Prosperous Forests

A research report commissioned by the Food and Land Use Coalition

November 2019

The **Food and Land Use** Coalition

COVER:
Antônio Bento de Oliveira walks through regenerating forest in search of Brazil Nut trees in the community legal reserve of the Vale do Amanhecer settlement, Brazil.
Marcelo Camargo/Agência Brasil

Teferi-Ufa coffee forest, Kafa Biosphere Reserve, Ethiopia
Stuart Clouth/P4F

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Acknowledgements

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We would like to thank Partnerships for Forests for providing significant input into this report, in particular the identification and profiling of the examples of best practice case studies. Partnerships for Forests is a UK government funded programme that seeks to catalyse investments in which the private sector, public sector and communities can achieve shared value from sustainable forests and sustainable land use.

By creating market-ready "Forest Partnerships" that offer an attractive balance of risks and benefits for the private sector, public sector and communities, the programme aims to mobilise significant investment, principally from the private sector. The programme is implemented by Palladium, McKinsey & Company, SYSTEMIQ Ltd and partners and is funded by the UK Department for International Development (DFID) and the Department for Business, Energy and Industrial Strategy (BEIS). It currently operates in Central, East and West Africa, Southeast Asia and Latin America.

The geospatial analysis conducted for this report to determine the size and geographic location of the tropical "forest frontier" was conducted by the World Resources Institute, led by Liz Goldman. In addition, this work was essential in categorising and quantifying the current land categories within the forest frontier.

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This report constitutes a collective view of the Food and Land Use Coalition. FOLU Core Partners and those who reviewed the document endorse the general thrust of the arguments made in this report but should not be taken as agreeing with every finding or recommendation. The institutions with which the Food and Land Use Coalition are affiliated have not been asked to formally endorse the report.

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UKaid from the British people

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Foreword

The Food and Land Use Coalition

Neither the United Nations Sustainable Development Goals nor the Paris Agreement targets will be reached without keeping tropical forests and other ecosystems abundant and intact. Indeed, there is no pathway towards the Paris goals considered by the Intergovernmental Panel on Climate Change (IPCC) that does not assume a near-immediate halt in forest conversion and significant forest restoration over the coming decades.[1] Achieving this is critical to avoiding runaway climate change and its immense consequences for all life on earth.

The Food and Land Use (FOLU) Coalition's recent *Growing Better* report[a] demonstrates emphatically that there does not have to be a trade-off between strengthening food security, tackling climate change and protecting biodiversity. However, for the local individual, choosing between protecting forests or expanding human activities involves very real trade-offs, and so protection of forests must be tangibly incentivised. The *Growing Better* report, therefore, proposes a combination of public and private actions. Options for regulators include stricter land use planning, pricing of externalities such as greenhouse gas emissions, expanding protected areas and indigenous peoples' territories, and effective law enforcement. Private action includes investments in innovative business models, which both protect forests and create alternative sources of income for local communities.

This paper focuses exclusively on the *private* strategy and is written to inspire action by demonstrating that innovative forest business models not only exist across the tropical belt, but also hold significant latent potential. This report deliberately uses the term "regenerative" to describe these business models in order to move beyond traditional sustainability approaches. Sustainable practices, by definition, seek to maintain the same state. In contrast, regenerative models recognise that natural systems are already deeply impacted and hence seeks to renew – or "regenerate" – the productivity of these systems.

This paper provides a detailed and varied catalogue of 25 case studies from around the tropical belt, grouped into three business "archetypes". It describes in detail the barriers which entrepreneurs currently face when establishing their regenerative businesses in a tropical forest landscape, and provides a set of structured recommendations, focused on private sector actors, for increasing their scale and impact. The report is primarily written for farmers, forest stewards and other land holders that have an interest in engaging in regenerative business models across the tropical belt, but have not yet made the transition. In addition, it targets key players in downstream areas of the value chain, such as commodity traders, financers, industry associations and marketing and sales specialists. Finally, it hopes to be a relevant read for policymakers that are looking at specific ways to regulate and support this sector.

