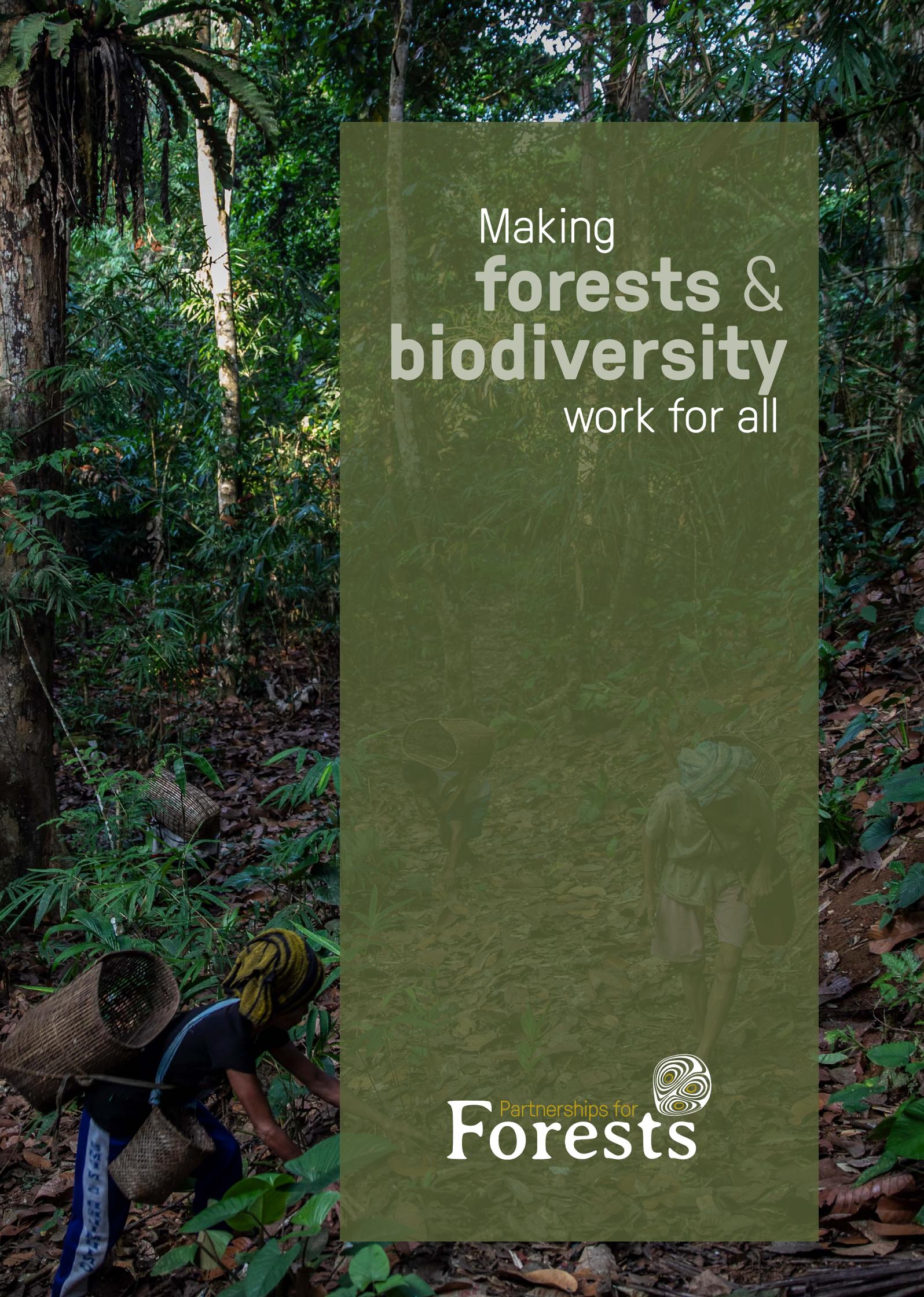


Making
**forests &
biodiversity**
work for all

Partnerships for
Forests



Making **forests & biodiversity** work for all

June 2020

COVER IMAGE
Collecting illipe nuts
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Foreword

Partnerships for Forests (P4F) is an 8-year programme funded by the UK Government's Department for International Development (DFID) and Department for Business, Energy and Industrial Strategy (BEIS). The overarching aim of the programme is to identify and incubate regenerative business models, specifically public-private-people partnerships, that incentivise forest protection and sustainable land use.

These regenerative business models promote sustainable land use and climate mitigation strategies whilst simultaneously providing societal and biodiversity benefits. As such they can be considered as nature-based solutions to the current climate crisis.

In this report, we show how P4F is supporting regenerative business models in areas with high biodiversity value across the tropics. Drawing on our partners' experience, we demonstrate why it is in companies' interest to develop sustainable, inclusive business models which contribute to biodiversity preservation. We also demonstrate why financiers should invest in regenerative business models and how governments can enable easier investments through supporting blended finance models and investment-friendly policies.

The report uses case studies and biodiversity spatial data to test the following hypotheses:

- 1** That inclusive business models that enhance or maintain biodiversity in a forest landscape exist and provide an alternative to business as usual;
- 2** That biodiversity can be enhanced by businesses working in forest landscapes, where developers implement the right business model archetypes and do so in an inclusive manner;
- 3** That if communities and businesses both derive economic, social and environmental benefits from local biodiversity then they will be incentivised to protect it.

In order to test the first two hypotheses, we have applied GIS spatial datasets to map P4F's portfolio against forest cover, biodiversity intactness and the forest frontier. To test hypothesis three, we use a case-based approach to better understand the biodiversity impact of our interventions against two impact pathways:

- 1** Targeted producers' performance and livelihood benefits with a focus on smallholder farmers and local communities;
- 2** Forest/landscape actors and governance systems at different scales, with a focus on their capacities and management systems to protect the forest.

To present this evidence, the case studies are structured around the following themes: 1) Relevance; 2) Early outcomes; 3) Sustainability; 4) Scaling; and 5) Transformative change.

Glossary

Archetype	a typical example of something. In this report we refer to three archetypes with reference to business models: (1) enhancing the value of standing forest (2) creating value from forest regrowth, and (3) produce-protect.
Biodiversity	biodiversity is the variability in species, genetics, ecosystems and biological communities that encompass the biosphere. A high level of biodiversity is usually important and desirable because it enables adaption to change, as well as greater resilience to shocks and stresses to the ecosystem. Genetic diversity is the variety of genetic characteristics within a species.
Deforestation	when a forest is cleared, and the land converted for agricultural uses, mining or urban development.
Forest degradation	a reduction in the capacity of a forest to produce ecosystem services.
Ecosystems	a biological community of interacting organisms and their physical environment.
Ecosystem services	the flow of value to humans that nature delivers – including the provision of food, fibre, water, energy, medicines and other genetic materials, but also the regulation of climate, water quality, pollution, pollination, flooding and storms.
Keystone species	a species which has a disproportionately profound effect on its environment and other species therein relative to its abundance. A keystone species is likely to be a predator or an organism that significantly alters their habitat.
Nature-based solutions	actions to protect, sustainably manage and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.
Non-timber forest products	substances, materials or commodities that are derived from forests but do not require the harvesting of trees.
Primary forests	a forest in its natural state, with no indication of disturbance and thereby exhibiting unique ecological systems.
Regenerative business model	regenerative models generate value from the protection and restoration of forests. The term “regenerative” acknowledges that natural systems are already deeply impacted and hence seeks to renew – or regenerate – the productivity of the natural ecosystem via a value-creating proposition. Regenerative models are grouped into three main categories: those which create value from standing forest, agricultural “production protection” approaches and models which generate value from regrowing forest.
Regrowth forests	a forest in which a substantial proportion of its mature trees have been felled and is in the younger growth phase.
Secondary forests	forest that has regrown but not fully recovered after timber harvesting or environmental damage.
Tropical forests	forests in a hot and humid climate, where there is no dry season and typically occur 10 degrees south or north of the equator.

Acronyms

ABT	Alam Bukit Tigapuluh	KVTC	Kilombero Teak Company
ARSX	Xingu Seeds Association	LMB	Landscape Management Boards
BEIS	Department for Business, Energy and Industrial Strategy	KPI	Key Performance Indicator
BII	Biodiversity Intactness Index	LPP	Landscape Protection Plan
BTP	Bukit Tigapuluh	MoU	Memorandums of Understanding
CATIE	Higher Education Centre in Costa Rica	NCRC	Nature Conservation Research Centre
CES	Cultural Ecosystem Services	NGO	Non-Governmental Organisation
CFI	Cocoa Forest Initiative	NTFP	Non Timber Forest Product
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora	P4F	Partnerships For Forests
COCOBOD	Ghana Cocoa Board	PMF	Participatory Forest Management
CPP	Community Partnership Program	PFMC	Participatory Forest Management Committees
CSSVD	Cocoa Swollen Shoot Virus Disease	RIMBA	Riau–Jambi–Sumatera Barat
DFID	Department for International Development	RLU	Royal Lestari Utama
ERC	Ecosystem Restoration Concession	RRSC	Rural Sustainability Service Centres
FAO	Food and Agriculture Organisation of the United Nations	SCCM	Sustainable Commodities Conservation Mechanism
FRERCO	Forest Reserve Encroachment and Remediation Committee	SCLFM	Sustainable Cocoa Landscape Finance Mechanism
FZS	Frankfurt Zoological Society	SDG	Sustainable Development Goals
GIS	Geographic Information System	TLFF	Tropical Landscapes Finance Facility
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit	UNEP	United Nations Environment Program
HCS	High Carbon Stock	VLFR	Village Land Forest Reserves
HCV	High Conservation Value	VSLA	Village Savings and Loans Associations
HFZ	High Forest Zone	WCA	Wildlife Conservation Area
IPCC	Intergovernmental Panel on Climate Change	WWF	World Wildlife Fund

Executive summary

Biodiversity can be used as a biometric to indicate the health of an ecosystem. Tropical forests support at least two-thirds of the world's biodiversity¹ despite covering less than 10% of Earth's land surface². Unfortunately, tropical forests and the biodiversity they support are under ever growing pressure due to deforestation and forest degradation driven by commodity agriculture and land use change. To tackle this, the root causes of deforestation and degradation – which include poor governance, global inequality, and changing social and environmental values – must be addressed.

Tropical forests are valuable not just for their biodiversity but also for the ecosystem services they provide. The richness of biodiversity therefore underpins the success and prosperity of humanity. Taking carbon as an example, tropical forest soils alone sequester more than 900 billion tonnes of carbon dioxide equivalent³. Unfortunately, the prevailing economic model is one that fails to recognise and protect goods and services that defy quantification and monetisation in the traditional sense, such as ecosystems and biodiversity.

Nature-based solutions,⁴ such as the regenerative business models incubated by P4F, are gaining increasing political traction. Nature-based solutions in the forest and land use sector offer an immense opportunity to achieve the 2015 Sustainable Development Goals and the Paris Agreement on climate change targets.⁵



¹ Raven PH (1988) *Our diminishing tropical forests. Biodiversity*, eds Wilson EO, Peter FM (National Academy Press, Washington, DC)

² Bradshaw CJA, Sodhi NS, Brook BW (2009) Tropical turmoil: A biodiversity tragedy in progress. *Front Ecol Environ* 7:79–87

³ Food and Land Use Coalition (2019) *Prosperous Forests* https://www.foodandlandusecoalition.org/wp-content/uploads/2019/11/FOLU-Prosperous-Forests_v6.pdf

⁴ Nature-based solutions are defined by the IUCN as “actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits”

⁵ Food and Land Use Coalition (2019) *Growing Better* <https://www.foodandlandusecoalition.org/wp-content/uploads/2019/09/FOLUGrowingBetter-GlobalReport.pdf>

Regenerative business models show that biodiversity and business productivity can be enhanced together

P4F has supported over 35 active regenerative business models across the tropical forest belt in Africa, South East Asia and Latin America. Forest protection and sustainable land use is central to each model incubated under P4F – it is this mechanism that delivers positive impacts on biodiversity, whilst creating positive impacts on local jobs, productivity, income, and human health.

This report demonstrates that inclusive business models that enhance or maintain biodiversity in a forest landscape exist and represent alternatives to a business as usual pathway. Our case study chapter illustrates that biodiversity-business-people triple wins are possible – but only if:

- Developers implement the right business model archetypes and do so in an inclusive manner;
- Communities and businesses are both able to derive financial and other benefits from local biodiversity.

Chapter 3 on case studies is divided into four sections, each illustrating a distinct regenerative business model. In each case study we consider:

- The relevance of the business model's forest protection mechanism, governance approach and livelihood benefits to potential enhanced biodiversity;
- Early positive biodiversity outcomes;
- Sustainability of the business model and the potential enhanced biodiversity; and
- Scalability of the business model and the potential enhanced biodiversity.

The four cases studies include:

1 How biodiversity can support sustainable economic growth: A deep dive into Ethiopian forest coffee

Business models that enhance the value of standing forest must also generate livelihood outcomes for communities living in and around remaining forest areas. This generally depends on communities being able to benefit directly from the ecosystem itself, be that through sustainable harvest of forest products or through sale of conservation outcomes in the form of credits. In our case study on the Ethiopian forest coffee value chain, the biodiversity value lies within the rich genetic resources that can be found in coffee that grows wild in Ethiopia's native forests. This forest coffee not only provides local communities with a price premium, its genetic value has the potential to increase the disease resistance and quality of cultivated coffee crops globally.

2 Why ecosystem restoration is good for business: A deep dive into direct seeding techniques in Brazil

Bringing value to forest growth involves business models working with communities living in and around the area to ensure they benefit directly from the restoration process. In this case study, we provide an in-depth look at the direct seeding restoration technique in Brazil, where producers and infrastructure projects are mandated by law to reforest a portion of land to offset their environmental liabilities. The restoration technique involves directly sowing a diverse mix of seeds from native species. This method reduces the cost of restoration, provides livelihood options and cultural value for indigenous people that collect the seeds and results in a more diverse and resilient forest that can support more biodiversity than traditional seedling-based restoration.

3 When production and conservation go hand in hand: A deep dive into cocoa production in Ghana

Produce-protect models enhance biodiversity by, on the one hand, increasing the efficiency of production on degraded lands and, on the other, setting up robust forest protection mechanisms to prevent any further encroachment. In this section we feature the Juaboso-Bia district landscape in Ghana, where Touton, a private cocoa trading company, and partners (government and civil society organisations) are implementing a landscape governance approach in cocoa production forests to help communities manage the land sustainably and create financial incentives for local people to adopt climate-smart agricultural techniques, protect remaining forests and promote the regrowth of trees in cocoa areas.

4 Why landscape governance is necessary for people and biodiversity: A deep dive into the Bukit Tigapuluh landscape in Indonesia

A synergistic approach is required to deliver value and biodiversity enhancement across a fragmented forest landscape. To best demonstrate this, we provide an in-depth case study looking at how regenerative business models provide incentives to protect the

Bukit Tigapuluh (BTP) Landscape in Indonesia. The BTP landscape is a produce-protect rubber plantation which contains a wildlife corridor and combines the collection of forest products, such as honey, to increase the value of standing forest. The business model has involved setting up a sophisticated landscape-wide governance body to work with multiple actors across the landscape to ensure it delivers a good outcome for local people, biodiversity and businesses.

Optimising regenerative business models for biodiversity – lessons for and private sector companies, policymakers, donors, and investors

Drawing from five years of programme operations, we have compiled lessons and recommendations for change agents looking to maximise the impact of nature-based solutions for communities and biodiversity. These are presented in full in the final chapter of this report.

Recommendations for project developers and private sector companies

- 1 Partnerships matter:** Formal partnerships between all actors involved are essential for establishing successful collaborative nature-based solutions. Invest time in identifying the actors – be that communities, companies, local authorities/government or civil society – and creating and formalising partnerships via Memorandums of Understanding (MoUs) that meet the needs of stakeholders from the onset.
- 2 Understand your context and design your regenerative business model accordingly:** Take the time to research, collect and analyse data and local information, to understand the most appropriate strategy/archetype according to the forest landscape. To maximise impact, explicitly build good land-use planning and monitoring into business plans and budgets.
- 3 Harness local expertise:** Achieving true collaboration with forest-dependent communities requires spending time to harness their local knowledge and ensure they receive an equitable share of the benefits from sustainable forest economies.
- 4 Consumers are increasingly conscious of the impact of their choices:** Capture and communicate your company's biodiversity and societal impact to consumers in an honest, clear way.
- 5 Bring biodiversity value into your business proposition:** Look for alignment between your business and biodiversity outcomes and use metrics to quantify the value of biodiversity to your business model and as a public good.

Recommendations for policymakers and donors

- 6 Managing landscapes for biodiversity outcomes is complex and public support is essential:** Policymakers and donors should implement policies, regulations and programmes that are aligned and support sustainable landscape governance at scale.
- 7 More blended finance and public money needs to be directed towards biodiversity-positive business models:** Donors should direct funding to project developers and companies incubating the solutions of the future and use their funding to ensure biodiversity outcomes are maximised and investment ready models are incubated.
- 8 Siloed working hinders the nature-based solutions transitions we need:** Policymakers and donors should support initiatives that foster lesson sharing beyond the normal suspects.
- 9 The market for project developers and incubators needs to expand:** Donors and impact development funders should increase the availability of funding for development and incubation services, to provide companies with the right support they need to incubate nature-based solutions.

Recommendations for investors

- 10 Transitioning sustainable land use financing starts with the leading pioneer investors:** Investing in nature-based solutions as an asset class is still very niche. Investors should build relevant knowledge in this area in order to better screen for risks and opportunities. Those leading pioneers that have already made investments in nature-based solutions need to share their learnings with others in the investment community so that investments in this space can be realised more quickly.



IMAGE
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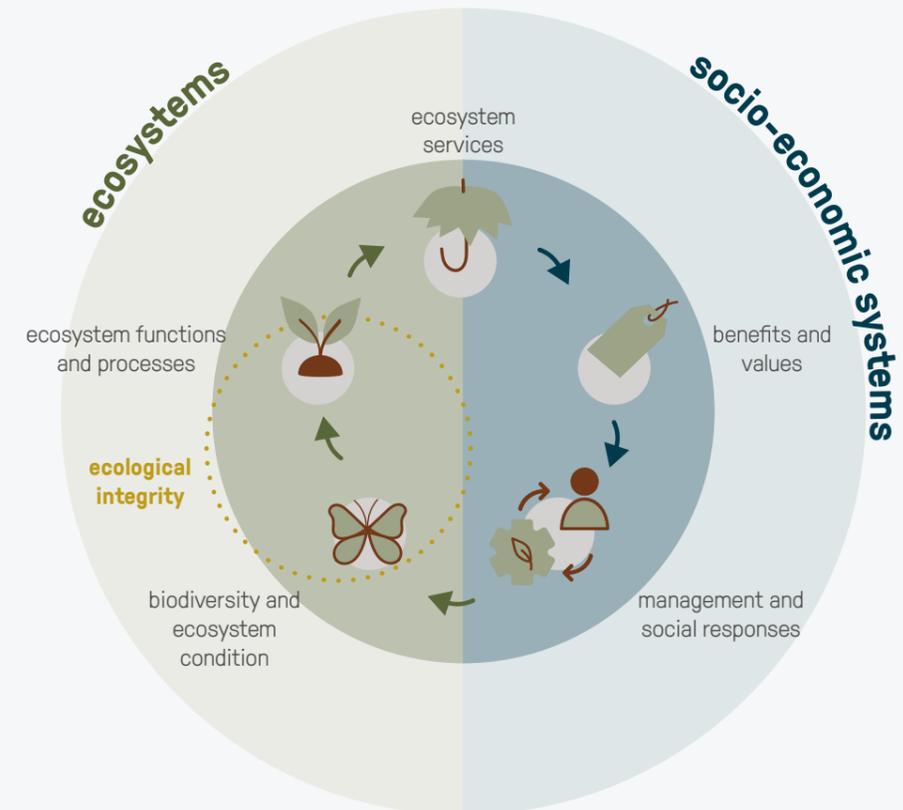
Why biodiversity matters

What is biodiversity?

