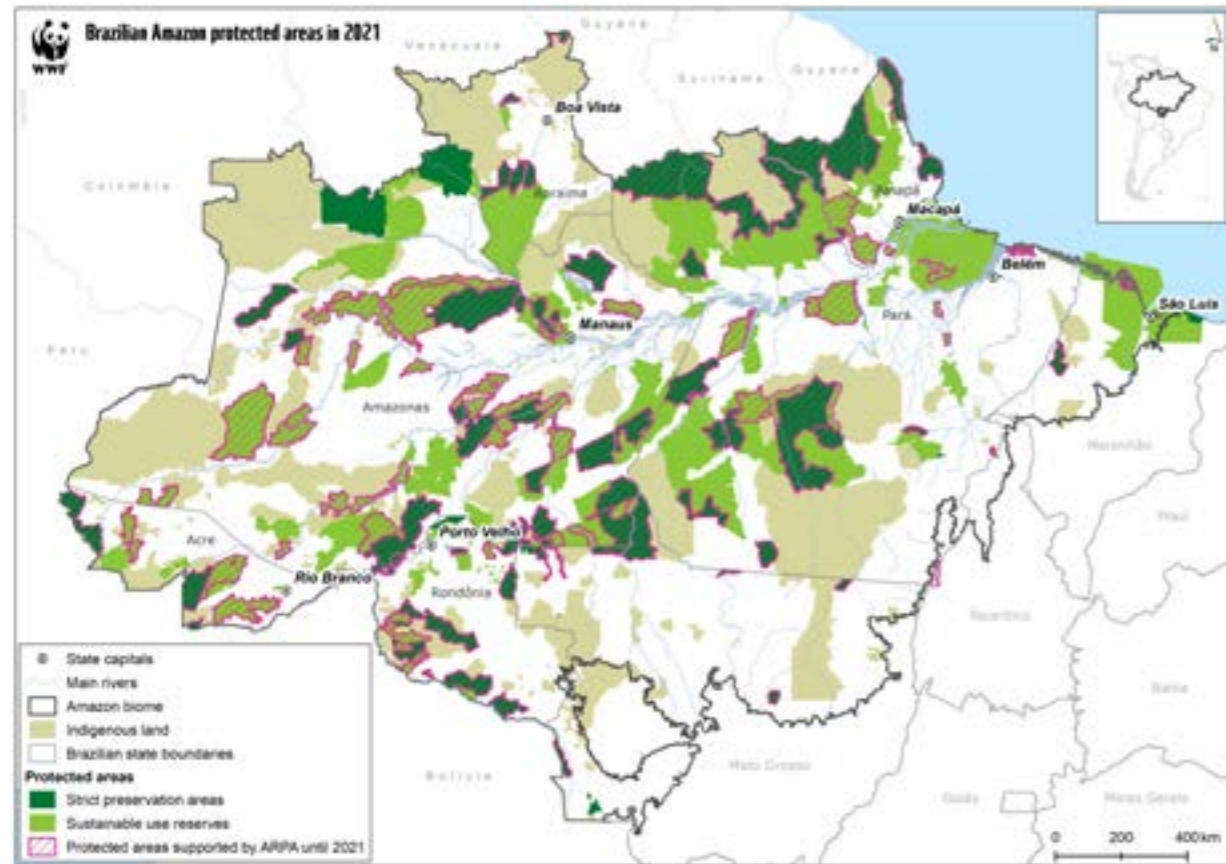
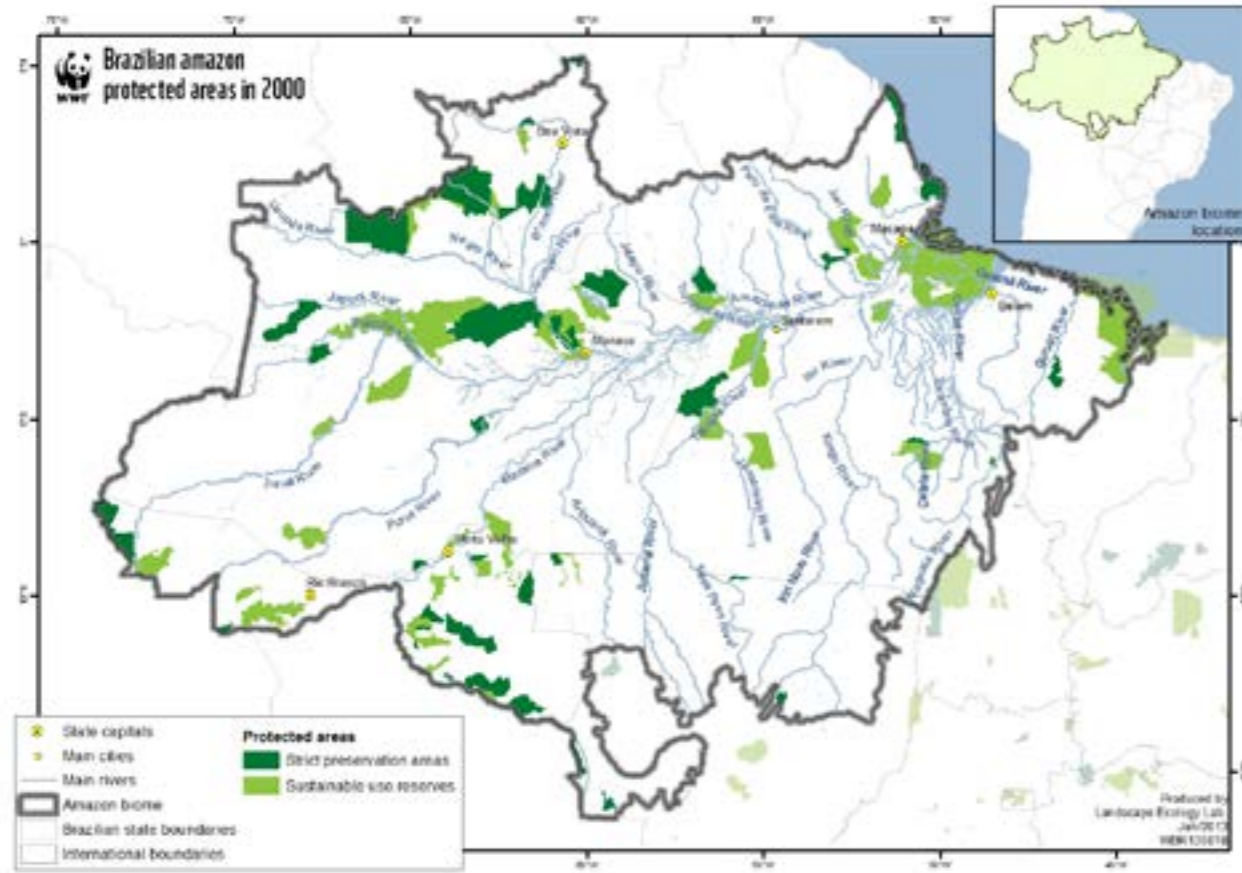
- 1. Created millions of hectares of new protected areas.** ARPA created 27 million hectares of protected areas in its initial years and went on to support the improved management of millions more. ARPA protected areas represent nearly 1.5 times the area of California, exceeding the Program's initial 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 CO₂ 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. Açai, 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.