The world faces a remarkable opportunity to transform food and land use systems over the next ten years. Simply put, not choosing to take this opportunity will make the SDGs and Paris Agreement targets unreachable, make extreme weather events an inevitability and hasten the loss of yet more of the world's irreplaceable and priceless biodiversity. Contrastingly, creating diverse, productive and climate-resilient forest economies is one effective step towards bringing climate change under control, safeguarding natural diversity, ensuring healthier diets for all, and drastically improving food security. There is no time to lose.

For more information, please visit our website at **www.foodandlandusecoalition.org**

a. The recently released Food and Land Use (FOLU) Coalition *Growing Better: Ten Critical Transitions to Transform Food and Land Use* report, to which the findings of this paper contributed, outlines a wider set of solutions for forests – from implementing large-scale payments for ecosystems services schemes such as REDD+, to establishing deforestation-free supply chains to massively increasing levels of transparency and accountability throughout food and land use systems. This paper's "sister" publication on public policies – Public Sector Measures to Conserve and Restore Forests: Overcoming Barriers (World Resources Institute, 2019) – collates decades of research and analysis to outline a detailed set of policy recommendations.

Executive Summary

There is an unprecedented case for urgent and radical transformation of humanity's food and land use systems, and particularly how they impact tropical forests.[b] Protecting and restoring tropical forests is a significant and complex challenge: one which requires a multitude of interventions, involving a wide variety of actors. This report examines the specific role of nature-based "regenerative business models", and how these can be implemented at the frontier of human development and standing tropical forest. The evidence presented, and real case studies showcased, demonstrates the potential for change. Diverse and inspiring regenerative business models already exist, but the window to deploy them is closing fast. This paper demonstrates what is needed now: an immediate and rapid scale-up of these models over the next decade, to help cover 600 million hectares of some of the world's most valuable and vulnerable land by 2030.

The world must focus efforts on the most vulnerable 20 percent of remaining tropical forests. Regenerative business models are most effective where the impacts of human development and resource demand meet the forest edge. Using satellite imagery to isolate forest loss "hotspots," this paper identifies 600 million hectares of the tropical belt which is already exposed and vulnerable to further exploitation and deforestation. This area includes around 20 percent of remaining tropical forests. It is in this region that regenerative business models have the potential to be most impactful over the course of the next decade – the 21st century tropical "forest frontier". Given limited time and resources available, focusing on this zone is proposed here as a highly effective strategy to "seal off" the forest frontier and hence protect the vast riches of forest lying behind it.

Regenerative business models provide an invaluable contribution: tangible socio-economic incentives to halt deforestation and promote restoration at a local level. There is no one-size-fits-all approach to tackling the global deforestation and restoration challenge – a wide variety of context-driven solutions are needed. Perhaps most importantly, these solutions must be applicable at the local level. Public interventions are a proven and irreplaceable solution for forest protection and restoration at scale. In addition, regenerative business models in tropical forests can provide a critical, and complementary, part of the answer by enabling forests to become more valuable standing than destroyed, in both economic and social terms. Regenerative business models acknowledge that natural systems are already deeply impacted and hence seek to renew, or "regenerate", the productivity of the natural ecosystem through building a value-creating proposition. They are crucial to the overall portfolio of solutions because they can provide sustained, market-driven socio-economic incentives and thereby secure long-term security at local scale.