Biodiversity is the variability in species, genetics, ecosystems and biological communities that – in sum – constitute the biosphere. Ecosystems are distinct biological communities of interacting organisms and their physical environment. It follows then that the health of an ecosystem is directly related to the breadth and depth of the biodiversity contained within it.

Type of biodiversity	Description
Genetic	The breadth of genetic characteristics observed in a species. Genetic diversity is the variability in species that allows certain members of the species to adapt and evolve to suit a changing environment.
Species	The breadth of different species found in any given environment. As each species plays a unique role in an ecosystem, any impact on a particular species is also felt by the ecosystem in which that species interacts.
Ecosystem	The breadth of ecosystems such as deserts, forests, grasslands, wetlands, and oceans found in any given region.

FIGURE 1
Example diagram demonstrating the link between biodiversity, ecosystem services and management responses*



* Figure adapted from Fig 1. in *Perspectives on the link between ecosystem services and biodiversity: The assessment of the nursery function*. Liquete, C., Núria, C., Lanzaova, D., Grizzetti, B., Reynaud, A., 2016. *Ecological Indicators*, 63, pp.249–257.



Land-use change is the greatest driver of habitat loss

1 The economic importance of nature

The economic value that ecosystem services and biodiversity provide to human socio-economic systems is estimated at approximately US\$125 trillion per year¹ – twice the value of global gross domestic product. But these services are under threat. By the end of the 20th century, over 75% of the world's land surface not under ice had been affected by human activities². Forests were put under enormous pressure to provide resources to a growing population. As a result, most forest areas were vastly degraded putting millions of species under threat of extinction.

¹ WWF (2018) Living Planet Report https://wwf.panda.org/knowledge_hub/all_publications/living_planet_report_2018/

² IPBES (2019): Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.

A recent report estimates that the annual cost to the world economy from the loss of nature will reach US\$10 trillion by 2050 and therefore the continued loss of biodiversity is as much of an economic crisis as an environmental one³. Without sustainable management and restoration activities, these ecosystem services will continue to be degraded, putting upward pressure on the price of key commodities as the world's agricultural sectors struggle to cope with the effects of climate change.

³ WWF (2020) <https://www.worldwildlife.org/press-releases/new-wwf-report-reveals-us-will-suffer-world-s-biggest-economic-impact-due-to-nature-loss>

2 What is driving the loss of critical habitats?

Commodity agriculture and land use change are the biggest drivers of deforestation and pose the greatest threat to biodiversity in critical habitats. To combat this, a concerted effort is required to tackle the root causes of degradation which include poor governance, global inequality, and changing social and environmental values. But the most important driver is perhaps that the prevailing economic model is one that fails to recognise and protect goods and services that defy quantification and monetisation in the traditional sense, such as ecosystems and biodiversity.

Market failure

Ecosystem services are often not 'priced' meaning that there is no common unit through which their value can be accurately expressed. This therefore makes decision-making difficult especially when trying to evaluate economic efficiency. As an example, agricultural crops have a market value for which they can be sold and bought; all things being equal, more crops usually mean more profit. From a decision-making perspective, these easily traded goods can bring huge potential to a country's economy. Economic policies must, however, also strike a balance between production and consumption, so as to prevent overproduction and falling prices. The cost of damage to the environment and biodiversity is considered in economic policies, since their value cannot be traded on the market.

Decision-making is also affected by opportunity costs, information asymmetry and competing stakeholder incentives. Typically, businesses favour quick economic returns from forests and land use over more sustainable approaches that are often perceived as more costly. In addition, in poor, rural areas the basic needs of communities usually come at the cost of forests and ecosystems. Subsistence farming and fuelwood collection are the main drivers of deforestation in many areas of the world, often found in areas with insufficient alternatives or incentives to protect their nearby forests. These market failures are compounded by poor governance systems and a lack of transparency and accountability between governments and the population.

Initiatives to address forest and biodiversity loss

We know the major impact that business as usual practices will have on driving emissions and climate change. The Intergovernmental Panel on Climate Change (IPCC) special report on climate change – informed by over 6,000 scientific references – clearly spells out the impacts of global warming

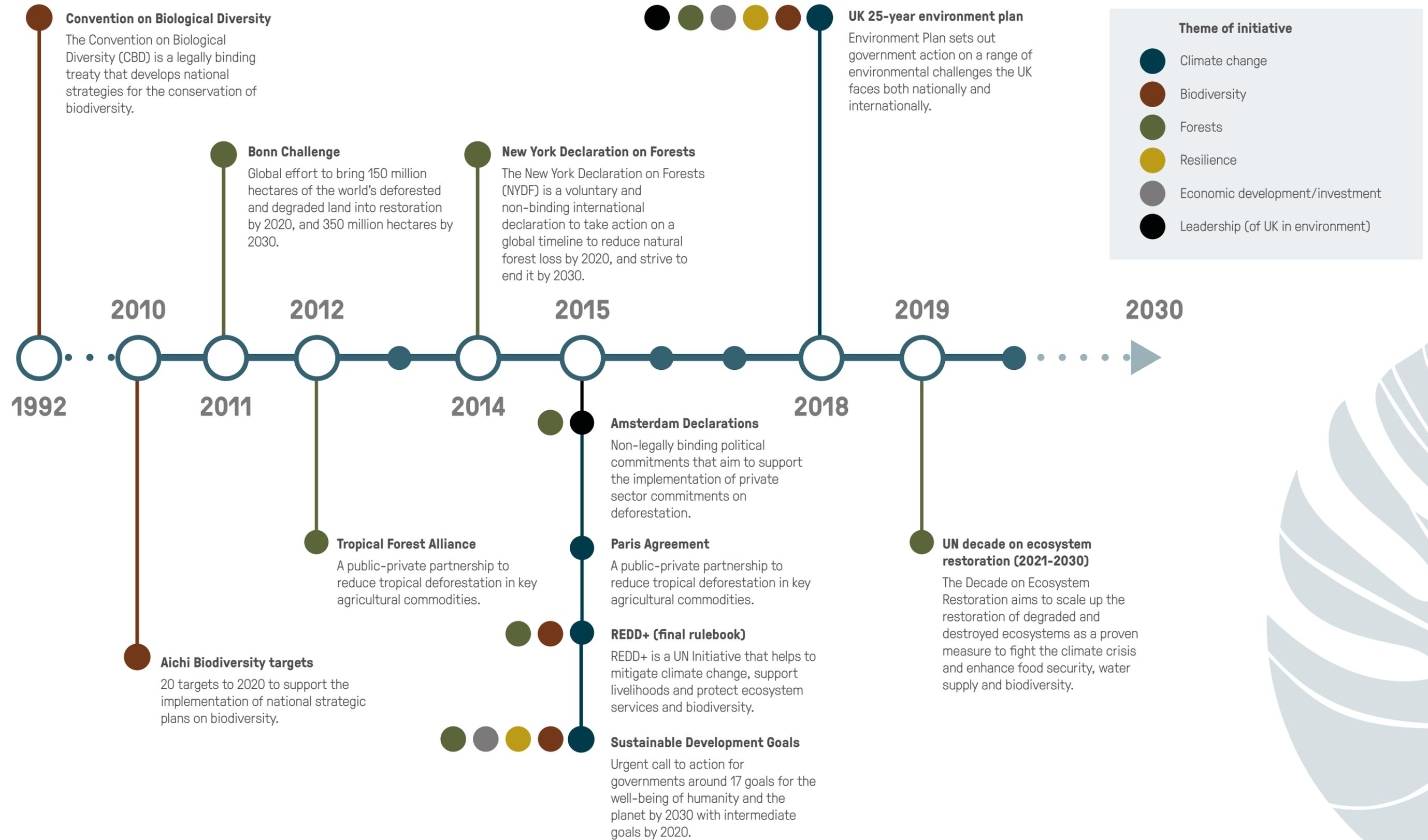
of 1.5°C above pre-industrial levels we are already experiencing⁴. Despite the continuing threat to biodiversity posed by the conversion of tropical forests, the solutions are already known. Supply chains, economies and businesses need to move away from business as usual and transform to ensure benefits for local and global communities and nature. The real challenge is mainstreaming and scaling these innovative nature-based solutions fast enough in order to protect our ecosystem and continue to limit global warming.

By incubating a series of nature-based solutions that aim to demonstrate that carbon sequestration, forest and biodiversity conservation can be more than just 'nice to have' add-ons to business models, P4F is building a platform of international and national initiatives and commitments to address forest and biodiversity loss (see Figure 2). Each solution is a critical component of a future economy in which economic growth and forests can grow together.

The following chapter demonstrates the importance of protecting and restoring tropical forests for biodiversity. It shows where the remaining biodiversity hotspots are in the tropics, and where past deforestation has driven biodiversity loss in critical ecosystems. The chapter also highlights the importance of secondary forests (forest regrowth following deforestation) to ensuring the connectivity of habitats.

⁴ IPCC, 2018: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press

FIGURE 2
Landmark initiatives to address biodiversity and forest loss



The importance of **protecting and restoring tropical forests**

Tropical forests are the most biodiverse ecosystems and species-rich habitats in the world but are at significant risk from widespread ongoing deforestation¹. In this section we use Geographic Information System (GIS) data to illustrate the extent of recent deforestation and its impact upon the biodiversity within the forests. The analysis demonstrates the need for regenerative business models that can protect and restore tropical forests and enhance biodiversity.

.....
¹ We refer to the data as showing forest cover and forest loss (deforestation) though there is a technical distinction between forest and tree cover. There are hundreds of technical definitions of forest. The datasets used secondary forest and forest loss use a definition of tree cover at 30% or greater canopy over. This means that there may be some cases where perennial crops such as palm are classified as 'forest'.

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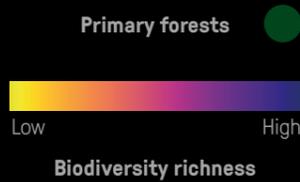


FIGURE 5
Interactive map: biodiversity intactness index for species richness*

Primary forests are vital for biodiversity conservation due to their unparalleled species and habitat diversity². Although the exact number of species found within tropical rainforests is unknown, estimates range from 3- 50 million³.

* Tim Newbold; Lawrence N Hudson; Andrew P Arnell; Sara Contu et al. (2016). Dataset: Global map of the Biodiversity Intactness Index, from Newbold et al. (2016) Science. Natural History Museum Data Portal

² "Primary forest is defined as mature natural humid tropical forest cover that has not been completely cleared and regrown in recent history". Turubanova S., Potapov P., Tyukavina, A., and Hansen M. (2018) *Ongoing primary forest loss in Brazil, Democratic Republic of the Congo, and Indonesia*. *Environmental Research Letters*

³ Mongabay: <https://rainforests.mongabay.com/>

There are a number of approaches to measuring biodiversity, from composite indexes to those which look at the health of keystone species. The Biodiversity Intactness Index (BII) estimates how the average abundance of native terrestrial species in a region compares with their abundances in intact habitat. Biodiversity in tropical forests, as measured using BII, has fallen significantly in recent years due to increased pressures from anthropogenic activities including deforestation and degradation⁴. Figures 5 to 6 show biodiversity measured by BII richness and offers a

⁴ Brockhoff, E.G., Barbaro, L., Castagneyrol, B. et al. 2017. Forest biodiversity, ecosystem functioning and the provision of ecosystem services. *Biodivers Conserv* 26, 3005–3035.

FIGURE 6
Interactive map: forest cover in 2018 (Hansen/UMD/Google/USGS/NASA)

visual comparison with the extent of primary forests. It is evident that primary forests harbour significant levels of biodiversity.

2001

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2018

Secondary forests (30% canopy cover)

Primary forests

Tree cover loss (2001 to 2018)



FIGURE 7
Interactive map: forest cover in 2001 (Hansen/UMD/Google/USGS/NASA)

Deforestation of primary and secondary forests can result in biodiversity loss and forest fragmentation, where the previously uninterrupted habitat is reduced to smaller fragments⁵. Fragmented forest creates a challenge for many species, which vary in their ability to cross deforested land. This can lead to forest dependent species becoming isolated in small patches of forest that are not big enough to support a healthy population.

Figures 7 and 8 show how rates of secondary

⁵ Morris, R.J. 2010. Anthropogenic impacts on tropical forest biodiversity: a network structure and ecosystem functioning perspective. *Philosophical Transactions of the Royal Society of London*. 65(1558), pp. 3709–3718.

and primary forest loss between 2001-2018 vary geographically⁶.

Primary forest offers the optimum conditions to support the greatest number and range of species. However, secondary forests play a key role in providing habitat to a wide range of species and

⁶ Hansen, M. C., P. V. Potapov, R. Moore, M. Hancher, S. A. Turubanova, A. Tyukavina, D. Thau, S. V. Stehman, S. J. Goetz, T. R. Loveland, A. Kommareddy, A. Egorov, L. Chini, C. O. Justice, and J. R. G. Townshend. (2013) "High-Resolution Global Maps of 21st-Century Forest Cover Change." *Science* 342 (15 November): 850–53. Data available online from: <http://earthenginepartners.appspot.com/science-2013-global-forest>. Note: this dataset is used for all forest cover maps in the report.

FIGURE 8
Interactive map: forest cover in 2018 (Hansen/UMD/Google/USGS/NASA)

creating connections between areas of primary forest. Protecting and restoring primary and secondary forest is critical to improving the health of tropical forests.

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- Primary forests 
- Tree cover loss (2001 to 2018) 
- Secondary forests (30% canopy cover) 
- Forest frontier 

FIGURE 9
Interactive map: forest frontier and forest cover (Hansen/UMD/Google/USGS/NASA)

Figure 9 shows the areas of forest that are forecast to be deforested next. These are known as the forest frontier and are expected to suffer biodiversity loss driven by deforestation⁷. To mitigate the risk of deforestation, there is a need for rapid scaling of regenerative business models in the forest frontier. These business models provide local communities, smallholders and businesses with an alternative means of income generation that doesn't lead to deforestation.

However, as we illustrate via the maps and narrative in the case study chapter, it is important to implement the right business model archetype in the appropriate forest landscape.

⁷ Food and Land Use Coalition: https://www.foodandlandusecoalition.org/wp-content/uploads/2019/11/FOLU-Prosperous-Forests_v6.pdf

Cases from the forest

This chapter presents four detailed case studies that illustrate how different regenerative business models can enhance biodiversity and deliver positive impact for local people.

P4F's wealth of experience incubating regenerative business models in the tropical forest belt demonstrates that it is possible for governments, businesses and communities to prosper from the protection and regeneration of forests. As a guide, we have used the forest transition curve model to illustrate the different models that should be adopted to best ensure healthy and resilient landscapes, in which local communities and private sector businesses have incentives to protect and restore forest (Figure 10).

This chapter presents four cases that are evaluated according to a methodological framework (see Box 10 in the Annex full framework) which considers:

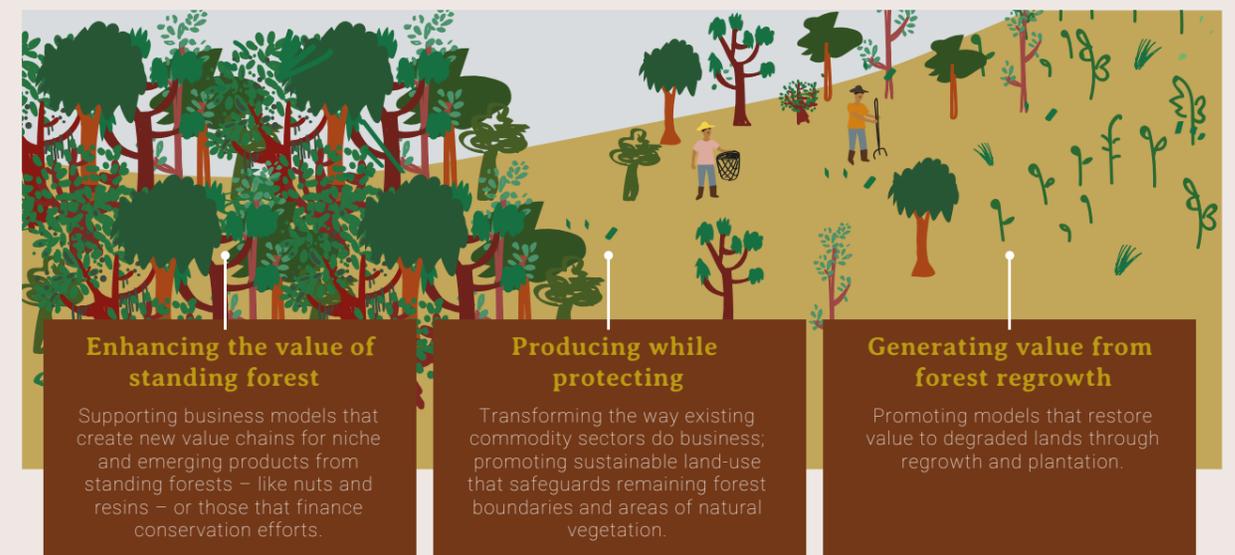
- the relevance of the business model's forest protection mechanism, governance approach and livelihood benefits to potential enhanced biodiversity;
- early positive biodiversity outcomes; and
- sustainability of the business model and the potential enhanced biodiversity.

The four cases include:

- 1 How biodiversity can support sustainable economic growth** – focuses on our 'enhancing the value of standing forest' archetype with a case study looking at Ethiopian Forest Coffee.
- 2 Why ecosystem restoration is good for business** – looks at our 'creating value from forest regrowth' archetype with an in-depth case study on the direct seeding restoration technique in Brazil.
- 3 When production and conservation go hand in hand** – brings to light our 'produce-protect' archetype with a case study on climate-smart cocoa production in Ghana.
- 4 Why landscape governance is necessary for people and biodiversity** – looks at how regenerative business models provide incentives to protect the Bukit Tigapuluh (BTP) Landscape in Indonesia.

FIGURE 10

P4F's regenerative business models can be grouped into three archetypes



1 How biodiversity can support sustainable economic growth

Creating a premium Ethiopian forest coffee brand to create value for communities and financial incentives to protect forests and their genetic diversity.

Archetype

Enhancing the value of standing forest

The challenge

There are over 120 species of coffee (genus *Coffea*) in the world, but there are only two species of economic importance; Arabica (*Coffea arabica*) and Robusta (*Coffea canephora*). Generally, these crops are grown as monocultures, so have limited genetic diversity. This limited diversity renders the crop vulnerable to abiotic threats such as climatic, soil and salinity changes, as well as biotic threats such as diseases and parasites. For instance, the coffee industry in Sri Lanka was forced to cease production at the end of the 19th century due to the devastating effects of coffee leaf rust disease.