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.

© Zig Koch / WWF

CASE STUDY

Community forest in the corridors: empowering communities and restoring forests

DR ANANTA RAM BHANDARI
HEAD OF FORESTS & LANDSCAPES PROGRAMME, WWF-NEPAL

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.²⁵

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.²⁶

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 2018.²⁷

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 2022.²⁸ 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.



© Emmanuel Rondeau / WWF-US

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 GtCO₂-eq in 2005, an increase of 0.4 GtCO₂-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.²⁹

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.³⁰ 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.³¹

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.³² 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.³³ However, several NGO reports indicate that there is potential for increased deforestation rates in Papua³⁴ and Sulawesi due to mining and agricultural activities.³⁵

CUSTOMARY FORESTS IN INDONESIA

CRISTINA EGHENTER, WWF INTERNATIONAL

The report *The State of IPs' and Local Communities' Lands and Territories (2021)*³⁶ shows that “at least 32%, or ~38 million km², 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”.³⁸ 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.³⁹ In the *Global Assessment Report on Biodiversity and Ecosystem Services*,⁴⁰ 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)⁴¹ 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*).⁴² 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*⁴³ and the ICCA Global Consortium report on *Home – Territories of Life*⁴⁴ 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.⁴⁵

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 underpasses, 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.



© WWF-India



© Richard Barrett / WWF-UK

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

FELIPE SPINA AVINO, OSVALDO BARASSI GAJARDO, VICTÓRIA VARELA (WWF-BRAZIL)
BITATE URU EU WAU WAU, ISRAEL CORREA DO VALE JUNIOR, DAMARY ELAGE,
IVANEIDE BANDEIRA CARDOZO (KANINDÉ ETHNO-ENVIRONMENTAL DEFENSE ASSOCIATION)

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.⁴⁶ 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,⁴⁷ 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^{48,49} 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.⁵⁰ Brazil's Indigenous territories have more vertebrate species than its non-Indigenous protected areas.⁵¹

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.⁵² Even though the Indigenous territories cover 28% of the Amazon Basin, they only generate 2.6% of the region's forest-related carbon emissions.⁵³ 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.



© Odair Leal / WWF-Brazil

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).⁵⁴ 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.



© Felipe Spina / WWF-Brazil



© Marizilda Cruppe / WWF-UK

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, COP26,⁵⁵ as well as in the national and international media with the launch of the documentary *The Territory*.⁵⁶

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

CASE STUDY

Financing the transition to sustainable forest conservation

JOHN LOTSPEICH, EXECUTIVE DIRECTOR, TRILLION TREES

CLEO CUNNINGHAM, HEAD OF CLIMATE AND FORESTS, BIRDLIFE INTERNATIONAL

LAURA D'ARCY, HEAD OF TRILLION TREES FOR WWF

TIM RAYDEN, FOREST RESTORATION LEAD, WCS

Trillion Trees⁵⁷ 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,⁵⁸ 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).⁵⁹

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.⁶⁰ 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.



© Jody MacDonald / WWF-US

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 forests⁶¹ 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 CO₂ 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.⁶² 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 1.⁶³