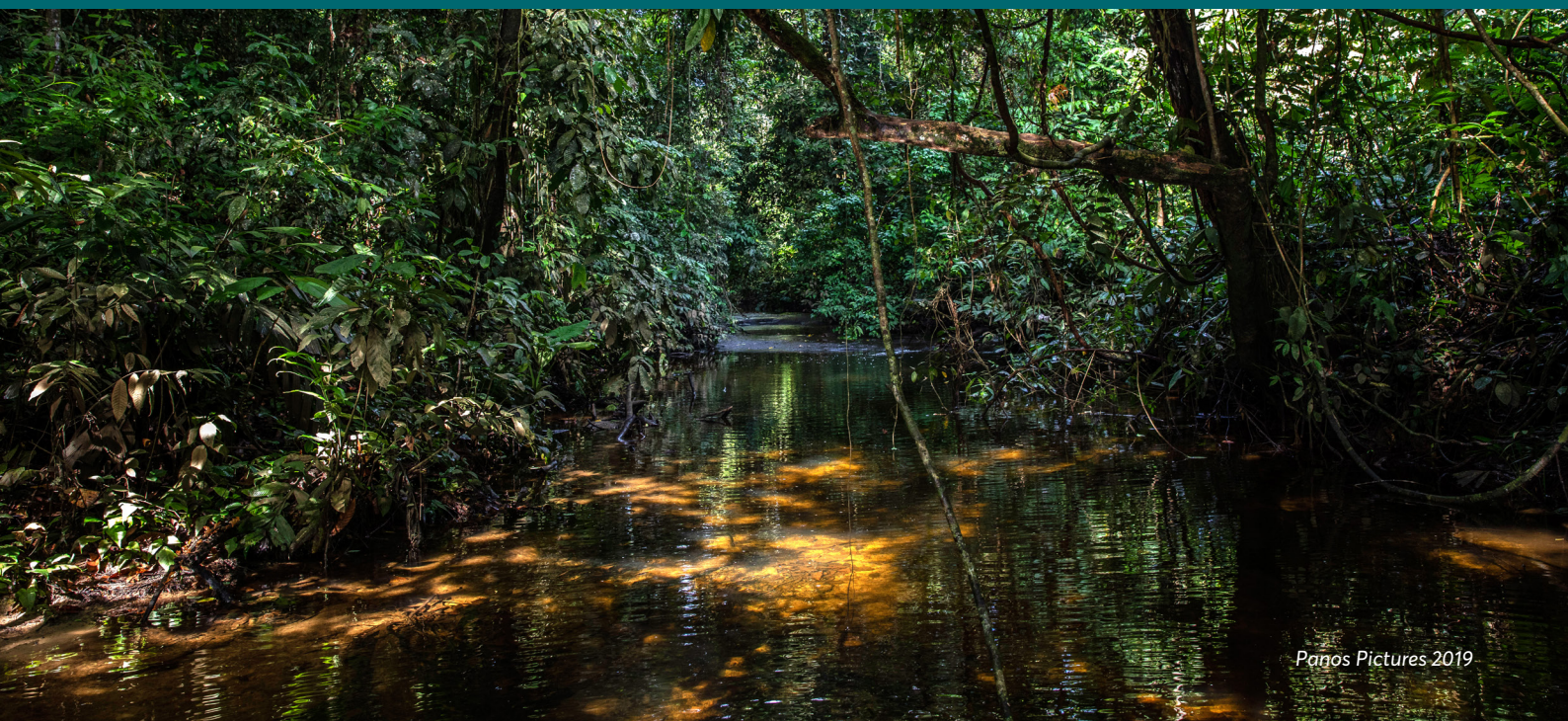
b. See, for example, the Food and Land Use Coalition's recent report *Growing Better: Ten Critical Transitions to Transform Food and Land Use* in which research for this paper was also included.

When considered collectively, existing regenerative business models already demonstrate the emergence of a new economic sector. The more than 200 case studies and examples examined for this paper demonstrate that action is not only possible but is already taking place. Business models which create value from standing forest, forest regrowth, or enable sustainable agricultural production are already being established across the tropical belt. Even within today's often challenging or prohibitive political and regulatory contexts, a diverse, innovative and evolving set of businesses exist which are proving that protecting and restoring forests can provide real financial returns, create transformative social impacts and deliver multiple environmental benefits. Taken together, these models represent the early growth of a new asset class of investment opportunities, and one which readers of this document have the chance to explore. The challenge now is to take this nascent sector and massively and urgently scale it up.