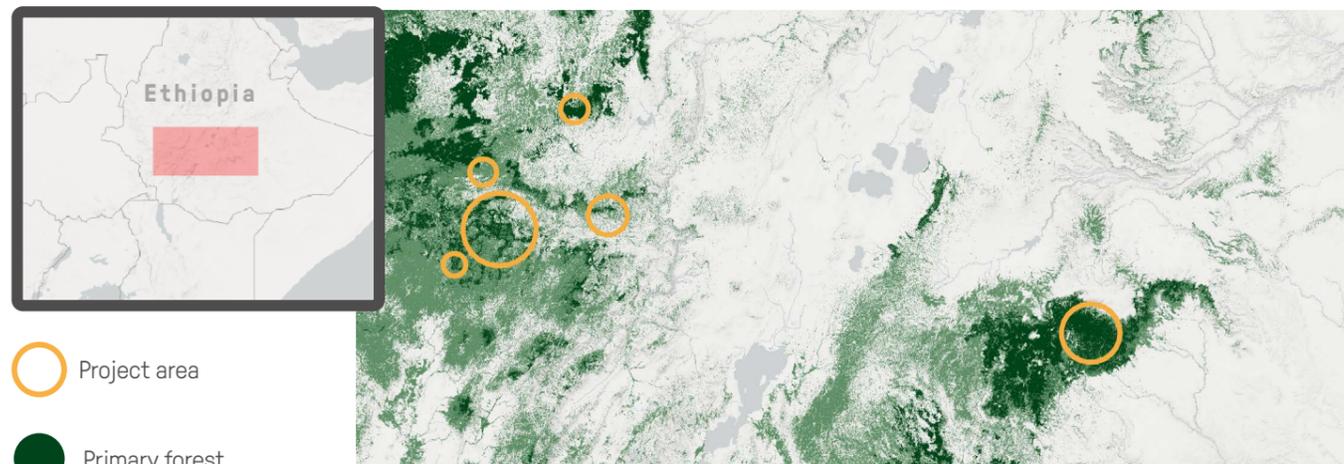
Contrastingly, in Ethiopia, diseases have not caused such economic disruption. This is mainly because both the disease and the coffee trees are endogenous species meaning that they share the same origin and therefore have co-evolved, consequently making the coffee crop in Ethiopia genetically diverse and

naturally resilient¹. Diversity also provides resilience to novel diseases such as the coffee berry disease. In the 1970s, coffee berry disease devastated coffee production in East Africa, and the industry in some countries struggled for decades as a result. Fortunately, researchers were able to identify coffee varieties that were resilient relatively quickly through selections of wild Ethiopian collections². It is therefore evident that sustaining genetic biodiversity within coffee crops is of great importance.

In Ethiopia, coffee contributes 5% of GDP and 30% of export earnings. An estimated 45% of the country's total production is harvested from forest and semi-forest coffee. Although these wild coffee trees are genetically distinct and more diverse than the cultivated varieties in Ethiopia, it is currently sold as commercial-grade coffee due to variable quality and lack of traceability.

¹ Aerts, R., Geeraert, L., Berecha, G., Hundera, K., Muys, B., De Kort, H. and Honnay, O., 2017. Conserving wild Arabica coffee: Emerging threats and opportunities. *Agriculture, Ecosystems & Environment*, 237, pp.75-79.

² van der Graaff, N.A., 1981. Selection of arabica coffee types resistant to coffee berry disease in Ethiopia (Doctoral dissertation, van der Graaff).



-  Project area
-  Primary forest
-  Secondary forest

FIGURE 11
Ethiopian Forest Coffee project area

This model enhances the value of primary forest through the development of a forest coffee value chain and associated premium forest coffee brand that relies on the genetic diversity of forest coffee. The forest coffee is collected from the areas shown in the map above. The higher prices paid for the premium brand incentivise the protection of the forest where forest coffee grows.

The wild *Coffea arabica* populations in the Afromontane rainforests are some of the most genetically diverse. Specifically, the globally significant Kafa Biosphere Reserve, one of 34 biodiversity hotspots of the world, harbours 5,000 *Coffea arabica* varieties, all of which are native species to the area. The reserve is also home to 100 bird and 48 mammalian species, including the black and white colobus monkey. Ethiopian forests are, however, under threat from agricultural expansion and deforestation for fuelwoods. The country has already lost approximately one third of forest cover³.

The solution

In collaboration with Ethiopia's Coffee and Tea Development and Marketing Authority, P4F supports key stakeholders that are implementing a regenerative business model to incentivise the conservation of the forests and the coffee's genetic diversity by developing a premium brand and supply chain for Ethiopian forest and semi-forest coffee.

The forest coffee is predominantly collected in Ethiopia's Kaffa, Sheka, Bench Majji, Ilu Babor and Bale areas that contain approximately 150,000 ha of forest. The business model stands to benefit around 10,000 farmers in these regions and achieve up to 6,030 tonnes of annual production, equal to approximately £69 million in exports.

P4F is supporting a consortium of organisations to develop the value chain. This involves Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, who are working to build a robust supply chain for Ethiopian Wild Forest Coffee, and TechnoServe Inc, who are developing the brand for Ethiopian forest coffee. The overall vision of the regenerative business model is to:

- Develop new and internationally recognised Ethiopian forest and semi-forest coffee brands;
- Export large quantities of Ethiopian forest and semi-forest coffee;
- Secure premium prices that will incentivise farmers to protect standing forest.

This case study will demonstrate how Ethiopian coffee farmers are able to derive an equitable share of benefits when their nearby forest is protected. It will also examine how the formalisation of the Ethiopian forest coffee value chain can help to protect commercial coffee plantations through the preservation of forest coffee genetic diversity, whilst protecting Afromontane forests and people, plants and animals that depend on them.

³ Deforestation: Did Ethiopia plant 350 million trees in a day? (2019) BBC. <https://www.bbc.co.uk/news/world-africa-49266983>



Biodiversity snapshot

COOPAVAM: Brazil Nuts Jurueña (Mato Grosso state and Rondônia state)

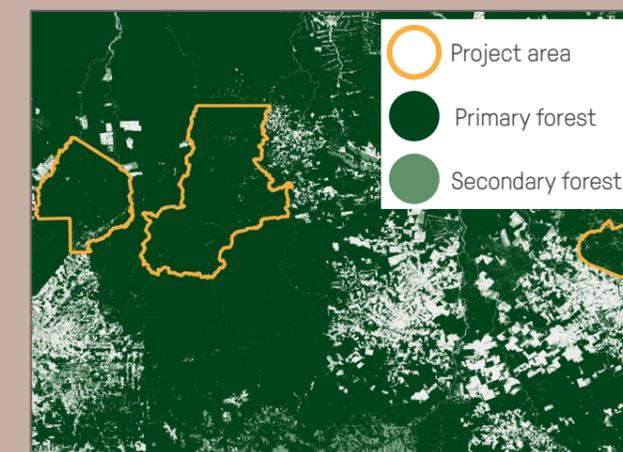
Enhancing the value of standing forest

P4F is supporting a growing economy around the harvesting of Brazil nuts to create value from the standing Amazon forest in Mato Grosso and Rondônia states.

These areas are biodiversity hotspots, with populations of jaguar, ocelot and macaw amongst other wild animals. Brazil nut trees only flourish in areas of diverse rainforest and produce nuts depending on rainfall and forest cover; in other words, yields of Brazil nuts are directly affected by biodiversity of the surrounding area. P4F supports the surveillance in the area, monitoring the threat of illegal logging. The COOPAVAM model covers 1.4 million ha of forest for and supports 4,000 livelihoods.

COOPAVAM PROJECT AREA

Brazil nut trees depend on a healthy, diverse surrounding forest to grow. COOPAVAM enhances the value of the standing primary forest through supporting a premium Brazil nut value chain.





Biodiversity snapshot

Hutan Desa Nanga Lauk Conservation Outcome Indonesia (Nanga Lauk Village Forest)

Enhancing the value of standing forest

In 2018, P4F supported Lestari Capital to launch the Sustainable Commodities Conservation Mechanism (SCCM). By collaborating with the financial, commodity and climate economy sectors, the SCCM creates a sustainable finance initiative that promotes landscape-scale conservation and restoration initiatives through a market-based approach. It is being implemented in the Forest Community of Hutan desa, Borneo, covering over 10,000 hectares of the landscape. The region supports 155 terrestrial species, 115 of those listed as threatened including the critically endangered Bornean banded langur, Sunda pangolin, helmeted hornbill, spoon-billed sandpiper and the endangered Bornean orangutan. Twenty-two of the 155 species are listed in CITES to protect against trade and exploitation. In addition, many flora species from which NTFPs are harvested grow within the region. *Aquilaria malaccensis* is found here and is critically endangered. Vulnerable or endangered plant species include Bornean ironwood, Light Red Meranti and *Gonystylus bancanus* for which P4F hopes that a viable ecotourism industry can be incubated here in order to generate income for local people and provide extra surveillance for the protection of illegally hunted wildlife.

NANGA LAUK VILLAGE FOREST PROJECT AREA

SCCM supports the protection of primary and secondary forest in Hutan Desa, Borneo through providing finance for conservation outcomes.



Image: Orang Utan.
© Denys Munang/ Eagle High Plantations.

Impact to date

Relevance

How does the business model ensure the protection of forests? How does this contribute to enhanced biodiversity?

In addition to strengthening the forest coffee value chain and creating incentives for communities to protect the forest as explained above, the model aims to improve forest change cover monitoring mechanisms by introducing innovative traceability models and strengthening community forest management.

In Ethiopia, community institutions that help manage forests are called Participatory Forest Management Committees (PFMCs). They are legally recognised entities with access to the forest and are responsible for its protection. These committees act as the first line of defence against encroachers. By intervening to develop a more profitable forest coffee value chain, the model has a trickle-down effect in that the PFMCs are able to reinvest the income made to improve their structure, monitoring and plan other interventions to best ensure forests are protected. These interventions help to preserve the plant and animal biodiversity and crucially, the genetic diversity of coffee varieties.

What is the business model governance approach?

The forest coffee value chain is governed by participatory forest bodies that are critical in ensuring coffee is harvested sustainably and in a way that enhances biodiversity. On the ground, PMFCs, which are formed of smaller Participatory Forest Management (PFM) groups, form coffee unions in order to aggregate to sell coffee (e.g. the Kaffa coffee union includes 58 cooperatives). The activities of each of these cooperatives are monitored by their associated coffee union which ensures they are sustainable. Monitoring activities include issuing penalties for members who are found to breach bylaws that are designed to ensure sustainable harvesting. These laws include banning the intensification of coffee production and tree cutting.

On the supply side, GIZ is working with cooperatives and unions by training farmers on harvesting practices. This includes training these groups to identify and select the highest quality berries to be brought to drying stations. The construction of centralised drying stations and raised drying beds have also been actioned, which improve the quality of the cup. On the demand side, TechnoServe is creating internationally recognised Ethiopian forest coffee brands. As global coffee companies create and manage their own brands, the goal is to incorporate Ethiopian wild coffee as a new product line across multiple coffee buyers and retailers.

BOX 1

Towards the right standard

Certifications of forest coffees used in Ethiopia so far are based on agricultural standards developed elsewhere in the world and therefore have little relevance for the production system in Ethiopia. Even today, there is no standard guideline for sustainable forest coffee production and the decisions to manage shade trees and coffee trees are left to the judgement of individual farmers.

The vegetation ecology of coffee forests and existing management practices at different intensities are well documented. Based on these it is possible to develop a standard management guideline for the sustainable harvest of wild forest coffee that can also serve as local interpretations by different international certification standards. These could have the potential to deliver improved economic prosperity, protect genetic diversity and wider forest biodiversity.



At a regulatory level, PFM groups, local and federal Coffee and Tea Authorities, and international coffee buyers have been collaborating through the Ethiopian Forest Coffee Forum in order to develop guidelines for sustainable coffee production and forest management (see Box 1⁴⁵).

⁴ Gole, T.W., 2003. Vegetation of the Yayu forest in SW Ethiopia impacts of human use and implications for in situ conservation of wild *Coffea arabica* L. populations. Cuvillier Verlag

⁵ Senbeta, F. and Denich, M., 2006. Effects of wild coffee management on species diversity in the Afromontane rainforests of Ethiopia. *Forest Ecology and Management*, 232(1-3), pp.68-74.

What livelihood benefits will smallholders and communities derive from the enhancement of biodiversity?

The regenerative business model ensures farmers are rewarded with premium prices for harvesting wild coffee sustainably and, in so doing, protecting the forests. As a direct result of the P4F intervention, the farmgate price has increased by 27% as per the latest technical report.

Certification systems are a mechanism to achieve better prices. In parallel, TechnoServe has been working on building a recognisable forest coffee brand that will be a larger, sector-wide, structural response that complements certification approaches. More broadly, coffee production systems in Ethiopia will contribute to achieving five Sustainable Development Goals (SDGs) (see Box 2).

Early outcomes

What positive biodiversity results have we seen to date?

The Afromontane rainforests are particularly important today as they harbour rich biodiversity including the world's greatest single repository of genetically diverse coffee varieties. The forests of Kafa alone contain over 5,000 varieties of coffee. This genetically diverse coffee has a great economic value for the global coffee industry with a report valuing the *Coffea arabica* wild genetic resource at around US\$1.5 billion⁶⁷.

⁶ Hein, L. and Gatzweiler, F., 2006. The economic value of coffee (*Coffea arabica*) genetic resources. *Ecological Economics*, 60(1), pp.176-185.

⁷ P4F has commissioned a new report to update this study (which is over 10 years old), this will be completed in 2020 and will focus on: 1) Assessing and updating the economic values of forest coffee and *Coffea arabica* biodiversity in Ethiopia. 2) Developing management guidelines for sustainable use and conservation of genetic diversity in the context of climate change and other drivers of change. This case study will be updated to reflect a summary of the findings.

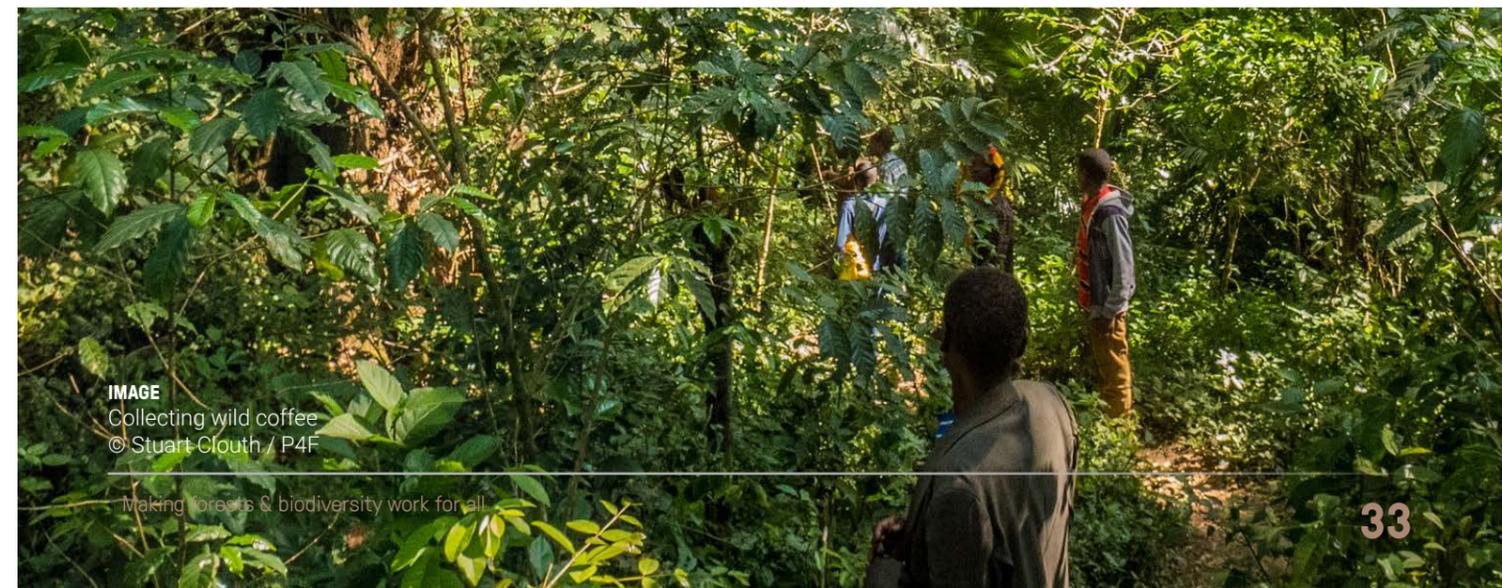


IMAGE
Collecting wild coffee
© Stuart Clouth / P4F

BOX 2**Coffee and the SDGs**

Goal 1. End poverty in all its forms everywhere: coffee related economic activities are the main source of income for 25% of the total population in Ethiopia. It is the best example for wealth distribution to people in all walks of life from coffee farmers to traditional local coffee retailers and international coffee exporters. By making the coffee supply chain green and preserving genetic diversity, sustainable economic growth can be achieved with appropriate market-based solutions that encourage such green practices.

Goal 2. End hunger by achieving food security and improved nutrition and promote sustainable agriculture: The coffee production systems are also managed for multiple products. Food crops, namely Ensete, bean, vegetable and fruit trees (avocado and papaya) are commonly produced in coffee agroforestry systems, contributing to food security and nutrition. In addition to this, beekeeping can be integrated so that farmers can make additional income from honey. Pollination by the bees in turn, can increase coffee yields by 30%.

Goal 3. Ensure healthy lives and promote wellbeing for all at all ages: Medicinal plants are also integrated into coffee crops. This system reduces environmental degradation and maintains a healthy living environment.

Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all: The coffee value chain employs many people at all levels of the supply chain, thus supporting economic growth in the regions. A higher genetic diversity in the coffee crop maximises its sustainability.

Goal 13. Take urgent action to combat climate change and its impacts: The coffee production systems in Ethiopia depend on the sustainable harvesting of coffee from forest landscapes. The industry incentivises the protection of these forests that contribute to combating climate change by sequestering carbon dioxide, filtering water and stabilising soils, protecting biodiversity and recycling precipitation.



the P4F team explored the potential impact of several forest products including honey, spices, medicinal plants and coffee to demonstrate that standing forests can generate revenue if the appropriate measures are taken to harvest these commodities. Coffee was favoured since Ethiopia is the origin of the commodity and one of the few countries in the world where it can be found growing in wild, native forests.

Indicative analysis produced promising results; forest and semi-forest coffee samples were collected from more than 100 PFMCs then roasted and cupped in a Specialty Coffee Association of America certified coffee laboratory. They were awarded cupping (taste) scores that confirmed the huge potential for high quality coffee varieties in these forests. In addition to this, a survey of 300 international coffee buyers revealed that 95% were interested in purchasing Ethiopian forest coffee.

The costs of maintaining the existing natural Afromontane forests that contain NTFPs, such as wild Ethiopian coffee, are significantly lower than the cost of restoring those forests once degraded or lost. As a result, the value derived from these NTFPs is not only linked to their sale on market but also to the non-monetary, ecosystem benefits they provide.

What positive biodiversity results do we expect in the long-term?

As the benefits from the forest coffee value chain continue to materialise, the increased revenues for local people will provide financial incentives to reduce forest loss and ensure the protection of the ecologically unique and biodiverse forest habitat. This change of behaviour will also help conserve the largest bank of wild coffee plant varieties for future breeding. With these factors in consideration, we anticipate that the scientific study commissioned by P4F will provide robust scientific and economic analysis to further support the preservation of the forest habitat and its biodiversity.

Sustainability**How sustainable is the intervention to the forest protection mechanisms?**

The viability of the business model and subsequent biodiversity impacts are dependent on farmers being able to derive economic gains from natural resources found inside the forest in a sustainable manner.

During the initial regenerative business model design,

What other livelihood benefits will smallholders and communities experience?