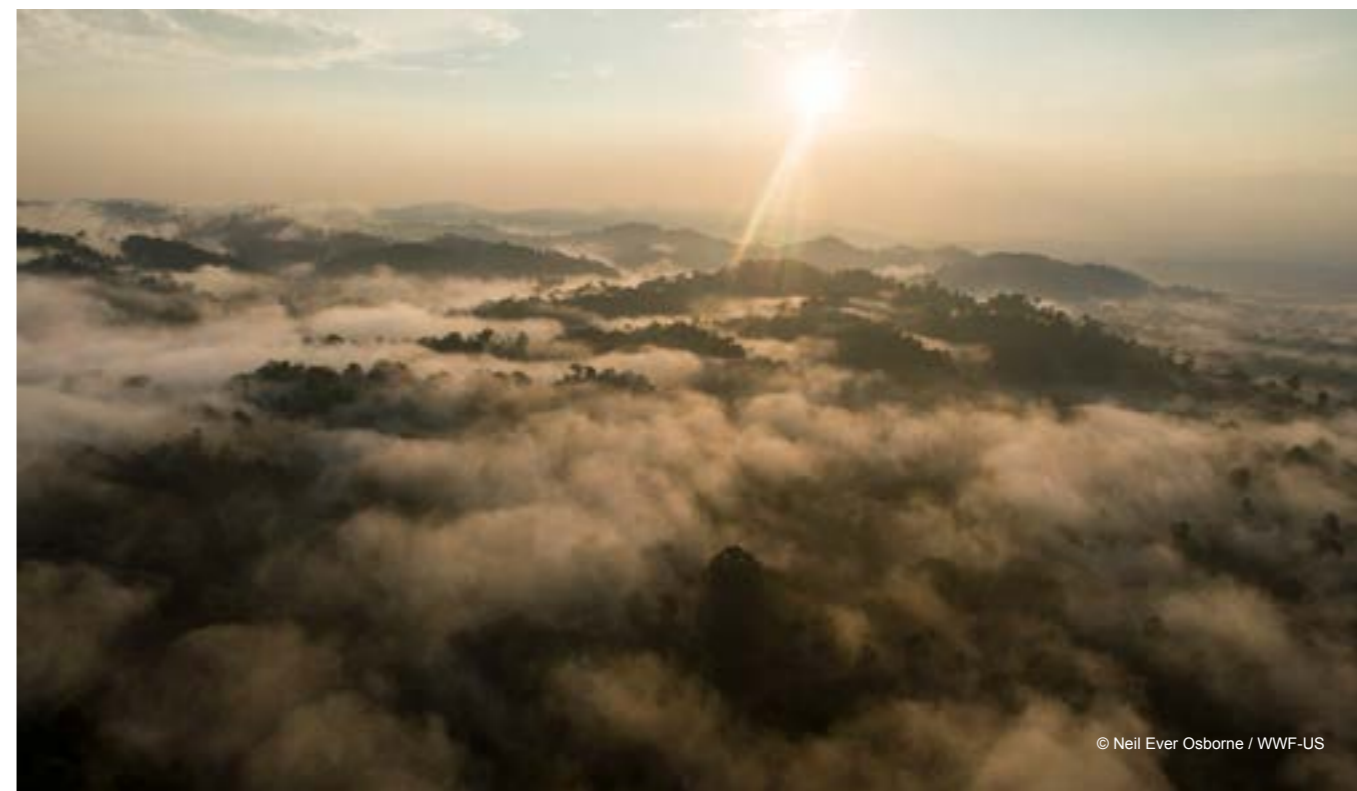
One of the key factors allowing severe threats to high-integrity forests to persist is inadequate financing for conservation measures on the ground, and for building greener local economies. The cooling that high-integrity forests have provided through their carbon uptake alone has had an estimated impact 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 CO₂.

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 CO₂ absorption in a high-integrity tropical forest that is under effective management. The unit also embodies:

- A “biophysical cooling” effect (separate from CO₂ absorption) that adds an extra 50% to its cooling value;⁶⁴
- High biodiversity value that correlates strongly with measures of forest ecological integrity;⁶⁵
- 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



© Neil Ever Osborne / WWF-US

degradation or are imminently threatened. With forests, as with a public health care system, both urgent and preventive care are needed.

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”,⁶⁶ 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 CO₂ 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.⁶⁷ 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,⁶⁸ home to 7% of Earth’s plant species and 5% of its vertebrate species,⁶⁹ a transboundary botanical refuge that holds more than 20,000 plant species⁷⁰ 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*).

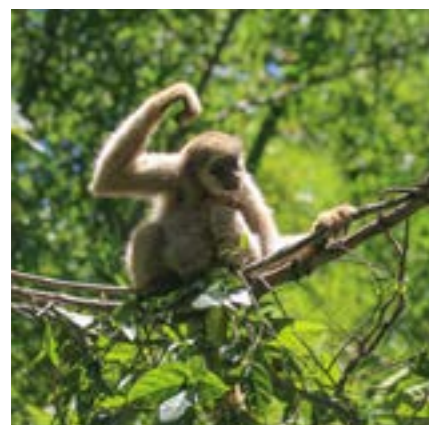
But today the Atlantic Forest is on the brink of extinction due to widespread deforestation by human activities. It faces significant threats from conversion and degradation, and 76% of the original forest cover in the three countries has already been lost.⁷¹ Centuries of impact have also caused severe degradation. The Atlantic Forest in Brazil now has only 12% of its original forest cover remaining as primary forests,⁷² 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.



Woolly Spider Monkey (*Brachyteles spp.*)



Araucaria (*Araucaria angustifolia*)



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.⁷³

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 Reforestar 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,^{74,75} providing a secure flow of finance to the forest scheme. Currently, the Reforestar 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 Reforestar 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