Although the signs are positive, regenerative business models will need to grow at more than 20 percent per annum to 2030 to effectively secure the forest frontier. Despite their potential, many models remain nascent and require an urgent strengthening of market, policy and fiscal support. Particularly prevalent obstacles include weak and unsupportive policy frameworks, entrenched mindsets and behaviours, lack of information and data available to key actors, and restricted access to the right types of capital.

This report lists 10 recommendations that aim to inspire a clear set of actions from its readers: that business actors reach out directly to the entrepreneurs and pioneers referenced here and establish new, exciting and competitively advantageous collaborations. These recommendations set out clear ways to create change and seize these regenerative opportunities: opportunities to create diverse, productive and transparent supply chains; opportunities to invest in ecosystems to hedge against risk, increase resilience and generate new value streams; opportunities to incentivise and motivate new behaviours; opportunities to uncover untapped value through nature-based innovation; and opportunities to work with a new, motivated and skilled set of local actors. Implementing these recommendations internally – from establishing natural-capital KPIs for all employees to setting out ambitious zero-deforestation land use plans across supply chains – will allow readers to take a leadership position that leaves competitors with no option but to shift to best practice.

In their more than 100-million-year history, there has never been a more important decade for the future of tropical forest ecosystems. Together, readers have the chance to positively and permanently impact the future of these ecosystems – and begin doing so with immediate and urgent effect.



Panos Pictures 2019

Recommendation summary

FOR FARMERS, FOREST STEWARDS, LAND HOLDERS AND THEIR INVESTORS

Establish businesses focused on ecosystem restoration and protection and leverage all value streams to improve returns and cashflow timings. Nature-based business models that place restoration and protection of natural capital at the centre of their value proposition offer the chance to generate a diverse and integrated set of revenues, across different timescales. In this way, natural production systems can provide effective diversification to reduce the risk exposure to production and market fluctuations to which monocultural production systems are vulnerable.

Partner with local communities to reach markets for their regenerative products. Indigenous groups and other local communities are major land holders across the tropical belt and have unique knowledge of the value of this environment and how to manage it sustainably. However, unfamiliarity with business approaches, and lack of access to markets, present significant challenges for these groups to create viable businesses. So-called "market access players" can help unlock the value chain, and hence provide forest foragers and farmers with market opportunities.

Secure land tenure and sustainable intensification services for local communities. Across the tropical forest frontier, national governments are putting in place regulations to support land tenure for smallholders and indigenous communities. However, these groups often need further help in order to secure their legal rights. The private sector can facilitate land tenure processes in their supply or production areas, which in turn will lower their own operational risks.

Invest in ecosystems as a risk management strategy. Understanding of environmental risks from poor forest management remains inadequate. Companies with direct exposure and reliance on natural systems (particularly agricultural and commodity producers) should invest in protection of natural ecosystems and active restoration to support the environmental services on which their businesses depend. Targets should be explicitly linked to natural capital, rather than current measures which often focus on manufactured or financial capital.

Direct research and innovation budgets towards solutions which mimic nature. Four billion years of evolution has created exceptionally complex, interrelated and dynamic natural ecosystems which regulate and deliver environmental services. But our collective knowledge of these complex systems is limited. By investing to understand them, humanity can unlock a vast, untapped and potentially profitable library of solutions.

FOR THE FINANCE, INSURANCE AND COMMODITY TRADING SECTOR

Establish innovative and/or concessional finance and insurance mechanisms and trading platforms to scale regenerative practice at ground level. As stated above, natural production systems are inherently diverse and thereby protect organisations from both market and production fluctuations, and regulatory and reputational risks due to environmental liabilities or externalities. However, few finance, insurance and trading houses are sufficiently active today, and further engagement is required by philanthropical and development finance. These institutions need to invest resources into understanding this imperative and build up internal capacity to engage with these new opportunities.