In addition to the increased farmgate price for forest coffee and subsequent increased incomes for local communities, further social benefits will be realised through community funds. Successful small coffee cooperatives and unions working with non-governmental organisations (NGOs) have created community funds as a result of increased coffee revenues. In setting up these funds, communities can make their own decisions with the profits they receive and can address pressing needs as determined by the members. Some examples include paving roads, funding health centres and schools and the provision of ambulance services. The forest coffee partnership encourages the development of community funds and provides farmers and cooperatives with the skills they need to establish and manage such a fund.

Scaling**How scalable/replicable is this forest protection mechanism?**

Progress to date on the Ethiopian forest coffee business model has been successful in scaling-up the forest coffee brand from idea to market. The model has also demonstrated how smallholder business models are able to achieve positive impacts on forests particularly in the absence of large commodity chains and scarce land for large-scale plantation/restoration projects. The learnings from the past three years will be used to inform the further strengthening of the forest coffee value chain in Ethiopia. To achieve this, the plan is to expand into additional forest areas while deepening efforts in existing forest by crowdsourcing additional buyers.

In Ethiopia, the regenerative business model, and subsequent benefits for communities, are highly replicable to other forest areas. Further, if we consider the value of the genetic biodiversity itself in developing commercial cultivators, its benefits could be scaled globally providing livelihood impacts for growers all over the world. For example, Panama Geisha coffee variety fetches the highest price in the global specialty coffee market. The germplasm that The Tropical Agricultural Research and Higher Education Centre in Costa Rica (CATIE) used to develop Panama Geisha variety was collected from wild coffee in Ethiopia, from Gori Geisha forest in 1950, by the Food and Agriculture Organisation of the United Nations (FAO). Close to 2,000 coffee collections were planted in a field gene bank at CATIE and researchers developed the variety from these collections. Though the genetic source originated in Ethiopia, Geisha coffee is grown in central and southern America today benefiting many growers throughout these regions and the global community of coffee consumers.

**Biodiversity snapshot****Mpingo Conservation and Development Initiative****Tanzania***Enhancing the value of standing forest*

In Tanzania, P4F is supporting the Mpingo Conservation and Development Initiative (MCDI) and the Kilombero Valley Teak Company (KVTC) to pioneer a community-based model of sustainable forest management. The regenerative business model focuses on FSC-certified timber from the mpingo tree, East African blackwood tree and other high-value timber species.

It works by creating Village Land Forest Reserves (VLFs) that incentivise forest protection by giving communities the authority to own and manage the forests around their villages. The model provides for 20 communities and 83,538 ha of forest and aims to recognise both economic and environmental values of protection.

The Miombo woodlands in Tanzania are also very important for biodiversity; supporting 364 mammal species including African elephant (vulnerable), African wild dog (endangered), African lion (vulnerable) and cheetah (vulnerable). There are also 10,000 plant species, 1,035 bird species (including the near-endemic Stierling's woodpecker) and 368 reptile and amphibian species.

MCDI AND KVTC PROJECT AREA

Sustainable community forest management ensures the secondary forest in Tanzania is protected.

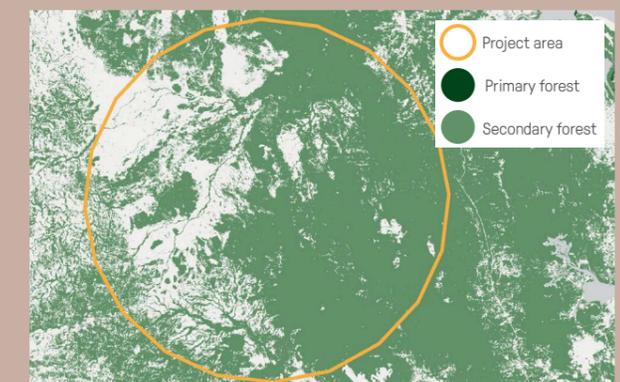


Image: African wild dog. Derek Keats via Wikimedia Commons (CC BY-SA 2.0).

2 Why ecosystem restoration is good for business

Restoring biodiverse forests – the economic, cultural and environmental aspects of biodiversity enhancement through direct seeding in Brazil.

Archetype

Creating value from forest regrowth

The challenge

Deforestation and degradation threaten Brazil's Amazon and Cerrado biomes. Between 2000 and 2015, the Amazon Biome lost more than 20 million hectares and the Cerrado more than 23 million – resulting in significant loss of biodiversity. Over the past 30 years, the Cerrado biome alone has lost 46% of its native flora and 657 species are considered bound for extinction, given the extent of forest lost to make way for agricultural production⁸.

Under its Forest Code and Nationally Determined Contributions, Brazil has committed to restoring 8 to 12 million hectares of forest by 2030. Currently, reforestation responsibility is typically owed by the mining and energy sectors, or as part of individual agreements between the Federal Public Prosecutors and farmers, in the form of environmental liabilities,

what can be considered a type of reforestation 'compensation'. These reforestation commitments are increasing demand for native tree seeds.

However, forest restoration activities face a series of barriers, both from demand and supply sides:

- Traditional methods are expensive and resource intensive;
- The actors that are responsible for or otherwise needed to embrace restoration – for instance, rural producers – lack the expertise;
- The supply chain required to meet the needs of restoration is inadequate and hindered by poor regulation, limited access to credit and poor supply of seeds in the marketplace; and
- Seed collector initiatives (these organisations produce the seeds for reforestation) struggle to overcome market and business bottlenecks and need a stronger business model to ensure they are sufficiently robust to meet future growing demand for native tree seeds.

⁸ Strassburg, B.B. et al. 2017. Moment of truth for the Cerrado hotspot. *Nature Ecology & Evolution*, 1(4), pp.1-3.

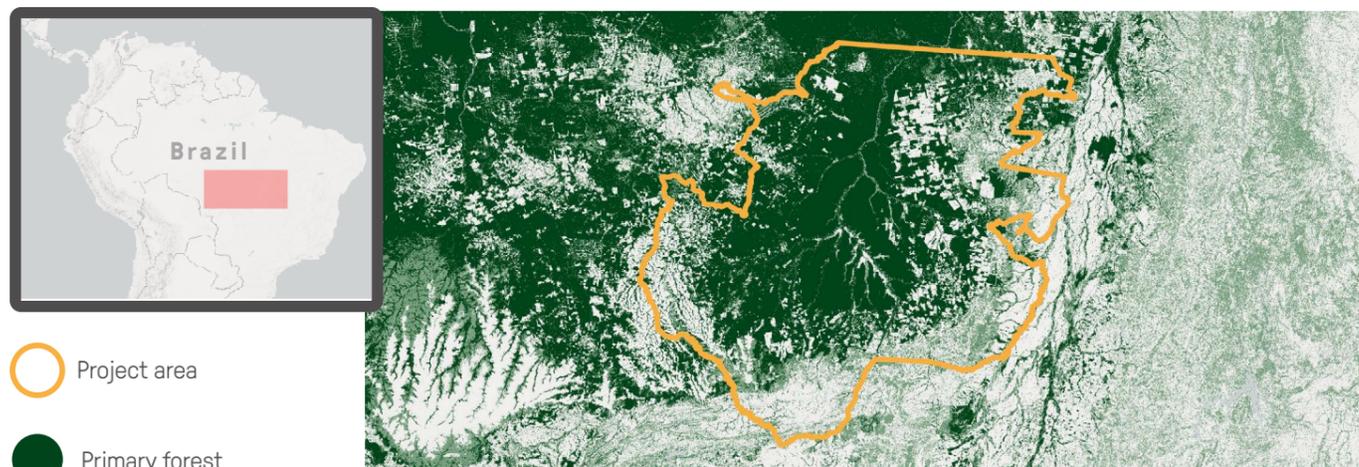


FIGURE 12
Xingu Seeds Association (ARSX) project area in Brazil

This model both enhances the value of standing forest and provides an effective method for forest restoration that overcomes some of the barriers of traditional forest restoration. Seeds from a variety of tree species are collected from primary forest in the area shown in the map above. The revenue generated through the collection of the seeds creates an incentive to protect the forest where the seeds are collected. The seeds are then used to reforest degraded areas.

BOX 3

The ARSX and Seed Paths Initiative Towards the right standard

ARSX is a network of around 500 native tree seed collectors located in the Xingu basin headwater, which stretches across both the Brazilian Amazon forest and the Cerrado biomes. Alongside seed collection and sales, the ARSX promotes an innovative technique called direct seeding (or as they call it, *muvuca*) – where a mixture of seeds from several species are planted directly in the ground – which is significantly cheaper, more efficient and has higher impact than cultivating and planting seedlings.

Seeds Path Initiative compliments ARSX by supporting the removal of some of the barriers impeding forest restoration with the support of a group of community practitioners, public and private stakeholders. The model has developed a multi-stakeholder initiative that raises awareness for the direct seeding technique as a more cost-effective solution, aiming to popularise the method among stakeholders that, either out of obligation or interest, need to restore forests.

The solution

This case study demonstrates how two complementary models supported by P4F have the potential to enhance biodiversity by improving the means and the methods to restore forest, whilst delivering economic and cultural benefits to local people.

The two regenerative business models explored in this case study are: The Xingu Seeds Association (ARSX) and the Seed Paths Initiative (see Box 3).

The ARSX business model is a socio-biodiverse supply chain which produces economic value from forest biodiversity and enhances biodiversity outcomes through reforestation. ARSX applies a multifunctional approach to the rural space⁹ in which the productive aspects of the territory, in this case, the business of seed collecting and selling, are valued alongside social and cultural aspects. Through an innovative and inclusive governance arrangement, the ARSX business model values traditional knowledge and endangered cultural heritage.

⁹ Knickel, K. and Kroger, M., 2008. Evaluation of policies in terms of the multifunctionality of agriculture and rural space: more integrative conceptual and analytical frameworks needed. *International journal of agricultural resources, governance and ecology*, 7(4-5), pp.399-418.



Biodiversity snapshot

Enabling Komaza to scale up to new regions

Kenya

Creating value from forest regrowth

P4F supports Komaza – a company aiming to ensure wood products in Kenya are produced sustainably. The model offers a source of income from micro-forestry to smallholder farmers using degraded land to harvest tree species in order to be sold as timber or fuelwood. This alternative income means forests such as the Arabuko Sokoke Forest are left standing since farmers are less likely to encroach in order to collect these items.

The Arabuko is the largest remaining piece of the coastal forests of Eastern Africa. The area is rich in biodiversity as it is made up of three different forest types. 20% of Kenya's bird species (270 species) and 30% of Kenya's butterfly species are present in the forest and it also sustains populations of endemic species such as the Clarke's weaver (endangered) and the golden-rumped elephant shrew (endangered). The forest is also noted for having a particularly biodiverse range of amphibian species. Komaza aims to increase the scope of its work to other areas.

KOMAZA PROJECT AREA

Komaza supports micro forestry projects on degraded land to create value for smallholders from forest regrowth.

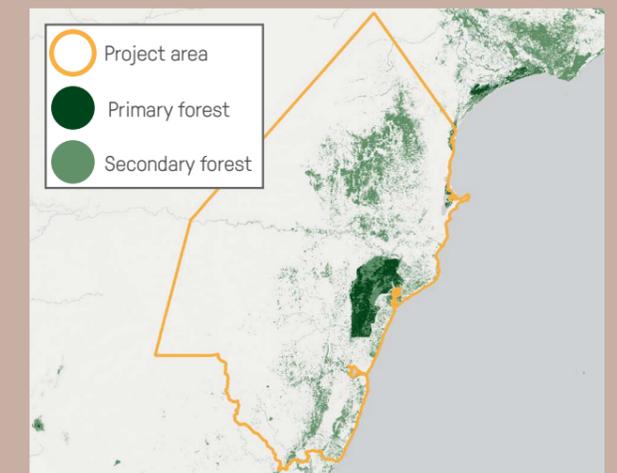


Image: A forest queen (*Euxanthe wakefieldi*).
Haplochromis via Wikimedia Commons (CC BY-SA 4.0).

P4F has supported ARSX in strengthening their business, including the revision of its governance arrangement with the collectors, which is key to the biodiversity approach of its model. P4F has also improved the network's business structure in order to increase access to markets, resulting in the restoration of 932 hectares with direct seeding in agribusiness and infrastructure business models both in the Amazon and Cerrado Biomes.

Impact to date

Relevance

How does the business model ensure the protection of forests? How does this contribute to enhanced biodiversity?

Both ARSX and the Seed Collectors Network promote direct seeding (see Box 4¹⁰) as a restoration technique that uses a mix of seeds for natural forest regeneration.

ARSX has been commercialising seeds for restoration from several localities within the Xingu and Araguaia

¹⁰ Campos-Filho, E. M., et al. 2013. "Mechanized Direct-Seeding of Native Forests in Xingu, Central Brazil". *Journal of Sustainable Forestry*, Issue 7, pp. 702 – 727, v.32.

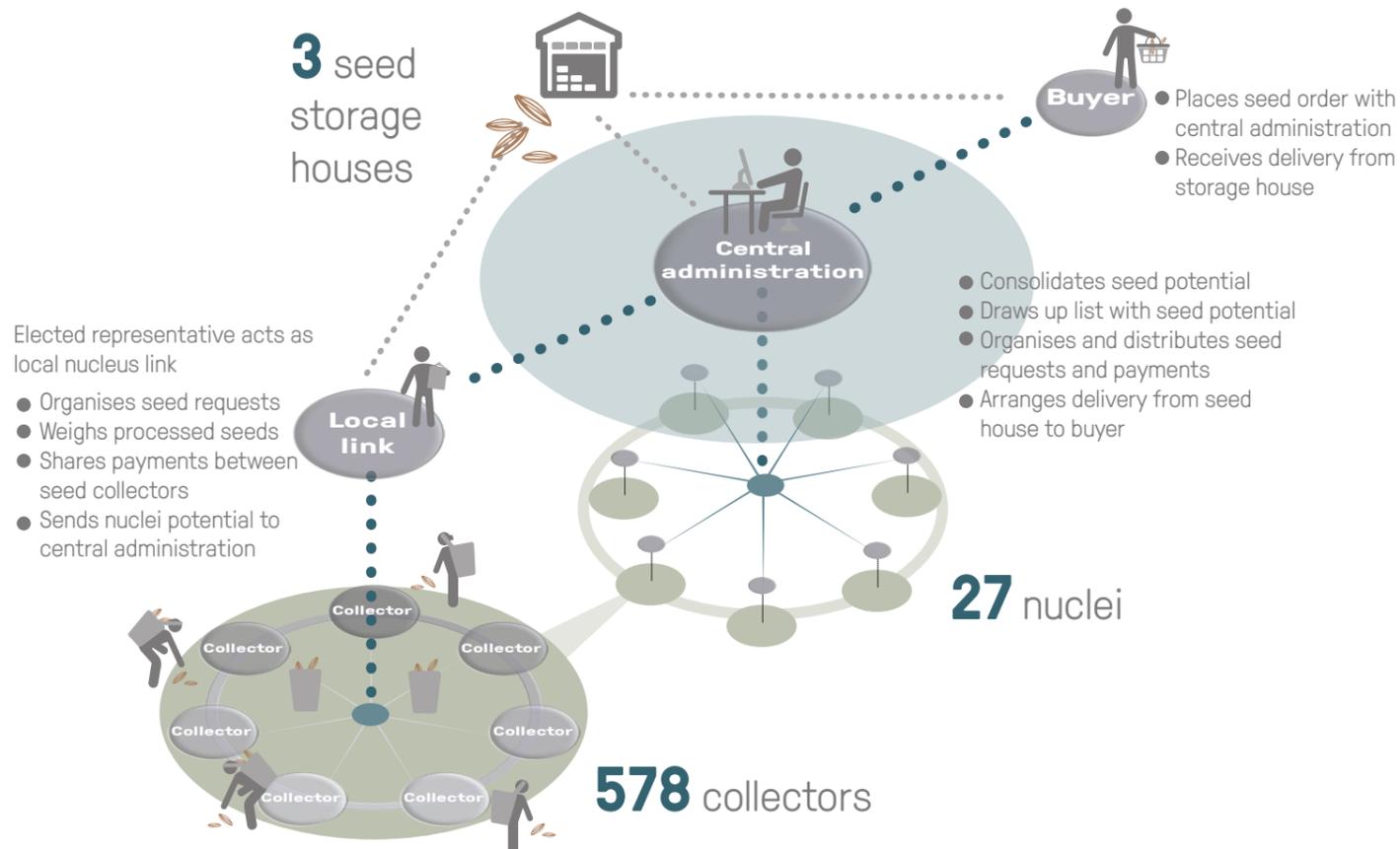
River Basins, in the central and western regions of Brazil. The association purchases seeds from 27 seed collector groups and then sells biome-tailored seed mixes. ARSX also provides technical assistance to buyers who want to reforest using the direct seeding technique.

As the seed collectors operate across different regions, when the collected seeds are mixed, this increases the genetic diversity of the species selected for restoration. Therefore, genetic diversity is introduced to different regions where restoration is performed through direct seeding using ARSX seeds. This process of mixing provides long-term genetic sustainability to the areas reforested and supports biodiversity by restoring a resilient forest habitat that supports a range of fauna and pollinators.

What is the business model governance approach?

ARSX organise the seed collectors in a decentralised nuclei model which is governed according to traditional roles within the indigenous community. The seed collectors, who comprise the nucleus, elect representatives to act as nuclei links responsible for organising seed requests, weighing processed seeds and sharing the payment between the seed collectors according to their delivery (see Figure 13). Traditional tools and straw baskets (handicrafts

FIGURE 13
The ARSX governance model



woven by indigenous women) are used to measure the volume of seed collected and associated payments to collectors.

This approach enables collectors from different parts of the forest to supply a centralised distribution system. Moreover, it directly promotes enhanced genetic biodiversity and ecosystem resilience in the restored forest.

What livelihood benefits will smallholders and communities derive from the enhancement of biodiversity?

Seed collection provides an important supplementary livelihood activity for the vulnerable communities found in the Xingu River Basin region. This area has the highest concentration of indigenous territories in Brazil, who are responsible for the maintenance of 92% of the natural forest area in the region¹¹. In addition, the region comprises 85 rural settlements of smallholders.