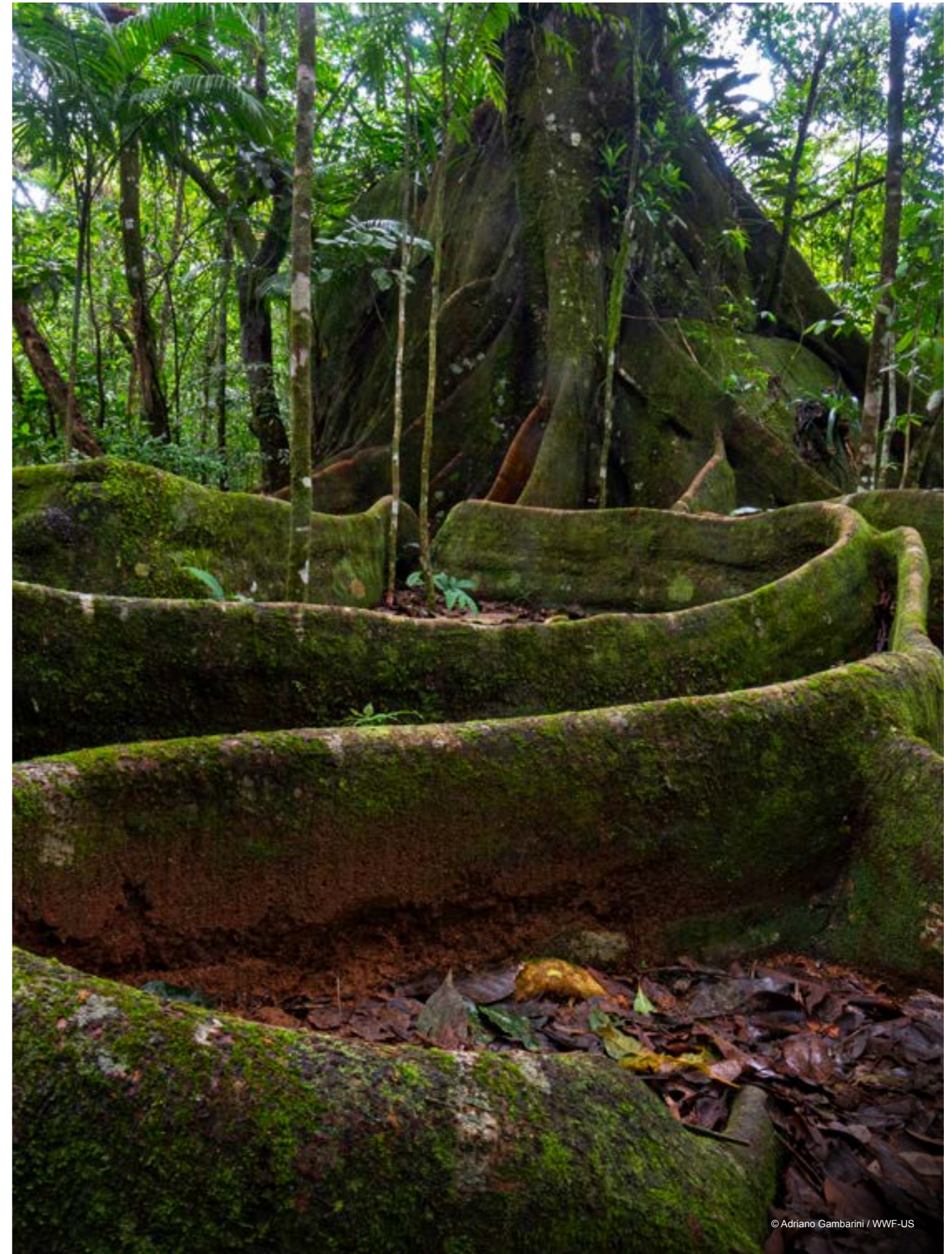
The outcomes mentioned here represent only a small portion of Atlantic Forest opportunities. A tremendous conservation and restoration task lies before the Atlantic Forest nations, and it demands immediate action and engagement. There is an urgent need to scale up existing smaller-scale action. The forest 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.



© Adriano Gambarini / WWF-US

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.

Forests Forward Action Areas:

- Improving forest management
- Sourcing responsibly
- Investing in landscapes

HOW: THE FORESTS FORWARD PATHWAY

Starting with a commitment to removing deforestation and forest degradation from their production and trade, WWF helps Forests Forward corporate partners' impact go beyond their supply chains and help transform industry practice for the benefit of nature, climate and people.



- Transparency
- Traceability
- Legality
- Disclosure



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.



© Edward Parker / WWF



© James Morgan / WWF



© Jürgen Freund / WWF



© David Bebbler / WWF-UK

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 aims⁷⁶ 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,⁷⁷ 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

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.⁷⁸
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.



© Shutterstock / Gustavo Frazao / WWF

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.



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,⁷⁹ Belgium,⁸⁰ Denmark,⁸¹ France⁸² and Switzerland,⁸³ the Netherlands,⁸⁴ and for one sub-national study in Wales.⁸⁵

Import data from the UN COMTRADE database⁸⁶ 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.⁸⁷

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
Cocoa	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
	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
Coffee	1805	Cocoa; powder, not containing added sugar or other sweetening matter
	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.⁸⁸ 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 Tool⁸⁹ was used to estimate commodity-specific per-hectare CO₂e 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)⁹⁰ and the PAS 2050-1 framework,⁹¹ 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 CO₂e 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 LULUCF) reported to the UNFCCC.⁹² 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.

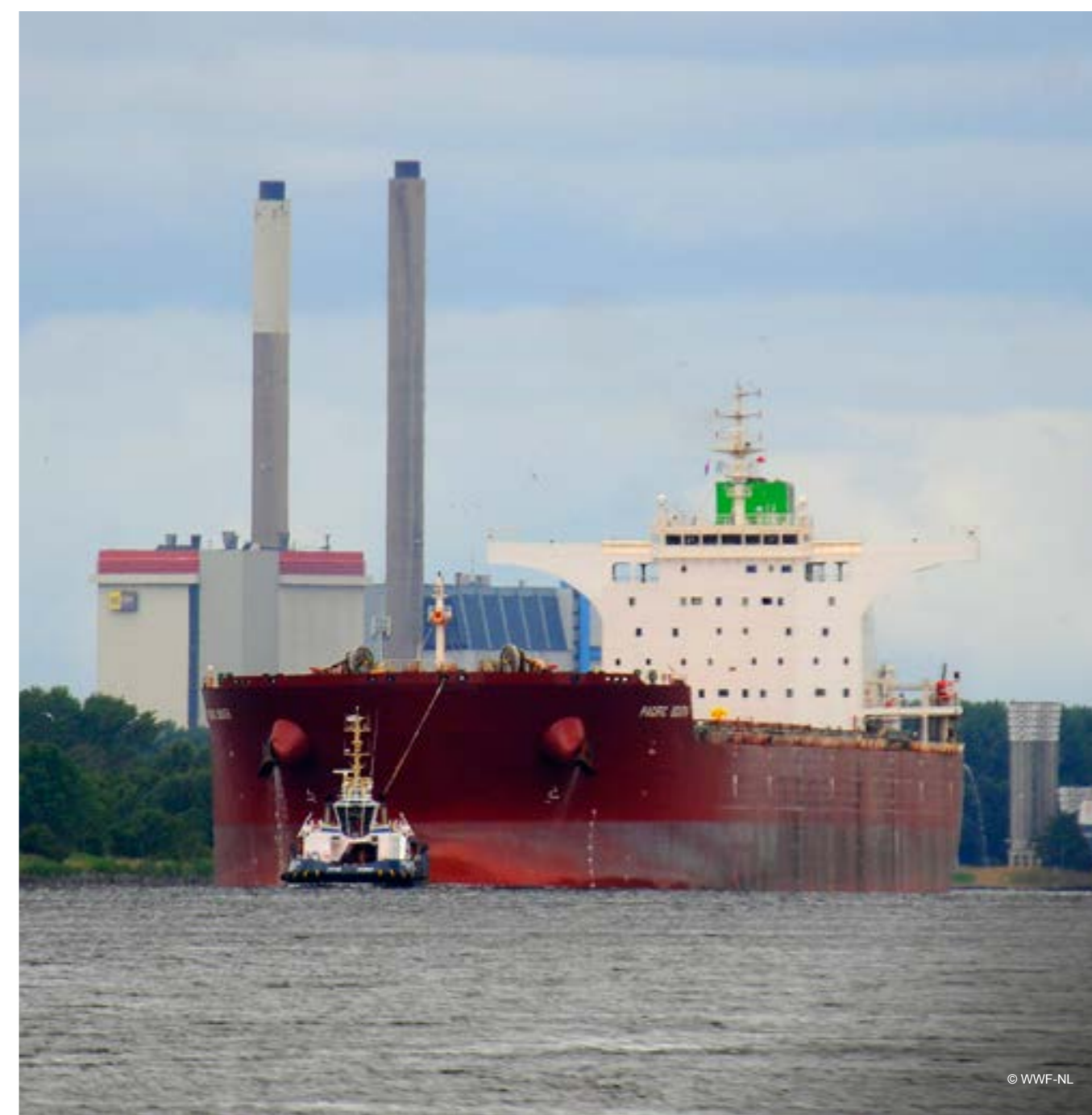
Table C: UNFCCC national GHG inventory dates used

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.⁹³



REFERENCES

Forest Declaration Assessment Partners. 2023. Forest Declaration Assessment. Climate Focus (coordinator and editor), and references therein. Accessible at www.forestdeclaration.org