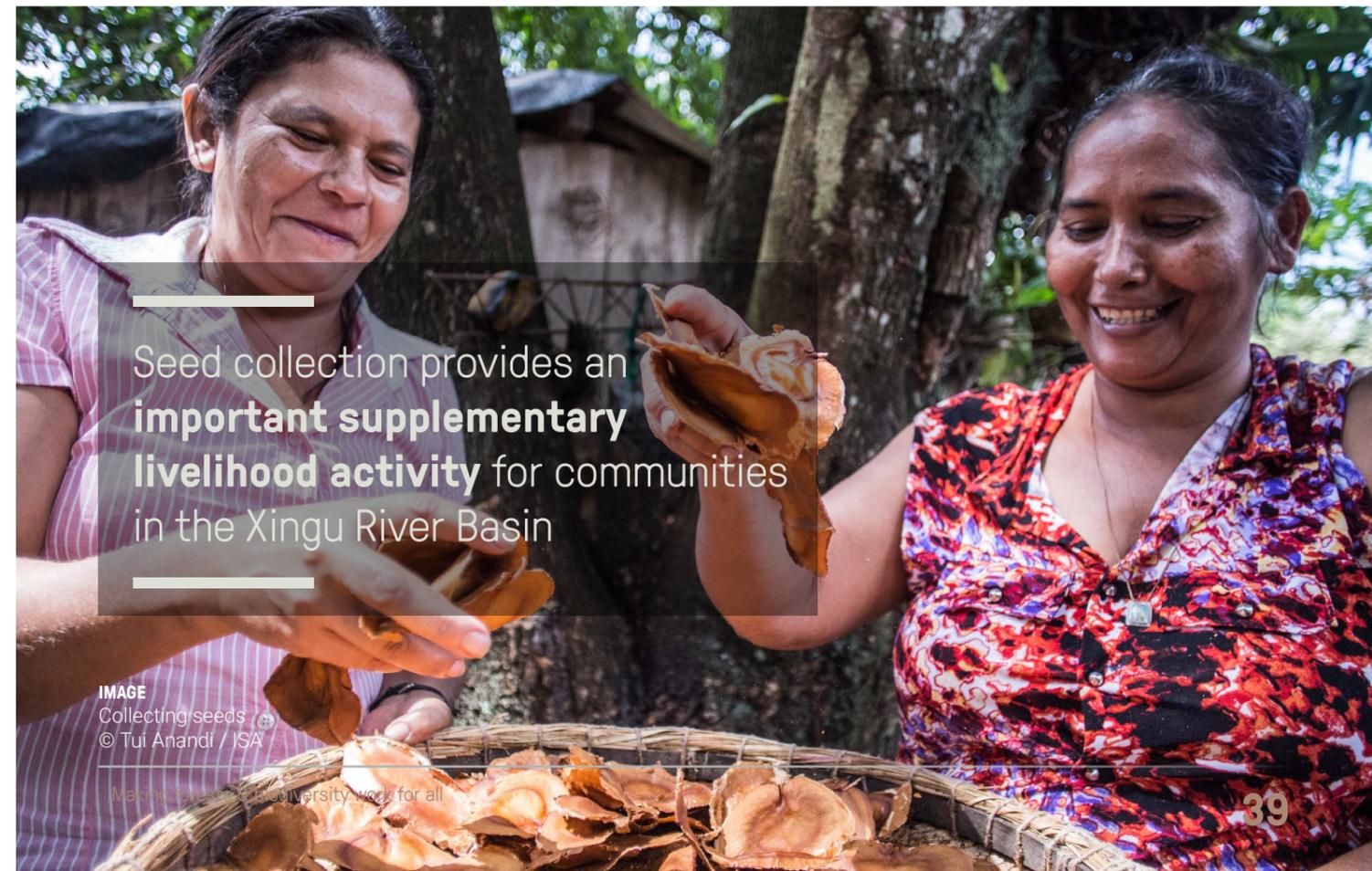
ARSX is a regenerative business model aiming to restore forests in degraded parts of the Brazilian Cerrado and Amazon by structuring a supply chain that can generate benefits to communities of seed collectors and provide good quality native tree seeds for agribusiness actors – such as soya or corn producers and cattle ranchers – that need to address their environmental liabilities through reforestation.

¹¹ URZEDO, Danilo Inácio. "Trilhando recomeços: a socioeconomia da produção de sementes florestais do Alto Xingu na Amazônia Brasileira". Masters' Thesis, 2014.

BOX 4
Direct seeding/muvuca

In Portuguese, the expression "muvuca" symbolises a lively gathering of diverse people. Its technical term, direct seeding, is a forest restoration technique based on directly planting seeds in the soil. Whereas traditional restoration involves planting young trees (an adaptation of commercial techniques for producing wood), direct seeding aims to mimic the natural forest regeneration process.

The direct seeding technique applied by the ARSX combines more than 200 native forest species. This seed mix has the potential to reproduce a thriving forest ecosystem that is much more diverse, denser, and with higher biodiversity impacts than traditional reforestation techniques. In comparison to traditional seedling-based reforestation, direct seeding is significantly cheaper (-63%), more efficient (20x more trees can be planted per day) and delivers higher impact (1.5-12x more trees per hectare).



Seed collection provides an **important supplementary livelihood activity** for communities in the Xingu River Basin

IMAGE
Collecting seeds
© Tui Anand / ISA

ARSX defines three different types of seed collectors: indigenous collectors, rural settlers and urban collectors. Urban collectors receive the largest incomes, given their proximity and their access to tools. For some of these individuals, seed collecting is their main source of income. For indigenous and rural settler collectors, seed collection supplements other livelihood activities, including subsistence agriculture, hunting and fishing. According to a 2016 study¹² the income benefits of participating in the forest seed market for one indigenous nucleus ranged from £1,900 - £2,400 in one year.

The collection and pre-processing of native seeds are deeply connected with traditional knowledge, experience and culture of each of indigenous peoples

¹² Urzedo, D., et al. 2016. Tropical forest seeds in the household economy: Effects of market participation among three sociocultural groups in the Upper Xingu region of the Brazilian Amazon. *Environmental Conservation*, 43(1), 13-23.

and villages¹³ in the Xingu and Araguaia River Basins. As such, seed collection provides a cultural, non-economic value to collectors in these communities.

Given their traditional knowledge of the forest natural cycles, the elders suggest the best time to collect the seeds. Further, identification of the best tree species and areas to collect the seeds is based on forest observation. Forest observation is attached to indigenous peoples' everyday activities and culture: hunting, fishing, travelling to other indigenous villages and preparing the space for establishing a new village (as most are semi-nomadic communities).

The traditional knowledge and cultural identity that is provided by communities' participation in seed collection can be considered as Cultural Ecosystem Services (CES) – they represent the nonmaterial

¹³ Dannyel, S.Á., 2017. "Sementes nativas que conectam o Xingú", primeira edição, São Paulo.

BOX 5
Social diversity and biodiversity

Indigenous languages are vital to help strengthen cultural knowledge, kinship and stories from generation to generation. The languages of the indigenous peoples in Brazil are deeply connected with the way they perceive and interact with each other (as individuals and groups) and with the nature and their environmental surroundings.

As indigenous peoples land is consistently under threat and the natural space that they occupy is being reduced by the expansion of the prevalent modern agriculture, they are pushed to learn and speak more in Portuguese – a language that represents their economic and social interactions

with non-indigenous people. Therefore, their traditional languages, just as the biodiversity, are also highly endangered.

ARSX provides economic incentives to help preserve communities' connections with nature and biodiversity. The Yarang women collector's movement of the Ikpeng People is a good example of the connection between biodiversity and culture. The word "Yarang" is what the Ikpeng people call the Leafcutter Ants. The name of the women seeds collector movement reflect the way the ants themselves collect leaves, flowers and seeds, as a substrate to the fungi they feed on.

Ikpeng People		Wauja People	
English	Ikpeng Language	English	Wauja Language
Flower	Ewrokgru	Flower	Opulu
Flowering	ewroktetpot	Fruit	otai
Fruit	Ewili	Collection process	
Fruiting	ewintetpot	Cleaning around the tree	awojogakatapai ataotepo
Collection process		Extract the seed from the fruit	halakakonapai ata otai
Above	Awikpot	Broken	halakakonapai
On the ground	Anumtowo	Washed	hukutakonapai
Cleaning	alingketketpot	Dried	uluhotakonapai
Drying	yumme noptowo	Drying	uluhotakonajopenei
Storing	yay wili euri	Storing	awajatakona ata otai
Transporting	yay wili antowo	Transporting	itsa

benefits obtained from ecosystems that arise through human-environment relationships. Understanding and valuing CES is of great importance because of the linkages between cultural values, valuation methods and the individual and collective decision-making that influence ecosystems and human well-being¹⁴. Thus, indigenous communities derive benefits that go beyond purely economic gains.

To increase productivity, is not uncommon to see regular technological improvements in this process. The indigenous communities are responsible for the initial processing of the seeds. Each individual species demands a specific pre-processing technique in order to improve their lifespan, avoid the attack of insects and fungi and prepare them for the replanting. In this process, indigenous communities mix the use of traditional tools (i.e. straw baskets mats and sieves, wood trimmers) with modern tools (i.e. pushcarts, knives, plastic buckets). The indigenous communities also have a specific vocabulary for these processes (Box 5)¹⁵.

Early outcomes

What positive biodiversity results have we seen to date?

Since its inception, ARSX has collected around 200 tonnes of seeds from more than 200 native species and has recovered around 6,000 ha (932 ha since P4F's support) of degraded forest along the Xingu and Araguaia Basin and in other regions of the Amazon and Cerrado.

P4F is supporting a study, to be published in 2021, that will analyse the intraspecies genetic diversity of four key restorative species for different environments. The four species (Figure 14¹⁶) were chosen due to their adaptability in less fertile soils (ideal for restoring degraded soils), resilience in water deficit conditions, growth rate and potential to attract seed dispersers. For each of these species, the researchers will collect 1,200 samples from 10 different areas, including areas restored with direct seeding, those restored through traditional seedling techniques and from natural forests. The DNA of the species will be analysed from these samples. Our hypothesis is that the genetic diversity of species in areas reforested with direct seeding, with seeds from ARSX, will be higher than in areas reforested with traditional seedlings, and higher than in natural forests.

¹⁴ Hirons, M. et al. 2016. Valuing Cultural Ecosystem Services. *Annual Review of Environment and Resources*. 41. 10.1146/annurev-environ-110615-085831.

¹⁵ Dannyel, S.Á., 2017. "Sementes nativas que conectam o Xingú", primeira edição, São Paulo.

¹⁶ Images: Cajueiro: Eric Gaba via Wikimedia Commons (CC BY 3.0), Baru: Fabricio Carrijo via Wikimedia Commons (CC BY 3.0), Jatobá: mauro halpern via Flickr (CC BY 2.0).



Biodiversity snapshot

Cocoa agroforestry restoration

São Félix do Xingu municipality, Amazon

Creating value from forest regrowth

P4F is supporting cocoa agroforestry on degraded pastureland in Pará, Brazil – the most heavily deforested area in the country. It offers a well-paying income alternative for smallholder farmers and ranchers, creating value from the remaining standing forest.

The region is important for fauna and flora biodiversity from which the farmers directly benefit through crop pollination. Protecting forests is vital for wildlife such as the jaguar (near threatened), toucans, macaws and ocelot, as they are threatened by habitat loss and fragmentation.

COCOA REFORESTATION PROJECT AREA

Cocoa agroforestry on degraded land provides an important income for local smallholders in Para, Brazil.

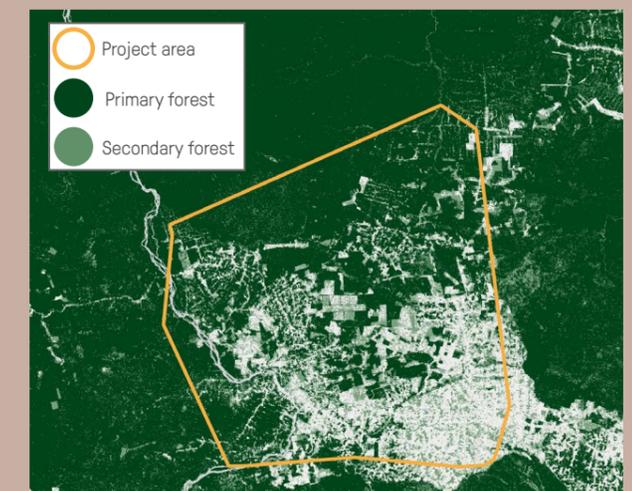


FIGURE 14
Species analysed in the scientific study



support will enable ARSX to consolidate their operation and increase livelihood benefits for collectors, through strengthened organizational capacity, logistics and market approach, and strengthened leadership capacity and governance. Once these aims have been met, the area restored with the use of ARSX seeds will continue to grow as the knowledge of the direct seeding restoration model becomes better-known by a broader audience of stakeholders.

Sustainability

How sustainable is the intervention to the forest protection mechanisms?

Traditional restoration methods demand a considerable amount of investment, both in terms of initial implementation and, later, monitoring improvements to forests. In Brazil, reforesting and monitoring one hectare using traditional seedlings is twice as expensive (~£3,896¹⁷) as planting a soy crop on the same hectare (~£1,860)¹⁸ over a three-year period.

Figure 15 shows that direct seeding not only increases the biodiversity of reforestation activities, but reduces the cost of restoration, and as such is more economically sustainable than traditional approaches. For example, on the investment side (CAPEX), reforestation seedlings cost double that of native seeds. Furthermore, as producers can use standard agricultural tools and equipment for direct seeding, operations costs are also lower using the Muvuca seeding method.

How sustainable are the livelihood benefits that smallholders and communities are receiving?

The seed collector initiatives provide the main source of native tree seeds in Brazil. These initiatives value not only the productive aspect of the rural space (by partially meeting the demand for native trees' seeds), but also understand how the seed collection work supports technological innovation, biodiversity protection, improvements in the livelihoods of fragile communities, traditional knowledge sharing, livelihood outcomes and the strengthening of social and cultural ties.

¹⁷ Estimated based on exchange rate 5 BRL = 1 GBP

¹⁸ Conab (2020) Production Cost Spreadsheets <https://www.conab.gov.br/info-agro/custos-de-producao/planilhas-de-custo-de-producao/itemlist/category/406-planilhas-de-custos-de-producao-culturas-de-1-safra>

What positive biodiversity results do we expect in the long-term?

Over the next five years, P4F will support the consolidation of the model as a profitable and independent business that will be able to scale through greater uptake of direct seeding. We expect that the Seed Paths Initiative model will further engage relevant actors within the agribusiness sector to employ the direct seeding technique, increasing the direct demand for the ARSX products (seeds and technical assistance). Additionally, we expect that P4F

Scaling

How scalable/replicable is this forest protection mechanism?

The muvuca forest restoration method is highly scalable, but this is dependent on demand. Estimates from 2014 indicate that 21 million hectares need to be reforested in order to meet legal commitments laid out in the Brazilian Forest Code¹⁹. However, farmers, among other agribusiness actors, perceive reforestation as a cost that restricts the use of land. Therefore, restoration as a business decision occurs mainly in areas that:

- Are perceived to have an objective economic value for private landowners, such as the protection of water springs and rivers;
- Are required to meet commitments by the Public Prosecutors' Offices; or,
- Are suitable to be set aside for natural restoration without a restoration cost.

In this context, efforts to increase the awareness and

¹⁹ Filho, Britaldo & Rajão, Raoni & Macedo, Marcia & Carneiro, Arnaldo & Costa, William & Coe, Michael & Rodrigues, Hermann & Alencar, Ane. (2014). Cracking Brazil's Forest Code. Science. 344. 363-364. 10.1126/science.1246663#_blank.

FIGURE 15
Estimate of seedling restoration cost in Brazil compared against muvuca (direct seeding)*



*P4F, ISA estimates, Mechanized Direct Seeding of Native Forests in Xingu, Central Brazil. Journal of Sustainable Forestry.

3 When production and conservation can go hand in hand

Protecting forests and biodiversity through corporate sustainability commitments in the High Forest Zones of Ghana.

Archetype

Agricultural produce-protect

The challenge

Ghana is the second largest producer of cocoa globally, with the sector accounting for about 60% of agricultural exports²⁰ and employing around 800,000 smallholder farmers²¹.

Cocoa production is predominant in the High Forest Zone (HFZ) which holds the largest area of remaining primary forest and produces over 50% of the country's cocoa beans. Due to low financial and technical incentives, weak land use planning and stakeholder collaboration, smallholder producers have resorted to

expanding their farms into any available land (including forest frontiers) – contributing to nearly 140,000 ha of annual deforestation in the HFZs. This agricultural expansion has left this pristine forest in a fragmented state with pockets of rich biodiversity under increased threat.

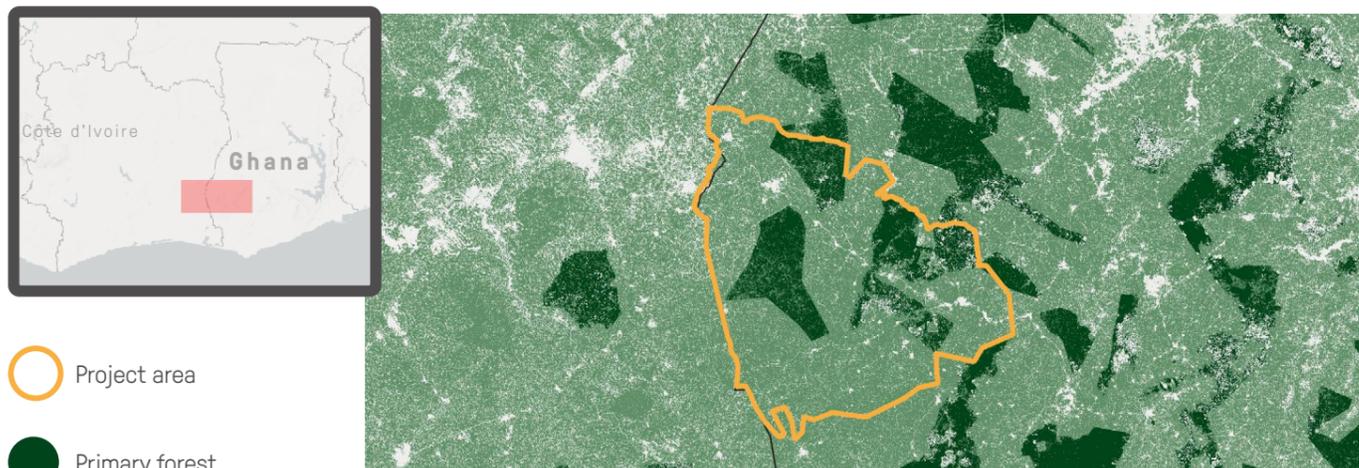
The Juaboso-Bia district landscape is a key cocoa-producing area in Ghana and has one of the highest densities of forest reserves and national parks in the Western region. Found within the Guinean Forests of West Africa, the landscape is one of the 36 globally recognised biodiversity hotspots²² and home to some of the tallest trees found in West Africa²³. The main protected areas in the district include the Bia National Park, Bia Resource Reserve and the Krokosua Hills Forest Reserve, which provide habitats for over 160

²⁰ International Cocoa Initiative: <https://cocoainitiative.org/news-media-post/cocoa-farmers-in-ghana-experience-poverty-and-economic-vulnerability/>

²¹ Ghana Cocoa Board: https://www.cocobod.gh/home_section.php?sec=1

²² Critical Ecosystem Partnership Fund: <https://www.cepf.net/our-work/biodiversity-hotspots>

²³ IUCN – Parks and Reserves of Ghana: <https://portals.iucn.org/library/sites/library/files/documents/2010-073.pdf>



- Project area
- Primary forest
- Secondary forest

FIGURE 16
Deforestation-free cocoa production project area in Juaboso-Bia Districts in Western Ghana

The agricultural produce-protect model is located in a landscape with a mix of primary forest, secondary forest and cocoa farms. The cocoa farms are owned by smallholder farmers and are distributed throughout the landscape in the map above. The model is designed to increase cocoa production without expanding into forest areas. Touton is committed to addressing deforestation in its supply chain and has taken a landscape approach to achieve this. Touton has worked with small holder farmers and other stakeholders in the landscape to improve production on cocoa farms and put in place incentives, monitoring and management systems to prevent encroachment into the forest.

Ghana's High Forest Zone holds the **largest area of remaining primary forest** and produces over 50% of the country's cocoa beans

species of birds and 62 mammal species, including the threatened chimpanzee, forest elephant and leopard²⁴.

The key challenges to protecting forests and biodiversity in this cocoa production landscape include:

- Inadequate financial incentives to enable cocoa farmers to find value in standing forests;
- Further encroachment due to low productivity of cocoa, resulting from: unsustainable agricultural techniques, ageing cocoa trees that produce lower yields and the lack of shade trees that are vital for cocoa production;
- Increasing impacts of climate change in the region which can drastically affect the quality of cocoa resulting in lower yields; and,
- Weak landscape governance to protect forests.