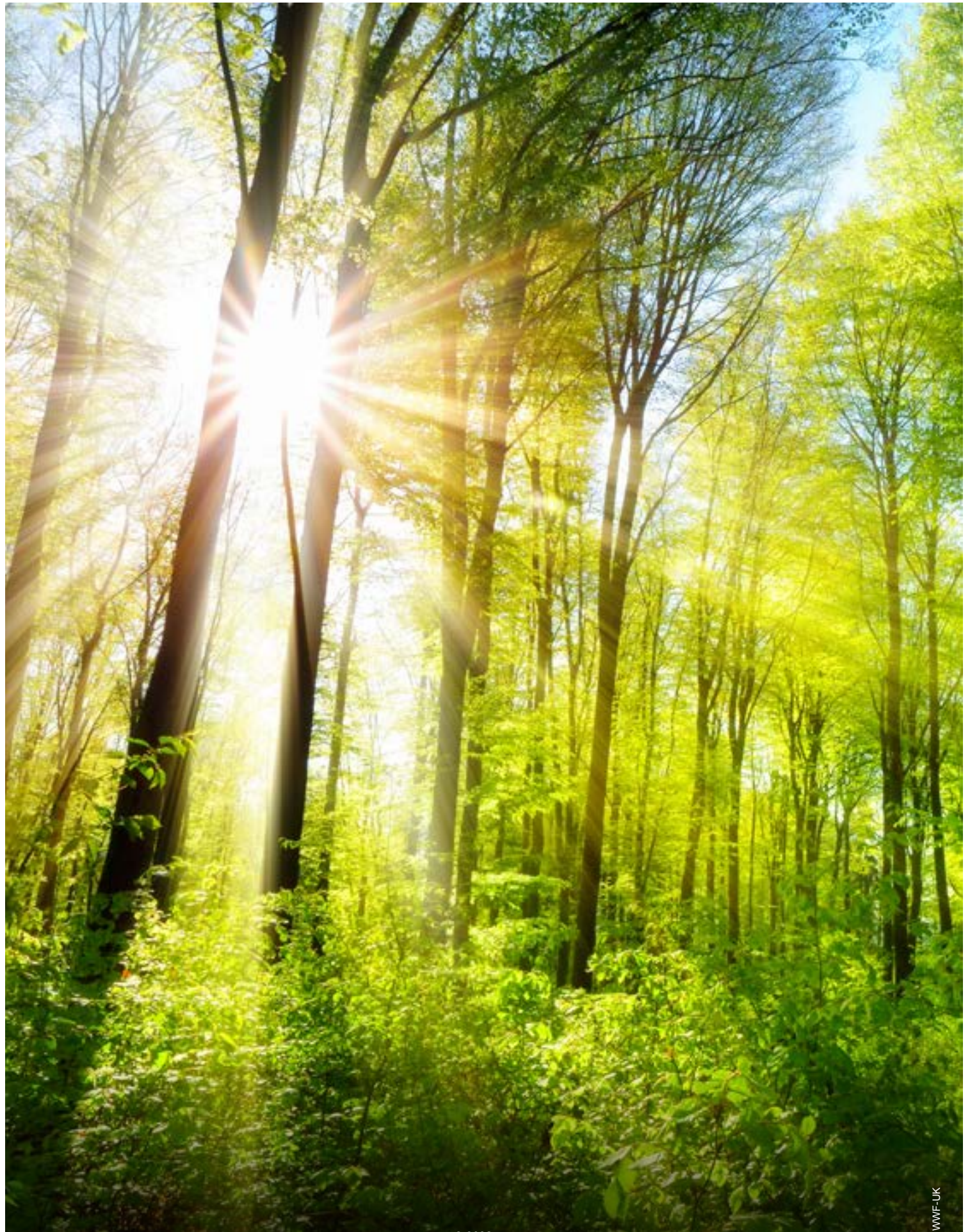
1 <https://www.wwf.org.uk/wild-ingleborough>
 2 <https://www.gov.wales/woodlands-wales-strategy>
 3 <https://www.theguardian.com/environment/2020/mar/12/wales-launches-5m-national-forest-scheme-with-pupils-help>
 4 <https://www.gov.wales/coetiroedd-bach-tiny-forests-guidance>
 5 <https://www.gov.wales/every-household-wales-can-collect-and-plant-tree-over-50-hubs-open-across-country>
 6 www.woodlandtrust.org.uk/press-centre/2023/05/wales-tree-planting-project-success/
 7 Forest Research. 2023. *Provisional Woodland Statistics 2023*. Farnham, Surrey.
 8 <https://www.gov.wales/small-grants-woodland-creation-window-2-rules-booklet-html>
 9 <https://www.bbc.co.uk/news/uk-wales-49586263>
 10 <https://tiranol.cymru/about/our-history/>
 11 <https://www.gov.wales/agriculture-wales-act-2023>
 12 <https://www.gov.wales/sustainable-farming-scheme-guide>
 13 <https://www.wwf.org.uk/updates/rural-wales-want-farmers-be-supported-tackle-crises>
 14 <https://www.gov.wales/sites/default/files/publications/2022-07/sustainable-farming-scheme-outline-proposals-for-2025.pdf>
 15 <https://stumpfortrees.org/>
 16 <https://snowdonia.gov.wales/protect/conservation-work/celtic-rainforests-wales/>
 17 DCCEEW – <https://www.dcceew.gov.au/environment/biodiversity/threatened/species/koalas/national-koala-monitoring-program#:~:text=Our%20current%20best%20available%20estimate,of%20Victoria%20and%20South%20Australia.>
 18 Paull, D., Pugh, D., Sweeney, O., Taylor, M., Woosnam, O. and Hawes, W. 2019. *Koala habitat conservation plan. koala habitat necessary to protect and enhance koala habitat and populations in New South Wales and Queensland*. WWF-Australia, Sydney.
 19 <https://wwf.org.au/news/2020/wwf-60000-koalas-impacted-by-bushfire-crisis/>
 20 Paull, D. et al. 2019. Op cit.
 21 <https://wwf.org.au/get-involved/we-all-need-trees/the-trees-scorecard/>
 22 <https://www.abc.net.au/news/2023-04-01/great-koala-national-park-going-ahead-nsw-labor-election-win/102153496>
 23 <https://www.cleanenergyregulator.gov.au/ERF/Choosing-a-project-type/Opportunities-for-the-land-sector/Vegetation-methods/Reforestation-by-Environmental-or-Mallee-Plantings-FullCAM>
 24 <https://www.accountingfornature.org/method-catalogue>
 25 Smith, A.C., Hurmi, K., Fox, J. and Van Den Hoek, J. 2023. Community forest management led to rapid local forest gain in Nepal: A 29 year mixed methods retrospective case study. *Land Use Policy* **126**: 106526.
 26 Talchabhadel, R., Nakagawa, H., Kawaike, K., Yamanoi, K. and Prajapati, R. 2020. Numerical simulation of inundation process of a heavy precipitation event: A case study of August 2014 in West Rapti River basin, Nepal. In: Ujttewaal, W., Franca, M.J., Valero, D., Chavarrias, V., Arbós, C.Y. et al. (eds.). *River Flow 2020. Proceedings of the 10th Conference on Fluvial Hydraulics*. Taylor and Francis, London.
 27 Ray, A. 2023. *Tigers struggle to move within Nepal even as they cross borders: study*. Mongabay. <https://india.mongabay.com/2023/07/tigers-struggle-to-move-within-nepal-even-as-they-cross-borders-study/>; Sadhu, A., Patra, M., Bhattacharya, Y., Ojha, P., Jain, D., Thakar, R., Ghade, R. et al. 2022. Recolonisation of tigers recorded from camera trap survey Suhelwa WLS, India. *Cat News* 75. 10-12., Summer 2022.
 28 DNPWC and DFSC. 2022. *Status of Tigers and Prey in Nepal 2022*. Department of National Parks and Wildlife Conservation and Department of Forests and Soil Conservation. Ministry of Forests and Environment, Kathmandu, Nepal.
 29 WWF-Indonesia and Republic of Indonesia. 2022. *Enhanced nationally determined contribution: Republic of Indonesia*. https://unfccc.int/sites/default/files/NDC/2022-09/23.09.2022_Enhanced%20NDC%20Indonesia.pdf
 30 Minister Regulation No. 833/KPTS/SR. 020/M/12/2019
 31 *Tutupan Sawit di Indonesia: Analisis Citra Satelit 2014-2016*. <https://auriga.or.id/related/detail/29/tutupan-sawit-di-indonesia-analisis-citra-satelit-2014-2016?lang=id> and KLHK. (2022). Serial penutupan lahan. <https://nfms.menhk.go.id/statistic>