This has been compounded by rising global demand for cocoa that has driven prices up and thereby increased the risk of deforestation as farmers resort to clearing forests to expand their farms. The practice of clearing forest reserves for illegal cocoa farms contributes to biodiversity loss and the extinction risk of threatened forest-dependent species. It also negatively impacts cocoa production due to soil degradation and changes in micro-climatic conditions and contributes to increased carbon emissions from deforestation. In the long-term, this threatens the livelihoods of farmers and the forest-users who

²⁴ Forestry Commission of Ghana: fcghana.org/page.php?page=268§ion=32&typ=1&subs=274

depend on forest resources and creates a business risk for cocoa companies.

The solution

P4F supports a regenerative business model that aims to achieve a sustainable and deforestation-free cocoa production landscape in the Juaboso-Bia Districts of Western Ghana. The model is led by Touton, one of the main buyers of cocoa in Ghana, in partnership with the Ghana Forestry Commission, Ghana Cocoa Board (COCOBOD), the Nature Conservation Research Centre (NCRC), SNV Netherlands Development Organisation, Agro Eco-Louis Bolk Institute, cocoa farmers and communities. It has piloted a governance framework in the district to protect forests, develop a market for climate-smart cocoa, whilst supporting smallholder farmers and local communities.

The business model is currently providing farm-level support to over 17,000 cocoa farmers and is expected to reach over 23,000 farmers by 2024. The model aims to increase the productivity of cocoa farms by:

- Training farmers on climate-smart agricultural techniques such as shade-grown crops;
- Developing incentive mechanisms to reduce the risk of encroachment such as premiums and additional livelihood activities for cocoa farmers and forest fringe communities to complement cocoa revenues; and
- Raising awareness in communities on Ghana's biodiversity and wildlife laws.

BOX 6**The Cocoa Forest Initiative (CFI)**

The CFI creates partnerships between the governments of Côte d'Ivoire and Ghana and the world's leading cocoa and chocolate companies to end deforestation in cocoa producing regions through collective action. To achieve a deforestation-free cocoa supply chain, the CFI action plan focuses on:

- 1 Forest protection and restoration,
- 2 Sustainable cocoa production and farmers' livelihoods, and
- 3 Community engagement and social inclusion.

The initiative developed a public-private Joint Framework for Action to address deforestation and biodiversity conservation with one of its core commitments being **"promoting the effective restoration and long-term conservation of National Parks, Wildlife Sanctuaries, Wildlife Resource Reserves, Forest Reserves, and unprotected off-reserve forest lands"**. The commitment further prohibits the production and sourcing of cocoa from farms in National Parks, Wildlife Sanctuaries, and Wildlife Resource Reserves, except against an existing legal status. Touton was one of the first 12 signatories of the CFI and is contributing to the Joint Framework for Action.



"The surest way to achieve zero deforestation outcome in cocoa and forest landscapes is for all stakeholders and value chain actors living and working in the landscapes to work in concert in providing pragmatic solutions to deforestation. Working in silos and not at a landscape scale will only give marginal results"

Ernest Dwamena

Ghana Manager, Sustainable Sourcing –Touton

The Touton business model is putting into practice the commitments of Ghana's Cocoa Forest Initiative (CFI) which targets the restoration of Ghana's biodiversity (see Box 6). The CFI has leveraged Touton's ability to drive its restoration activities which will result in greater forest climate resilience, increased community value for standing forests and ultimately a deforestation-free landscape.

This case study demonstrates how the business model is using a landscape governance approach to provide economic incentives to cocoa farmers and local communities, whilst protecting the biological diversity within the remaining fragmented forest reserves in the Juaboso-Bia district. It equally highlights the positive relationship between corporate environmental responsibility, increased yields and livelihoods – suggesting that biodiversity protection is not only beneficial to the business value chain but also to cocoa productivity.

Impact to date**Relevance**

How does the business model ensure the protection of forests? How does this contribute to enhanced biodiversity?

Incentive creation and income diversification

To achieve a deforestation-free cocoa value chain, the business model focuses on catalysing private sector investments to bring approximately 180,000 hectares of land (including the Bia National Park and Krokosua Forest Reserve) under sustainable and improved management, while working with smallholder farmers and communities at the periphery of forest reserves, to help prevent further encroachment, improve farmer livelihoods and lift communities out of poverty.

The regenerative business model is based on Touton's incentive mechanism whereby trainings, agro-inputs (fertilisers, equipment and pesticides), premium prices and additional livelihood opportunities are conditionally attached to producer performance and compliance with climate-smart cocoa production standards. Through trainings on good agricultural practices, farmers increase the production and sale of climate friendly beans.

Additional livelihoods activities, such as the domestication of snails and grasscutters, have been introduced to offer a lucrative business venture for the diversification of farmers' income streams – reducing the need for forest encroachment and providing an alternative source of meat which reduces the risk of bush meat hunting. Producers who own illegal farms within forest reserves are excluded from all sustainability related benefits and premiums, reducing the occurrence of free-riding within the landscape.

Streamlining forest and biodiversity protection through the production of deforestation-free cocoa

Rural Sustainability Service Centres – locally known as "Akuafio Yiedie Fie" (Farmer's well-being house) – have been set up to provide a variety of services to support farmers. The Centres advise and train farmers on good agricultural practices, provide agro-inputs such as fertilisers to help increase cocoa productivity and quality, assist with rejuvenating old cocoa farms, and provide support to farmers with access to finance. Service Providers are trained and go on to engage the wider community with individual coaching and training. Additionally, Touton is training and coaching farmers to embrace agroforestry management systems, such as using shade trees, to produce biodiversity-friendly and climate-smart cocoa.

Beyond the provision of farmer incentives, disincentives such as arrests, prosecutions and fines are used to penalise non-compliance. The establishment of forest encroachment monitoring guards and committees ensures that producers comply to joint engagements and established climate-smart production standards. Touton is mapping farmers in their direct supply chain to identify and collect information on the geographic location of cocoa farms to ensure that cocoa does not come from forests in the rural area, parks and national reserves. Further, a web-based deforestation alert and monitoring system has been developed and piloted to track and provide near real time changes in forest cover.

In order to promote community awareness on the dangers of deforestation and land degradation, Touton has instituted an annual Forest Caretakers Gala dubbed "The Forest Stewardship Competition" among 42 communities within the landscape. The competition is geared toward fostering a sense of unity, ownership and commitment among communities for safeguarding their environment and ensuring production is done in a sustainable manner.

What is the business model governance approach?

Conservation targets can be impaired by a lack of capacity, resources and weak governance arrangements in public institutions. The Touton business model implements a landscape governance framework by engaging and partnering with stakeholders through Landscape Management Boards (LMB). This mechanism ensures that all stakeholders across the cocoa sector are committed to, and collaborate on, achieving deforestation-free and climate-smart cocoa by using financial incentives. This is also tied to Ghana's Emission Reduction Programme with oversight of land use management and the protection of biodiversity-rich forest reserves. Prior to the Touton pilot, activities within the landscape were largely uncoordinated and lacked sufficient funding to continue operations.

Making forests & biodiversity work for all

**Biodiversity snapshot****Rainforest Alliance-Olam Partnership for Livelihoods and Landscapes****Western Ghana***Agricultural produce-protect*

P4F is supporting the Rainforest Alliance-Olam Partnership for Livelihoods and Forest Landscape Management in Western Ghana to improve landscape governance. This area of Ghana is an important one to focus on for biodiversity protection because it includes the Sui River Forest Reserve which has been subject to illegal farming and consequently biodiversity loss. Forest management is required to reduce the further loss of biodiversity.

The reserve is home to the black-and-white colobus monkey, Royal antelope, Campbell's monkey and over 160 bird species including rufous fishing owl (vulnerable), white-breasted guineafowl (vulnerable), crowned eagle (near threatened), hornbills and spot-breasted ibis. The area also supports flora species such as African whitewood trees, natal elm and *Chrysophyllum perpulchrum* from which fruits, wood, latex and medicines are harvested.

RAINFOREST ALLIANCE-OLAM PROJECT AREA

The business model will incentivise 10,000 cocoa farmers to sustainably manage 155,000 hectares of the Sui River Forest Reserve, and so protect the 97,500 hectares of forest it contains.

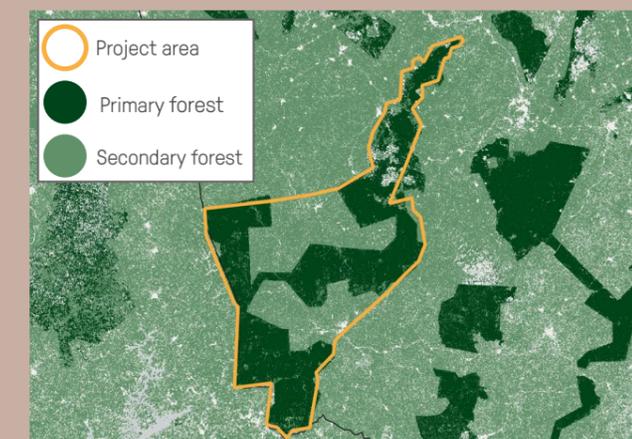


Image: Black-and-white colobus monkey
Chi King via Wikimedia Commons (CC BY-SA 2.0)

The LMB ensures that local populations benefit from landscape activities and are involved in the decision-making process. Key to the model is the understanding that cocoa farmers, traditional leaders, and local communities need to be incentivised to protect the remaining forest reserves and preserve the local habitats of threatened species. The chiefs and village leaders are the traditional authorities of the landscape and are often the custodians of local knowledge and traditions – highly influential within communities.

A community forest reserve encroachment and remediation committee (FRERCO) made up of 14 traditional authorities has been set up in the Juaboso-Bia landscape. The mission of the committee is to profile illegal farms in the forest reserves, restore degraded parts of the forest reserve and put in place a remediation action plan for evicting farmers while safeguarding their livelihoods. The role of chiefs has equally been instrumental in sensitising communities on the benefits and incentives provided, administering farm validation processes and collaborating with the Forestry Commission to address cases of defaulters.

The Cocoa Forest Initiative (CFI) has provided a regulatory framework that has allowed Touton to leverage its ability to drive restoration activities, which will result in greater forest climate resilience, increased community value for standing forests and ultimately a deforestation-free landscape which is free from every form of illegal operations. Touton implement activities that contribute to the three key priorities under the CFI framework. One of these priorities is “Investment in long-term productivity of high-quality cocoa in an environmentally sustainable manner and growing more cocoa on less land” especially through the strengthening of cocoa traceability systems at the national level. As such, Touton is committed to pursue their engagement with other partners including the governments of Ghana and Ivory Coast to develop tools and systems to improve landscape governance, assess deforestation risks whilst enhancing their forest monitoring and remediation capacity.

What livelihood benefits will smallholders and communities derive from the enhancement of biodiversity?

Around the Bia National Park, local communities benefit from the protection of forests and biodiversity through the following:

- Climate regulation and environmental resilience since forests produce ideal micro climatic conditions for cocoa production. Forests also help regulate the water supply and improve water quality whilst also preventing soil erosion from heavy rainfalls;
- Pollination and honey collection from bees which depend on the forest ecosystem;
- Income from wildlife tourism related to forest-

dependent species such as chimpanzees, pangolins and primates. The national park has also been designated as an Important Bird Area, making it a desirable destination for bird watching²⁵;

- Cultural and spiritual value from forest reserves including the Bia National Park. For some communities, forests are where ancestral spirits and gods are found and are important areas to preserve as it is believed that they protect the landscape;
- Preservation of cultural heritage as cultural taboos, customary beliefs and other traditional norms contribute to the protection of forests and use of natural resources, as sacred sites within forest reserves act as traditional conservation areas due to the restrictions in accessing the areas.

However, as not all of these benefits are directly quantifiable in terms of income, the cocoa business model aims to provide economic sustainability at the farm and household levels to provide incentives to reduce the illegal exploitation of forest reserves.

The provision of farm inputs, trainings and agroforestry systems is helping farmers expand their livelihood assets with increased incomes of up to 16%. On the supply side, beneficiaries are provided with extension services (beyond trainings and inputs) to produce food crops for household subsistence or for local sales. Women groups, for example, are engaged in the cultivation of pepper, garden eggs, okra and rice through support from Village Savings and Loans Associations (VSLAs). Vegetable farming activities take place at the household level and allow women to focus on alternative livelihoods other than charcoal collection. Additionally, the vegetables regulate the soils and make them conducive for cocoa and support the growth of micro-organisms.

Secondly, additional livelihood activities such as the production and sales of honey and animal rearing has helped to increase income channels while minimizing interests in illegal wildlife trade. The production of snails and grasscutters (cane rats) at the local market provides valuable additional income to communities and provides an alternative source of meat which slows the rate of bushmeat-incited poaching on threatened species like chimpanzees and the White-Breasted Guinea Fowl.

Early outcomes

What positive biodiversity results have we seen to date?

The project has conducted training sessions for 12,150 farmers in 367 communities on climate-smart agricultural techniques whilst raising awareness on existing biodiversity and wildlife laws. A total of 60 service providers (including 20 youth) linked to Touton's

²⁵ IUCN – Parks and Reserves of Ghana <https://portals.iucn.org/library/sites/library/files/documents/2010-073.pdf>

Rural Service Centres have been trained to restore degraded forest landscapes around forest reserves and provide support with the tree registration²⁶. So far, 15 ha of forest plantations have been established along water bodies across 11 communities. In addition, four tree seedling nurseries have been established with a total of 33,000 seedlings from six different species.

Apart from setting up six cocoa agroforestry demo farms, 1,000 ha of cocoa farms have been planted with 80,000 timber trees, including varieties such as the *Terminalia superba*, *Terminalia ivorensis*, *Khaya ivorensis* and *Mansonia altissima*. In 2019, over 200 farmers were sensitised on the concept of ‘Trees in Agroforestry’ which allows for the planting, registration and selling of mature timber trees on cocoa farms.

Additionally, Touton has raised and distributed 250,000 cocoa seedlings to support farmers with the rejuvenation of their old cocoa plantations, ensuring that they maximise the use of their replanted fields. The tree restoration schemes create a synergy between forests and cocoa farms in helping to (re) populate the varieties of insect pollinators (bees and butterflies) necessary for the fruiting of cocoa pods.

The Forest Stewardship Football Cup which rallies over 5,000 people from 145 communities has contributed in creating widespread awareness on the dangers of deforestation while strengthening collective community engagement. The 2019 edition was advertised on Ghana’s most listened radio stations to educate the public on the need to protect forests.

As a result, farmers are increasingly becoming aware of the ecosystem services provided by trees in mitigating climate change risks, reducing the rate of rainfall variations and drought, in addition to their long-term economic benefits. Producers are learning about how forests can improve soil and water conservation and protect biodiversity currently under threat due to traditional farming practices.

A registry has been opened at the landscape level for illegal farmers to self-register and be supported with remediation plans for moving out of the forest reserve. So far, a total of 3,000 farms from 31 fringe communities have been registered with the Forest Remediation Committee, demonstrating that farmers support and are committed to ensuring successful implementation and restoration of degraded parts of the forest reserves.

²⁶ Touton CFI Progress Report (2020) https://touton.com/images/resources/Reports/200331-CFI-TOUTON_Narrative_CFI_Progress_Report_GH_final.pdf



Biodiversity snapshot

Sustainable sourcing coalition for the protection of Bukit Barisan Selatan National Park

Indonesia

Agricultural produce-protect

P4F has aligned with other organisations including the Wildlife Conservation Society, to help protect the UNESCO World Heritage Site of Bukit Barisan Selatan National Park and its communities.

The park is a globally important habitat for critically endangered Sumatran elephants (with 25% of the global population), Western Sumatran rhinoceros (with 17-24% of the global population) and Sumatran tiger (with 25% of the global population). Other animals present in the park include the Malayan tapir (endangered), siamang gibbon (endangered) and sun bear (vulnerable). Nearly one third of the park has been deforested for coffee plantations and, at the current rate of agricultural expansion, the park would lose a further 25,000 ha of forest by 2050. The P4F business model is working to prevent this by protecting the remaining forests with a secure one-mile buffer zone. It is within this zone that more than 2,000 coffee farmers source their robusta coffee yields sustainably and will benefit from an average income increase of up to 20%, producing 26,000 tonnes of verified deforestation-free coffee.

SUMATRAN COFFEE PROJECT AREA

To protect this primary forest reserve a productive coffee buffer zone has been secured.

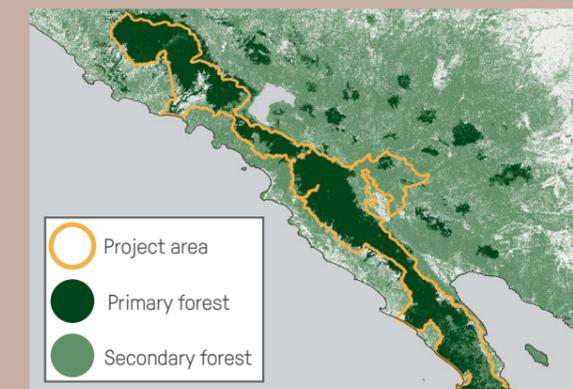


Image: Malayan Tapir
Tambako The Jaguar via Flickr (CC BY-ND 2.0).

What positive biodiversity results do we expect in the long-term?

It is expected that the deforestation-free cocoa production landscape with the Juaboso-Bia district pilot will be successful and will expand to other cocoa-producing regions leading to an overall reduced pressure on the remaining forest. The Forest Reserve Remediation Committee, made up of chiefs and local community executives, will collaborate with the COCOBOD and Forestry Commission to evict all illegal farms from forest reserves in order to increase restoration and natural forest regeneration. The evicted farmers will be given trainings and support on alternative livelihoods to ensure they are lifted out of poverty.

For the communities within the landscape, particularly those on the periphery of forest reserves, the livelihood benefits and access to finance will continue and will result in cocoa farmers focused on improving production on their fields instead of encroaching into nearby forests. It is also expected that the cocoa agroforestry techniques and the climate-smart cocoa standard will be implemented by all farmers in the landscape, which will increase productivity and quality, and will produce resilient climate-smart cocoa.

Sustainability

How sustainable is the intervention to the forest protection mechanisms?

Catalysing sustainable finance

The Touton-led regenerative business model will ensure that the continued management of the landscape governance approach is financially sustainable as it will set up a sustainable cocoa landscape finance mechanism (SCLFM) to strengthen collective action, and finance landscape governance within the deforestation hotspots of Ghana's High Forest Zones.

The SCLFM will provide a platform that will attract concerted efforts from other private companies in solving landscape problems. Companies, through their CFI commitments have demonstrated their willingness to incentivise smallholders through performance-based payments related to ecosystem protection. In this regard, Touton have already signed partnership agreements with other private cocoa companies including Mondelez, Mars and Ferrero, to fund and operationalise landscape governance systems under a framework for emissions reductions beyond the Juaboso-Bia Landscape into neighbouring Asutifi Asunafo and Sefwi Wiawso landscapes. The private investments secured by the SCLFM will enable the protection of the remaining forest reserves while delivering socio-economic benefits for local communities.

In the future, the investments mobilised by the SCLFM

and its scaling into wider landscapes will lead to increased outcomes for carbon sequestration. The project is expected to sequester over 1.2mt of carbon emission – providing a huge opportunity for the development of carbon markets and thus greater forest resilience.