32 [http://pskl.menhk.go.id/berita/437-capaian-perhutanan-sosial-sampai-dengan-1-oktober-2022.html#:~:text=Jakarta%20E2%80%93%20Sampai%20dengan%201%20Oktober,Kemitraan%20Lingkungan%20\(Ditjen%20PSKL\).](http://pskl.menhk.go.id/berita/437-capaian-perhutanan-sosial-sampai-dengan-1-oktober-2022.html#:~:text=Jakarta%20E2%80%93%20Sampai%20dengan%201%20Oktober,Kemitraan%20Lingkungan%20(Ditjen%20PSKL).)
 33 Ibid.
 34 <https://auriga.or.id/flipbooks/report/en/71>
 35 Ibid.
 36 WWF, UNEP-WCMC, SGP/ICCA-GSI, LM, TNC, CI, WCS, EP, ILC-S, CM and IUCN. 2021. *The State of Indigenous Peoples' and Local Communities' Lands and Territories: A technical review of the state of Indigenous Peoples' and Local Communities' lands, their contributions to global biodiversity conservation and ecosystem services, the pressures they face, and recommendations for actions*. Gland, Switzerland.
 37 Rights and Resources Initiative. 2015. Differences in IP and LC territory area amounts can arise, depending if they refer to land area, forest area, land and inland water areas; or report on IP and LC or IP territories only.
 38 E.S. Brondizio, J. Settle, S. Diaz, and H.T. Ngo (eds). 2019. *Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. PBES secretariat, Bonn, Germany.
 39 Sze, J.S., Carrasco, L.R., Childs, D. and Edwards, D.P. 2022. Reduced deforestation and degradation in Indigenous Lands pan-tropically. *Nature Sustainability* **5**: 1230130.
 40 IPBES. 2019. Op cit.
 41 <https://www.iccas.or.id/>
 42 <https://www.iccas.or.id/publikasi/read/509>
 43 Conlu, M.T. (ed.) 2022. *Celebrating territories of life in Southeast Asia*. Non-Timber Forest Products – Exchange Programme Asia.
 44 ICCA Consortium. 2021. *Territories of Life: 2021 Report*. ICCA Consortium: worldwide. Available at: report.territoriesoflife.org
 45 Edwards, D.P., Socolar, J.B., Mills, S.C., Burivalova, Z., Koh, L.P. and Wilcove, D.S. 2019. Conservation of tropical forests in the Anthropocene. *Current Biology* **29** (19): R1008-R1020.
 46 https://www.theamazonwewant.org/spa_publication/amazon-assessment-report-2021/
 47 Fa, J.E., Watson, J.E.M., Leiper, I., Potapov, P., Evans, T.D. et al. 2020. Importance of Indigenous Peoples' Land for the Conservation of Intact Forest Landscapes. *Frontiers in Ecology and the Environment* **18** (3): 135-140.
 48 Saatchi, S.S., Harris, N.L., Brown, S., Lefsky, M., Mitchard, E.T.A. et al. 2011. Benchmark map of forest carbon stocks in tropical regions across three continents. *Proceedings of the National Academy of Sciences* **108** (24): 9899-9904.
 49 Frechette, A., Ginsburg, C. and Walker, W. 2018. *A Global Baseline of Carbon Storage in Collective Lands: Indigenous and Local Community Contributions to Climate Change Mitigation*. Washington D.C., Rights and Resources Initiative (RRI), Woods Hole Research Center (WHRC), World Resources Institute (WRI).
 50 Fernández-Llamazares, Á., Terraube, J., Gavin, M.C., Pyhälä, A., Siani, S.M.O. et al. 2020. Reframing the Wilderness Concept can Bolster Collaborative Conservation. *Trends in Ecology & Evolution* **35** (9): 750-753.
 51 Schuster, R., Germain, R.R., Bennett, J.R., Reo, N.J. and Arecese, P. 2019. Vertebrate biodiversity on indigenous-managed lands in Australia, Brazil, and Canada equals that in protected areas. *Environmental Science and Policy* **101**: 1-6.
 52 Sze, J.S., Carrasco, L.R., Childs, D. et al. 2022. Reduced deforestation and degradation in Indigenous Lands pan-tropically. *Nature Sustainability* **5**: 123–130.
 53 Walker, W.S., Gorelik, S.R., Baccini, A., Aragón-Osej, J.L., Josse, C. et al. 2020. The role of forest conversion, degradation, and disturbance in the carbon dynamics of Amazon Indigenous territories and protected areas. *Proceedings of the National Academy of Sciences* **117** (6): 3015-3025.
 54 <https://smartconservationtools.org/SMART-Community/Your-stories/Case-Study?CaseStudyID=5>
 55 Vigdor, N. 2021. From the Amazon to Glasgow: An Indigenous activist says, 'We have no more time.' *New York Times* 1 November 1 2021. <https://films.nationalgeographic.com/the-territory>
 56 <https://trilliontrees.org/>
 57 IPCC. 2019. *Special report on climate change desertification, land degradation, sustainable land management, food security and greenhouse gas fluxes in terrestrial ecosystems (SRCCCL)*. World Meteorological Organisation.
 58 Girardin, C.A.J., Jenkins, S., Seddon, N., Allen, M., Lewis, S.L. et al. 2021. Nature-based solutions can help cool the planet – if we act now. *Nature* **593**: 191-194.
 59 Verdone, M and Seidl, A. 2017. Time, space, place and the Bonn Challenge