Development of climate-smart cocoa standards

Touton and other cocoa companies envisage a 100% transformation of their sourcing landscapes into certified climate-smart cocoa landscapes. To be able to make independent verifiable claims for climate-smart cocoa sourcing, Touton and other private cocoa sourcing companies are planning to develop a national climate-smart cocoa standard with the Government of Ghana and civil society. This will involve introducing a climate-smart cocoa manual as well as on-farm services rendered through Touton's Rural Sustainability Service Centres (RSSC). Climate-smart cocoa practices, as envisioned under this initiative, will go beyond current certification practices to make the connection between the adoption of climate-smart practices and credible, performance-based emissions reductions.

Enhancing the cocoa value chain

Streamlining forest and biodiversity protection has been vital in securing and expanding Touton's operations within the Juaboso-Bia landscape. By transforming their cocoa value chain through sustainable sourcing, Touton have considerably reduced risks associated with their business and secured the supply of climate-smart cocoa through the trust they have gained in working with community farmers and the extensive logistical networks set up in the landscape. This growth is equally evidenced by an increase in Touton's investments, particularly through the creation of three new business entities (Nananom, Eliho and AYF limited) to commercialise sustainability services to producer communities. The RSSC provide an opportunity for all supply chain actors to benefit and sustainably secure the cocoa supply chain for many years to come within the project area.

How sustainable are the livelihood benefits?

The governance mechanisms enhanced through the Touton-led business model will ensure livelihoods are supported in the long-term and will further strengthen the local community's resilience and adaptability to climate change. Additional incomes from livelihoods will also be reinvested into business ventures – enabling farmers to expand their businesses and secure their livelihood base.

Touton will explore livelihood diversification activities within the Juaboso-Bia landscape to develop sustainable economic revenue streams which are compatible with cocoa. An assessment conducted in adjacent landscapes on Non-Timber Forest Products (NTFP) species and international market opportunities

suggests that NTFPs could significantly augment and diversify incomes amongst cocoa communities in a sustainable, climate-smart and biodiversity-friendly manner²⁷.

The livelihoods and resilience of smallholder cocoa farmers has been enhanced by work with COCOBOD to identify old or diseased farms that require rehabilitation. The group has identified 430 outbreaks of the cocoa swollen shoot virus disease (CSSVD), which was affecting 5,656,534 trees. Currently 614 ha of cocoa farms have been treated and 687,164 diseased trees have been removed.

Scaling

How scalable/replicable is this forest protection mechanism?

CFI's vision for Ghana is to eliminate deforestation and degradation from Ghana's forest landscapes with several private companies adhering to this vision, including Touton. Within the Juaboso-Bia landscape, companies are merging their efforts to scale-up. The scale-up phase will include a geographic and operational expansion of the project into neighbouring landscapes – specifically Sefwi Wiawso and Asunafo -Asutifi. This will further increase the beneficiary base and generate higher social impact and positive biodiversity impact.

For the scale-up to happen, however, a financial vehicle to attract and engineer investments beyond the Juaboso-Bia area is needed. This is where the SCLFM – an upcoming enabling mechanism that P4F is incubating – will come in to support wider stakeholder action to scale and replicate results into other landscapes.

By demonstrating the potential of producing sustainable and deforestation-free cocoa, cocoa companies are paving the way for others in cocoa (as well as other sectors) to implement similar regenerative business models in regions where agricultural expansion is usually responsible for deforestation and biodiversity loss. The development of a climate-smart cocoa standard has the potential to become a Ghana Standard and be scaled out across the broader Ghana's Cocoa Forest REDD+ Program landscape.

²⁷ Internal technical report submitted by Touton to P4F.



Biodiversity snapshot

Initiative for Sustainable Landscapes

Kenya

Agricultural produce-protect

P4F is supporting the Sustainable Trade Initiative (IDH) with an innovative livestock production model as part of a wider effort to restore and protect the biodiverse Mau Forest Complex; Kenya's largest closed-canopy montane forest. The regenerative business model aims to conserve 100,000 hectares of South West Mau Forest by 2030. Livestock grazing, unsustainable resource extraction and land conversion has seen the forest reduce by more than 25% in 20 years. The model aims to incentivise farmers with efficient production systems and better access to markets whilst ensuring herd control; thereby protecting the forest.

These forests are rich in biological diversity. Although closed-canopy forests cover only 1.7% of Kenya's total land area, they host a disproportionately high percentage of the flora and fauna species (40% of the mammal species, including 70% of the threatened mammal species, and 30% of the bird species, including 50% of the threatened bird species). Mammals found in Kenya's mountain forests include species of international conservation interest, such as the black rhino (critically endangered), mountain bongo antelope (critically endangered), African elephant (vulnerable), and the African leopard (near threatened).

MAU FOREST PROJECT AREA

Kenya's remaining Mau forest is protected by working with farmers to provide incentives for sustainable cattle ranching.

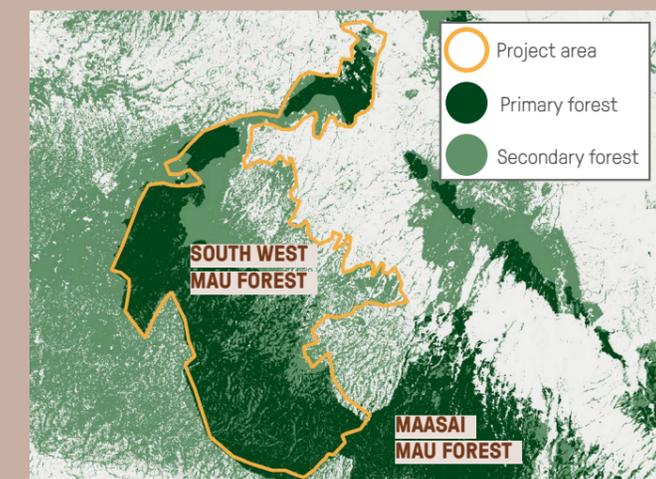


Image: Mountain bongo antelope skeeze via Pixabay.

4 Why landscape governance is necessary for people and biodiversity

Protecting critically endangered wildlife in the Bukit Tigapuluh (BTP) Landscape in Indonesia

The challenge

Sumatra's deforestation crisis started in 1985 when the production of palm oil began rapidly spreading across the island. Logging for pulp and paper production and coal mining soon followed. Since the 1980s, individuals from other islands have also flocked to Sumatra to set up small-scale farms. Between 1985 and 2014, the island's forest cover plunged from 58% to 26%. While Indonesia's laws attempt to protect against illegal deforestation, law enforcement has remained weak on the ground, making Sumatra an inherently difficult place for conservation.

One of the areas in imminent threat is Thirty Hills or Bukit Tigapuluh. The 400,000-hectare landscape is home to the last remnants of lowland tropical forest in Sumatra and one of the world's most precious ecosystems that is home to elephants, tigers, and orangutans. Around half of the forest has been lost over the last 20 years and the wildlife populations are

threatened by poaching, human-wildlife conflict and habitat loss. It is estimated that only 120 elephants, 170 orangutans, and 30 Sumatran tigers—all of them critically endangered—exist in the remaining forest.

A lack of enforcement and systems to monitor the landscape hinder its protection. Until recently, there has also been a lack of alternative, sustainable business models to create economic incentives for protecting the remaining forest.

The solution

P4F has championed two key regenerative business models (see Box 7) that support the transformation of the BTP landscape (see Figure 16) into a production-protection ecosystem. The models align with the Indonesian Government vision to protect the area as part of the ambitious RIMBA Corridor: an on-going large-scale conservation programme that aims to establish an ecosystem corridor spanning the width

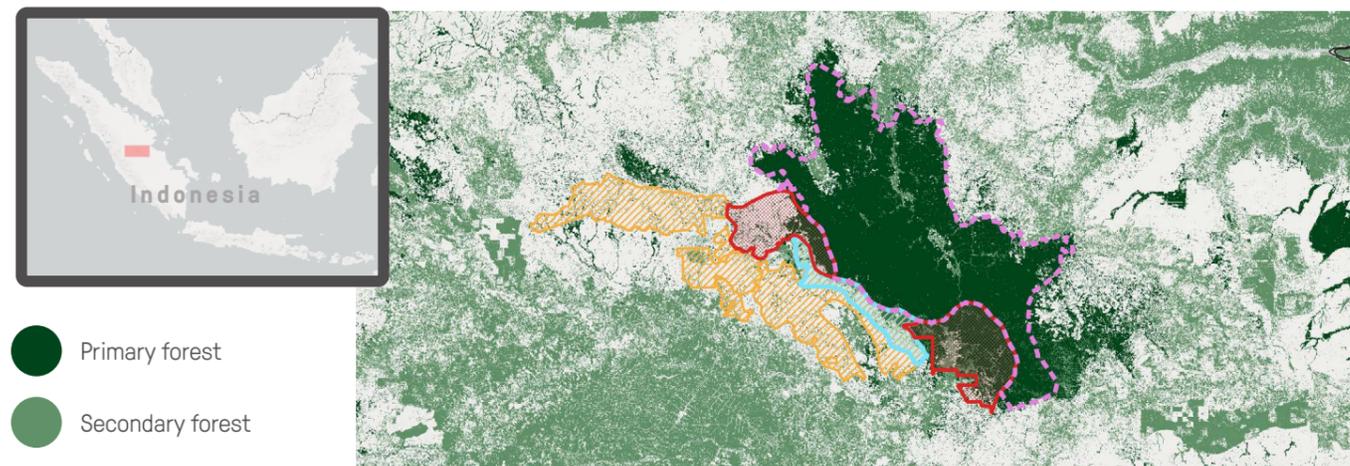


FIGURE 17
The Bukit Tigapuluh landscape in Jambi province, Sumatra, Indonesia

This is a produce-protect model that takes a landscape approach. Rubber trees are being planted on degraded land in the RLU concession areas. The rubber production concessions border a national park comprising a large area of primary forest that is suffering from encroachment. A Wildlife Conservation Area (WCA) has been established between the rubber concessions and the national park. Forest in the WCA is being protected and restored. This protection activity both provides protection to the national park and creates a corridor for wildlife that connects forested areas. This sustainable rubber model has resulted in the project partner benefitting from green finance and market leadership.

BOX 7

Regenerative business models found in the BTP landscape



Sustainable natural rubber

A pioneer integrated sustainable rubber plantation run by PT Royal Lestari Utama (RLU) and designed to attract capital through impact oriented and long-term funding sources that support landscape rehabilitation projects with clear environmental and social benefits. In parallel with these activities, RLU supports the protection of remaining natural forest and endangered species in their concession area through creation of a Wildlife Conservation Area.

Forest honey

Forest honey has the potential to be a profitable business for ecosystem restoration concessions across Indonesia, while also generating a fair and steady income for local communities. By allowing forest communities to secure a sustainable livelihood from standing forests, they are incentivised to help prevent forest degradation and deforestation. P4F supports the creation, management, and supply forest honey in Indonesia. This honey is collected by local communities from Sialang trees found inside the ecosystem restoration concessions (ERCs).



IMAGE
Collecting honey in BTP

of the island of Sumatra. The corridor will connect the fragmented habitats of endangered wildlife (mainly Sumatran elephants, tigers and orangutans) that have previously been disturbed by roads, rapid urbanisation and agricultural expansion in the landscape of Riau–Jambi–Sumatera Barat (RIMBA), central Sumatra, Indonesia.

To support its vision, P4F has been working with critical forest stewards in the landscape (see Box 8). The approach highlights how multiple stakeholders can coordinate work to protect forests in Indonesia by creating economic incentives that are conducive to forest conservation. By setting up a governance arrangement to monitor the protection, efforts will go towards protecting endangered wildlife in the region and helping the government to meet larger conservation and emissions goals.

BOX 8

Key actors and their roles in the BTP landscape

P4F-supported partners

PT Royal Lestari Utama (RLU) established in 2014, is a Joint Venture between Barito (one of Indonesia’s largest land managers) and Michelin (French tire manufacturer). RLU manages a rubber concession of approximately 89,000 ha with an Industrial Plantation Forest (HTI) license spread across two landscapes in Indonesia; ± 18,000 ha in East Kalimantan and ± 71,000 ha in Jambi province, Sumatra, the latter situated within the broader Bukit Tigapuluh Landscape.

Frankfurt Zoological Society (FZS) is an international conservation organisation, focusing on preserving wildlands and biological diversity. FZS runs the BTP wildlife conservation programme, which started as a project to reintroduce orangutans into the wild and has scaled into elephant conservation, community development, education, and forest protection.

Warsi is a non-profit organisation that carries out community assistance activities in and around forest communities in Sumatra, Kalimantan and Papua. In the BTP landscape they lead the Landscape Protection Forum that brings together multiple actors in the landscape to coordinate forest and wildlife protection issues.

Impact to date

Relevance

How does the business model ensure the protection of forests? How does this contribute to enhanced biodiversity?

P4F supports key companies and NGOs to implement regenerative business plans and act as forest stewards of the BTP landscape. To protect the remaining forest, a mosaic of business models are being implemented – from a socially inclusive sustainable rubber plantation managed by RLU, to businesses that create value from standing forest, such as wild honey collection in the PT ABT ecosystem restoration concession.

RLU is pioneering an innovative model in nature conservation while at the same time has developed a socially inclusive rubber plantation. These activities

Other landscape actors

PT Alam Bukit Tigapuluh (ABT) is an ecosystem restoration concession jointly owned and managed by World Wildlife Fund (WWF) and FZS. The company focuses on restoring deforested concession areas, setting aside sections for local and indigenous communities to generate income, and support the forestry operations, all while protecting the forest to help both nature and people. The concessions consist of Blocks 1 and 2, covering a total area of 38,000 ha. Block 2 is heavily degraded and is targeted to become the wildlife habitats for especially two main endangered species: the Sumatran elephant and Sumatran tiger.

Eyes on the Forest is a coalition of environmental non-governmental organizations founded in 2004 that investigates actors behind illegal logging, forest encroachment, and fires. The coalition disseminates investigation data to downstream companies who buy commodities (e.g. palm oil, pulp) from growers, as well as government agencies that manage and oversee forests. In Sumatra, its network includes KKI Warsi NGO who manages social forestry areas of 165,000 ha around Jambi, West Sumatra, and East Kalimantan provinces.

Bukit Tigapuluh National Park is a protected forest managed by the Indonesian Central Government. Established in 1995, the 140,000 hectare National Park is home to 30 Sumatran tigers, 120 Sumatran elephants, and 160 Sumatran orangutans.

will transform a heavily degraded landscape into an economically viable area yielding sustainably produced rubber. Remaining forested areas in the concession have been voluntarily set aside for ongoing conservation. The High Conservation Value²⁸ (HCV) and High Carbon Stock²⁹ (HCS) methodologies were used to distinguish areas marked for protection from areas marked for production³⁰.

P4F supports RLU and partners to manage this innovative approach in order to develop a responsible business that includes protecting its endemic wildlife

28 HCV approach helps to identify and protect important natural and social values such as intact forests, rare and endemic species and habitats, vital ecosystem services, and cultural sites.

29 HCS is a methodology that distinguishes forest areas for protection from degraded lands with low carbon and biodiversity values that may be developed.

30 The assessments indicated the presence of 51 wildlife species protected under Indonesian regulation PP No.7/1999, 38 species under CITES Appendix II and 180 species under the IUCN Red List. RLU classifies these conservation areas as “No-Go” zones – areas which will not be developed. In total, the No-Go areas represent 18,370 ha or 26% of the total concession area.

populations. The support includes enabling partners to establish and restore a Wildlife Conservation Area within the landscape which is critical for linking two important areas of the BTP landscape: PT ABT blocks 1 and 2. The conservation area will also act as a buffer zone between areas allocated for economic production and the BTP National Park (see the blue area in Figure 17).

P4F is also supporting the development and implementation of a ‘Human-Elephant Conflict Mitigation Procedure’ that will reduce wildlife conflict in the conservation area. Conflict between humans and elephants has claimed the lives of both humans and wildlife in the landscape and has caused significant economic damage. The elephant population in the BTP landscape represents one of only two remaining large elephant populations in central Sumatra with long-term survival potential. Introducing mitigation measures should help to reduce the frequency of human-elephant conflicts and ensure their long-term presence in the landscape. The Wildlife Conservation Area has now been incorporated into the draft national 10-year Elephant Conservation Plan.

BOX 9

Enhancing the value of standing forest by establishing a forest honey value chain

PT ABT has developed a detailed business plan and established a MoU with Javara, a market access player that offtakes the honey at a premium and sells in high-end supermarkets. A pilot is now testing the quality, quantity, market demand and operating model to see if ABT honey can be fully commercialised. Training and sales from the honey pilot provide improved safety conditions and additional income to honey harvesters. Also, the pilot products include QR codes on the honey jars that allow customers to see the process of local communities harvesting and processing the wild honey.





Bukit Tigapuluh is home to the **last remnants of lowland tropical forest** in Sumatra and one of the world's most precious ecosystems

In addition to the sustainable rubber plantation and Wildlife Conservation Area, P4F has supported ecosystem restoration concessions (areas bordered in red in Figure 17) situated at both ends of the corridor to establish new regenerative business models. These models help to enhance the value of the remaining standing forest surrounding the national park, thus incentivising its protection and the biodiversity that it hosts. Box 9 shows the results of a pilot to establish a forest honey value chain in the ecosystem restoration concession.

What is the business model governance approach?

This complex production-protection landscape with multiple stakeholders requires an effective landscape governance mechanism that provides incentives for all stakeholders to protect and conserve the remaining forest and biodiversity that depends on it.

The BTP Landscape Protection Forum (see Box 9) has been established as the central mechanism to coordinate the governance of the landscape as a whole. It is responsible for coordinating all elements of forest and wildlife protection through forest enforcement, conflict resolution for communities and corporates and law enforcement for illegal deforestation and poaching in the landscape.

In addition to the Landscape Protection Forum, RLU has developed a Landscape Protection Plan (LPP) that provides a framework to support actors across

the landscape and align stakeholders' business practices and protection efforts with RLU's. The LPP was established to incorporate clearly defined social and environmental objectives and safeguards in conjunction with a landmark US\$95 million loan to help finance the project.

What livelihood benefits will smallholders and communities derive from the enhancement of biodiversity?

The partnership will enhance the livelihoods of more than 50,000 people across 18 villages in the landscape by providing improved incomes from the production of legal and sustainable rubber and NTFPs found in the existing forests. The partnership will also provide training to locals that want to be involved in forest restoration and protection activities.

These alternative livelihoods help to address the small-scale deforestation and biodiversity loss caused by villagers encroaching into remaining forested areas to expand their smallholdings. Later in 2020, P4F is expecting to support a Community Partnership Program (CPP), designed by RLU to promote socio-economic inclusion and environmental sustainability within its concession, notably by developing out-grower schemes, and other livelihood strategies to support the economic empowerment of local communities.

Progress against the LPP and CPP is tracked and

verified annually by a third-party specialist consulting firm and the results published publicly.

Early outcomes

What positive biodiversity results have we seen to date?

A 9,700 ha Wildlife Conservation Area has been established on the concession as a buffer to the Bukit Tigapuluh National Park. The area is a critical habitat for tigers, elephants and orangutans amongst other endangered species and will also help to protect the southern border of the National Park from further encroachment and degradation. In addition, RLU has set aside all HCV, HCS and riparian areas in the concession representing approximately a third of the entire concession.

Furthermore, the Wildlife Conservation Area (WCA) will improve connectivity between the two ERC concessions at the north and south end of the area, and through the provision of alternative livelihoods that will help to reduce pressure on both blocks.