global forest restoration target. *Restoration Ecology* **25** (6): 903–911.
 61 For fuller documentation of the HIFOR initiative, including a fuller review of the scientific basis outlined here, see www.wcs.org/our-work/climate-change/forests-and-climate-change/hifor
 62 <https://forestclimateleaders.org>
 63 <https://www.unep.org/resources/kunming-montreal-global-biodiversity-framework>
 64 <https://www.wri.org/insights/how-forests-affect-climate>
 65 <http://www.forestintegrity.com>
 66 <https://sciencebasedtargets.org/resources/files/Beyond-Value-Chain-Mitigation-FAQ.pdf>
 67 <https://www.wcs.org/our-work/climate-change/forests-and-climate-change/hifor>
 68 Myers, N., Mittermeier, R.A., Mittermeier, C.G., da Fonseca, G.A.B. and Kent, J. 2000. Biodiversity hotspots for conservation priorities. *Nature* **403** (6772): 853-858.
 69 Cullen Jr., L., Bodmer, R.E. and Valladares Pádua, C. 2000. Effects of hunting in habitat fragments of the Atlantic forests, Brazil. *Biological Conservation* **95** (1): 49-56.
 70 Mittermeier, R.A., Gil, P.R., Hoffmann, M., Pilgrim, J., Brooks, J., Mittermeier, C.G. et al. 2005. *Hotspots revisited: Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions*. Cemex, Mexico City.
 71 MapBiomas Trinational Atlantic Forest Project – Collection [2021] of the Annual Coverage and Land Use Series
 72 Fundação SOS Mata Atlântica, INPE. 2021. *Atlas dos remanescentes florestais da Mata Atlântica: período 2019/2020, relatório técnico*. Fundação SOS Mata Atlântica, São Paulo.
 73 Brancalion, P.H.S.M., de Siqueira, L.P., Amazonas, N.T., Rizek, M.B., Mendes, A.F. et al. 2022. Ecosystem restoration job creation potential in Brazil. *People and Nature* **4**: 1426–1434.
 74 SEAMA, Secretaria de Meio Ambiente e Recursos Hídricos, Decreto Nº 4.021-R, de 19/10/2016
 75 SEAMA, Secretaria de Meio Ambiente e Recursos Hídricos, Lei Nº 10.557, de 07/07/2016
 76 <https://explorer.land/p/organization/hp/forests-forward>
 77 <https://explorer.land/p/project/hp-peru-2022/post/eigEW/>
 78 We note there is no mention on whether the national commitments are only on domestic footprint or also include overseas footprint, but the overall aim is to reduce global footprint. While open to interpretation, both domestic and international footprint of major consumer countries need to be addressed to achieve the global footprint of consumption and production reduction included in the GBF. CBD Parties should integrate specific objectives, linked to GBF targets to take transformative actions to reduce global footprint (e.g. 5, 7, 10, 14-16 and 18). Countries with a bigger footprint will need to reduce their footprints more, so that action on environmental footprint supports a just transition.
 79 WWF-UK and RSPB 2020. *Riskier Business: The UK's External Land Footprint*.
 80 Jennings, S. and Schweizer, L. 2019. *Risky Business: The risk of corruption and forest loss in Belgium's imports of commodities*. WWF-Belgium.
 81 Jennings, S. and de Korte, M. 2018. *Risky Business: the risk of corruption and forest loss in France's imports of commodities*. WWF-France.
 82 Jennings, S. and Cooper, H. 2020. *Risky Business: The risk of corruption and forest loss in Denmark's imports of soy, timber, pulp and paper*. WWF-Denmark.
 83 Jennings, S., Cooper, H. and McCormack, C. 2020. *Risky Business: Deforestation and social risks in Switzerland's imports of commodities*. WWF-Switzerland.
 84 Jennings, S., Meijer, S. and van Dooren, C. 2022. *The impact of Dutch imports on nature loss worldwide*. WWF-Netherlands.
 85 Buckland-Jones, S., Cooper, H., Evans, R., Jennings, S., Munkedal, C. and Rahman-Daultry, K. 2021. *Wales and global responsibility: addressing Wales' external land footprint*. WWF-Cymru, RSPB Cymru and Size of Wales.
 86 UN Comtrade. 2023. <https://comtradeplus.un.org/>
 87 Conversion factors. Soy: Roundtable on Responsible Soy 2022. Soy Conversion Factors. Cocoa: Fairtrade International (2013). Questions & Answers: Cocoa conversion rates for mass balance. Coffee: The Coffee Guide. International Trade Centre.
 88 FAOSTAT. 2023. <https://www.fao.org/faostat/en/>
 89 de Weert, L. 2021. LUC Impact Tool. Blonc Consultants. <https://bloncsustainability.nl/news/update-of-the-blonc-direct-land-use-change-assessment-tool>
 90 IPCC. 2019. Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Introduction (Vol. 4 Chapter. 1). [https://doi.org/10.1016/S0166-526X\(00\)80011-2](https://doi.org/10.1016/S0166-526X(00)80011-2)
 91 BSI. 2012. PAS 2050-1: 2012 Assessment of life cycle greenhouse gas emissions from horticultural products. BSI.
 92 WRI. 2023. Climatewatch. <https://www.climatewatchdata.org/data-explorer/historical-emissions?historical-emissions-data-sources=climate-watch&historical-emissions-gases=all-ghg&historical-emissions-regions=All%20Selected&historical-emissions-sectors=total-including-lucf%20total-including-lucf&page=1>
 93 https://unfccc.int/NDCREG?gclid=CjwKCAjw04yBhApEiwAJcvNoUULBVyPQ_XYQnyWEjDwE-BWg2YttbG6B28TAHys0SWYvR_A1g3Hh0CFesQAvD_BwE



© naturepl.com / Nick Hawkins / WWF



Working to sustain the natural world for the benefit of people and wildlife.

together possible™ panda.org

© 2023

© 1986 Panda symbol WWF – World Wide Fund for Nature (Formerly World Wildlife Fund) ® “WWF” is a WWF Registered Trademark. WWF, Avenue du Mont-Bland,

1196 Gland, Switzerland. Tel. +41 22 364 9111. Fax. +41 22 364 0332.

For contact details and further information, please visit our international website at www.panda.org