In May 2018, a ground-breaking partnership agreement amongst 28 key local stakeholders for joint protection of the landscape was signed. The agreement comprised a diverse group of stakeholders including private sector actors, local governments and law enforcement agencies, the Indonesian Ministry of Environment and Forests, NGOs and indigenous community leaders all committing to work together to coordinate forest and wildlife protection issues.

What positive biodiversity results do we expect in the long-term?

Despite a local context that presents many social and environmental challenges, the business model has made major progress, particularly with the creation of a consultation and inclusion programme for local communities, the shrinking of illegal deforestation practices in the territory, and the protection of nearly 10,000 additional hectares dedicated to providing a wildlife corridor.

Over the next few years, RLU plans to:

- Achieve long-term protection of the identified HCV and HCS areas through maintenance and protection of buffer zones to avoid encroachment and continued engagement with local communities;
- Improve ecosystem services across the concession, particularly the availability of drinking and irrigation water; and,
- Increase and improve the habitat for elephants and all other wildlife contained in their concession e.g. tigers and orangutans.

By 2033, RLU expects to restore about 4,500 hectares of degraded forest in the WCA and in other set-aside areas on the concession. Forest regrowth will be encouraged either through natural growth or active restoration. Tree nurseries (see Figure 23) in the WCA have been established to grow saplings of endemic tree species prior to their planting.

The ERC is also working to create a brand of honey from the area to be a recognised premium brand in



The Wildlife Conservation Area is a **critical habitat for endangered species** and protects against further encroachment and degradation

Indonesia. Working with local community members, they plan to increase production to two to five tonnes per annum, providing a sustainable source of income to fund the ERC's operations and increase the household income of those involved in the honey value chain by 20%.

Sustainability

How sustainable is the intervention to the forest protection mechanisms?

In 2017, RLU received the first tranche of a 14-year sustainability bond issued by the Tropical Landscapes Finance Facility (TLFF). The release of the funding is conditional on the production of climate-smart, wildlife friendly, and socially inclusive natural rubber. The &Green fund – a fund that aims to prove that financing inclusive, sustainable and deforestation-free commodity production can be commercially viable and replicable – has purchased US\$23.75 million of the notes issued by the TLFF and developed a key performance indicator (KPI) framework linked to the investment that defines the baseline, milestones and outcome targets for the delivery of the environmental returns. Should these KPIs on landscape protection continue to be met, the active commercial plantations in the RLU concessions will continue to be financed and WCA will continue to provide a buffer zone to encroachment into the national park.

A business-as-usual scenario in which the WCA (and associated forest protection mechanisms) was not created would have caused significant impact to the landscape, including:

- Continued encroachment and forest loss within the concessions and Bukit Tigapuluh National Park;
- Continued encroachment and forest loss within the ecosystem restoration concessions;
- A lack of connectivity for wildlife within the RIMBA Corridor, leading to decreased ecosystem viability, habitat loss, and lower viable populations of key major species such as elephants and tigers, as well as uncontrolled poaching;
- More forest loss through fire and easy access from the logging roads;
- A continued lack of community awareness of environmental impacts leading to greater environmental damage through poor land use practices and wildlife conflict/poaching; and
- Continued social conflict as encroachers stake further claims.

In relation to the ecosystem restoration concession, once the forest honey value chain is fully established, the revenue is expected to cover approximately one third of its overall operating costs (including costs of

conservation efforts for the area), thus contributing to a more sustainable business model and ongoing forest conservation activities.

How sustainable are the livelihood benefits?

Alternative livelihood schemes that incentivise communities to avoid clearing the forest for agricultural activities have been established. These include smallholder rubber production and sale of vegetables to RLU. The CPP includes the building of community houses, schools and health clinics and the business model aims to improve the livelihoods of 16,000 people in 20 people in Jambi and East Kalimantan. In sum, the model aims to:

- Create employment opportunities for planting, maintenance, tapping and milling, estimated to reach approximately 16,000 people;
- Provide enhanced livelihoods for local communities through the planting of a joint venture rubber plantations within the concession estimated to reach 7,000 hectares, or 3,500 smallholders at an average of 2 hectares each; and,
- Provide market access for existing smallholder rubber farmers through direct purchasing by RLU.

The positive impact derives from the continuous and more resilient livelihoods from reforestation and regeneration-based adaptation activities along with sustainable smallholder cultivation, the majority of which will come from local and indigenous communities.

Scaling

How scalable/replicable is the forest protection mechanism?

The Tropical Landscapes Finance Facility was founded by the United Nations Environment Program (UNEP), World Agroforestry Centre, ADM Capital and BNP Paribas to bring long-term finance to projects and companies that stimulate green growth and improve rural livelihoods. All investments made by TLFF are impact focused featuring improved management of forests, biodiversity, and ecosystem services. TLFF and partners expect the financing of this first sustainable landscapes bond to become a replicable template for other sustainable landscape projects in Indonesia and other tropical forested countries in the next few years. Furthermore, TLFF partners are applying the lessons learnt in the setup of the BTP investment to other funds in pipeline projects financing sustainable land use. For example, UNEP is partnering with Rabobank and the Dutch Government to set up the AGRI3 fund that aims to attract US\$1 billion in private and public capital towards sustainable, deforestation-free agricultural production. Similarly,

key investors in the model – &Green – have been developing an investment pipeline of sustainable land use projects building on their experience in the Bukit Tigapuluh landscape.

Separately, P4F is exploring how it can replicate lessons learned in establishing the forest honey supply chain to other ERCs in Indonesia. The operating principles of ERCs are similar across the country, whereby the management and conservation costs could be met by establishing regenerative business models for NTFPs found within the concession. P4F

has a pipeline of a further 6 ERCs with an area of over 300 thousand hectares – all of which overlap with biodiversity hotspots – that could be conserved by replicating the lessons learned in the BTP landscape.

How scalable/replicable are the livelihood benefits?

In a similar manner to the forest protection mechanism, the livelihood benefit and other social commitments made as a condition to the investment in the sustainable rubber plantation will be translated to other future investments made by the business model's investors.

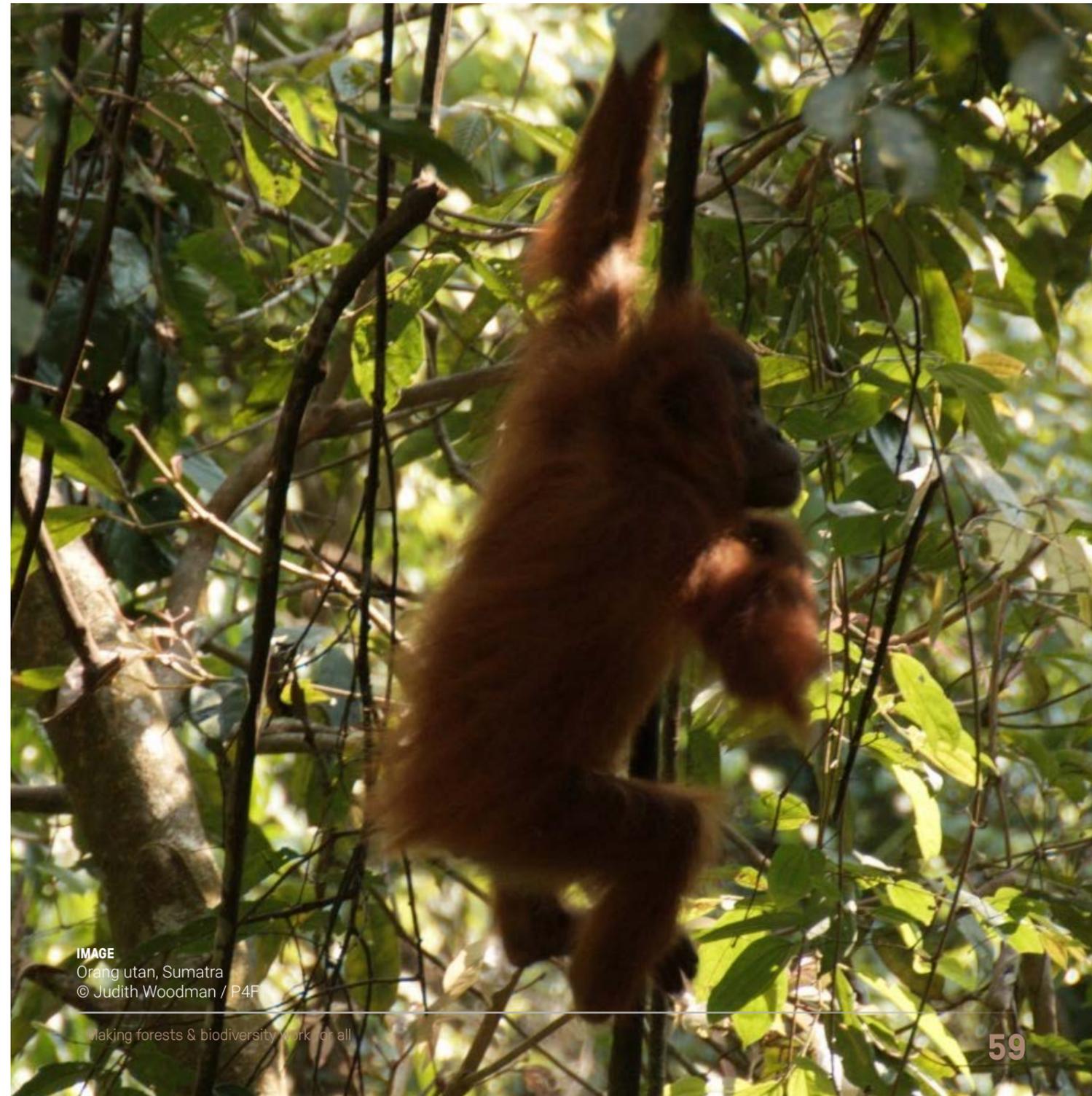


IMAGE
Orang utan, Sumatra
© Judith Woodman / P4F

Common threads:

what we can learn from successful regenerative business models?



Common threads: what we can learn from successful regenerative business models?

Drawing from five years of programme operations we have compiled lessons and recommendations for (1) project developers and private sector companies, (2) policymakers and donors, and (3) investors looking to maximise the impact of nature-based solutions for people and for biodiversity.

Recommendations for project developers and private sector companies

1 Lesson: Formal partnerships between all actors involved are essential for establishing successful collaborative nature-based solutions.

These take time and need to be set up with an agreed MoU that sets out the terms of the collaboration and ensures all parties are aligned and know their roles and responsibilities. Project developers are well placed to guide parties in forming meaningful partnerships and map out key actors that need to be involved – from private sector companies through to community cooperatives and government actors. For example, in the Touton cocoa landscape in Ghana a formal MoU was created to bring all the relevant stakeholders in the business model under a shared framework for collaboration.

Recommendation: Invest time in creating and formalising partnerships that meet the needs of all from the onset.

2 Lesson: Understanding the forest transition curve and business model archetypes are a useful starting point for delivering positive biodiversity impacts.

Our GIS analysis in Chapter 2 shows that since biodiversity and forest health are closely linked, by protecting and restoring forest project developers are

likely to deliver positive biodiversity impacts. However, to maximise for biodiversity impacts, developers must also explicitly build this into their business plans, land use planning and monitoring. Focusing on the forest frontier may have the greatest potential to conserve biodiversity.

Recommendation: As a first step, devote time and resources to collect and analyse data, information and local information to identify the most appropriate strategy/ archetype according to the forest landscape. To maximise impact explicitly, build-in good land use planning and monitoring into business plans and budgets.

3 Lesson: Local communities and indigenous people that live in and around forests are critical forest guardians, with unrivalled knowledge and cultural ties to the landscape.

Private sector companies operating in forest landscapes must ensure that local people are consulted, engaged in the process and incentivised to protect the forest and its biodiversity. For example, in Brazil the direct seeding restoration technique depends upon the cultural knowledge and expertise of the

indigenous seed collectors. Indigenous communities pass down knowledge over many generations about the different tree species in the forest and where to collect their seed. This knowledge equips them with the skills to gather a biodiverse mix of seeds for restoration.

Recommendation: Work to achieve true collaboration with forest dependent communities in a way that harnesses their local knowledge and ensures they receive an equitable share of the benefits from sustainable forest economies.

4 Lesson: Biodiversity outcomes are of interest to consumers – building brands, building QR traceability and using social media to tell the story of sustainable forest products such as honey and forest coffee are great ways to raise consumer awareness.

For example, Javara, a market off taker of the forest honey gathered from the BTP landscape, uses QR codes on its branded honey jars to allow customers to see the process of local communities harvesting and processing the wild honey.

Recommendation: Capture and communicate your company's biodiversity impact to consumers in a way that appeals to their hearts and minds by connecting them with the source of the product through transparency and traceability.

5 Lesson: Awareness raising for biodiversity in forest business models should be a core business concern and how the private sector can profit from biodiversity sustainably.

The case of forest coffee in Ethiopia shows us how these positive biodiversity impacts can directly benefit business while also producing a public good. Forest coffee benefits local communities who receive a premium price, whilst the formalisation of this value chain ensures the protection of wild coffee genetic resources that are invaluable for disease resilience.

Recommendation: Look for alignment between your business and biodiversity outcomes and use metrics to quantify the value of biodiversity to your business model and as a public good.

Recommendations for policymakers and donors

6 Lesson: Managing landscapes for biodiversity outcomes is complex.

It requires landscape governance approaches that foster individual action through to collective action, and engage national governments, traditional authorities and communities. In addition, it requires supporting policies, commitments and regulatory frameworks that encourage biodiversity positive land use and the required reporting and monitoring systems. However, in order to achieve transformative change for forests and biodiversity, scale is important. Individual companies can do their part but if multiple partners are able to collaborate, benefits can be greater than the sum of their parts – as demonstrated in the Ghana cocoa and BTP landscape case studies.

Recommendation: Policymakers and donors should implement policies, regulations and programmes that support sustainable landscape governance at scale.

7 Lesson: Blended finance and donor support is required for private sector companies who are willing to be the pioneers of change.

Many of them are developing and piloting the regenerative business models required to enhance biodiversity in production landscapes, but they need additional technical support and funding to take their ideas over the line. In the case of the green bond investment in sustainable rubber in the BTP landscape in Indonesia, blended finance from the &Green Fund via the TLFF was facilitated via P4F's work to secure a wildlife corridor and a first loss guarantee provided by USAID. Donor and public money is essential in these complex deals in an emerging asset class of nature-based solutions.

Recommendation: Donors should direct funding to companies that are incubating the solutions of the future and use their funding to

ensure biodiversity outcomes are maximised.

8 Lesson: There are a huge number of approaches to nature-based solutions that can deliver benefits for people and planet, but many of us still work in silos.

There is a real need for collaborative sharing of lessons and experiences between project developers, companies, investors, government and NGOs. For instance, in the case of cocoa in Ghana, the CFI has played a critical role in providing a multi-stakeholder platform for collaboration between national governments, cocoa companies and civil society.

Recommendation: Policymakers and donors should support initiatives that foster lesson sharing beyond the normal suspects.

9 Lesson: The market for project developers and incubators needs to expand.

Project development is difficult – it requires specialist knowledge, experience and resources. For example, all the business models featured in this report have only been realised through the local expertise of the P4F team and their partners and through established tools and processes to support idea development. Grant funds provide partners with the resources they need to overcome specific barriers – but these need to be targeted and additional. To accelerate the transition to regenerative business models the market of project developers and incubators needs to be strengthened and expanded.

Recommendation: Donors and impact development funders should increase the availability of funding for development and incubation services, to provide companies

with the right support they need to do differently. Increasing the volume and variety of project developers working in the nature based solutions space will enhance competition and increase value for money.

Recommendations for investors

10 Lesson: Investing in nature-based solutions as an asset class is still very niche.

Pioneering intermediaries play a critical role in structuring these investment deals but there is a need for rapid upskilling, knowledge sharing and enhanced understanding of the investment risks and opportunities presented within nature-based solutions. For example, &Green's investment into the RLU rubber concession in Indonesia represents one of a handful of investments the fund has made, representing an important case study for other investors looking to move into this space.

Recommendation: Investors should build relevant knowledge in this area in order to better screen for risks and opportunities. Those leading pioneers that have already made investments in nature-based solutions should share their learnings with others in the investment community.



IMAGE
Tapping rubber
© Hick Duarte

Annexes

TABLE 1
Value add of biodiverse ecosystems

Pollination	Pollination by domesticated and wild bees, flies, butterflies and other insects equates to between US\$235-577 billion worth of annual global food production (Forbes, 2019). Without pollinators, at least 39 globally produced crops would see a decline in production. The US\$100m cocoa industry benefits from the pollination services provided by the 'little midge', (<i>Cecido-myiid</i> , <i>Ceratopogonid</i> midges), which pollinates the cacao plant; a service worth US\$5.7 billion.
Disease regulation	Biodiverse ecosystems mitigate the spread of infectious diseases such as Hantavirus, a zoonotic pathogen (TEEB, 2011 and Witkowski, 2015). Galetti et al (2015) studied the effect of biodiversity loss and the occurrence of Hantavirus <i>spp</i> in the Brazilian Atlantic rainforest. In areas where large fauna had been eradicated, Hantavirus occurrence increased. Also, the pharmaceutical industry depends on biodiversity to derive components for medicines such as aspirin, atropine and quinine.
Resilience to natural disasters	The natural resilience of ecosystems to weathering or ecological disturbances is being reduced due to biodiversity loss. This is important for businesses because when the environment does not have the capacity to bounce back after damage (e.g. floods, fire, drought), commodity production can suffer.

BOX 10

A case-based approach to understanding P4F's biodiversity impact

Four detailed case studies will be presented in the following chapters. These cases are evaluated by an adapted version of the framework devised by P4F's independent Evaluation Manager (EM). P4F's EM have identified impact pathways through which they see the changes in P4F's overall theory of change happening. For the purpose of understanding the biodiversity impact of our interventions, we will focus presenting evidence against two of these pathways:

- 1 Targeted producers' performance and livelihood benefits, with a focus on smallholders and communities.
- 2 Forest/landscape actors and governance systems at different scales, with a focus on their capacities and management systems to protect the forest.

Case studies will be structured around the following questions based on existing evidence:

Relevance:

- How does the business model ensure the protection of forests is undertaken and how does that have the potential to contribute to enhanced biodiversity?
- What is the business model governance approach and how does that have the potential to contribute to enhanced biodiversity?
- What livelihood benefits do smallholders and communities derive from the potential enhancement of biodiversity in the project areas?

Early outcomes:

- What positive biodiversity results have we seen to date?
- What positive biodiversity results do we expect over the long term?

Sustainability:

- How sustainable is the intervention to the forest protection mechanisms that are delivering the enhanced biodiversity?
- How sustainable are the livelihood benefits that smallholders and communities are deriving from the enhanced biodiversity?

Scaling:

- How scalable/replicable are the forest protection mechanisms and therefore the potential enhanced biodiversity?
- How scalable/replicable are the livelihood benefits that smallholders and communities are deriving from the potential enhanced biodiversity?

Limitations of the methodology

This report is based on analysis of existing open source GIS datasets and project information provided by the P4F programme and its partners. The case studies combine qualitative and quantitative data to build a narrative case study structured around a common methodology.

Biodiversity enhancement is not embedded into P4F's programme design – as P4F is primarily concerned with forest protection and enhancement – as such the positive impact cases in this report include both direct and indirect results. Forest protection and enhancement is the mechanism delivering the biodiversity in many cases.

Making
**forests &
biodiversity**
work for all