Embrace real-time, open-access information systems to enable better risk management of environmental externalities in existing portfolios, and value assessment of regenerative businesses opportunities. The financial sector can take advantage of its portfolio position to invest into information systems that might not be economically attractive or feasible for the individual producer. Remote sensing and other technology solutions provide increasingly effective and cost-efficient ways to understand our natural systems and assess risks in land use value chains. Intelligent algorithms allow us to

process previously unthinkably large volumes of data and to begin an era of "radical transparency": where the true nature of environmental and social impacts is understood by users through the provision of standardised, credible and easily accessible information.

FOR BUSINESS ASSOCIATIONS, ROUNDTABLES AND OTHER CONVENING INSTITUTIONS

Encourage and endorse moratoria and similar policy and voluntary business initiatives to motivate better land use planning. Businesses should prepare for future requirements to pay for environmental externalities and liabilities (both historic and anticipated). Moratoria are widely used by policymakers to signal the value of nature and incentivise protection. Moratoria should be endorsed and actioned by the business community involved in deforestation-risk commodity production to help build better land use practices across the sector and create a level playing field for change. Detailed land use plans, and environmental externality calculations, should be used to set ambitious and future-proof targets.

Implement systems of payments for environmental services. Associations can incentivise regenerative practices by implementing a system of payments for the delivery of environmental services and penalise environmental externalities and liabilities. Payments for environmental services (PES) can tip the financial equation to make regenerative practices more economically attractive than destructive ones for the individual farmer, and hence provide the catalyst for scaling these models at ground level.

FOR MARKETING AND SALES PROFESSIONALS

Connect consumers with nature and people. There is a global rise of climate awareness that translates into individual action – from climate demonstrations to climate-conscious consumption patterns. This is an opportunity for marketing and sales professionals to really connect the consumer with the origin of everyday products like food, beverages, fuel, cosmetics, furniture and medicine, telling the everyday and personal stories of the farmers who have produced them. This experience of exclusivity of supply down to an individual farmer, plant or tree level is proving a powerful way to retain consumers.

Brazil Nut tree in Vale do Amanhecer legal reserve settlement
Marcelo Camargo/Agência Brasil

InfiniteEARTH Rimba Raya Biodiversity Reserve
Denys Munang/Eagle High Plantations

Long-term finance for conservation

Lestari Capital

Lestari Capital (LC) is piloting a Sustainable Commodities Conservation Mechanism (SCCM) in the palm oil sector. Palm oil companies who are members of the Roundtable on Sustainable Palm Oil (RSPO) are obliged to compensate for historical clearance of high conservation value and carbon stock forest areas. In order to gain and maintain RSPO certification, the companies must conduct impact assessments and then finance projects that deliver conservation outcomes for a minimum of 25 years as compensation for any clearance identified. However, many palm oil companies have limited knowledge and experience of conservation and finance.

The SCCM channels money owed by RSPO certified palm oil companies into high-quality conservation and restoration projects that are certified under internationally recognised standards. Lestari identifies suitable conservation projects, undertakes due diligence, and then markets and pitches these to RSPO certified companies on behalf of the projects. The contracts ensure environmental and social safeguards, performance-based payments and effective deployment of funds, which LC monitors and reports on. In this way, the SCCM provides a new source of finance for conservation, ecosystem restoration and community forestry projects and creates an effective and efficient path for companies to act credibly and transparently on their sustainability commitments.

“We see this as a potentially fundamentally disruptive way to finance conservation in the future...it is not meant to replace public money, but to take conservation to places where public money can’t take it

Wild coffee cherries, Ethiopia
Stuart Clouth/P4F

Wild coffee processing facility, Ethiopia
Will Crowne/DFID 2019

Ethiopian native forest coffee

Innovative private coffee companies

Ethiopia is the largest producer of Arabica coffee in Africa and the fifth largest coffee producer in the world,[3] with coffee generating 5 percent of the country's GDP and nearly a third of its foreign currency earnings.[4] The sector employs around 20 million people, the significant majority of whom are smallholders working on one or two hectares of land. An estimated 45 percent[5] of the country's total coffee production is "wild" and grown in forested areas, forming part of a broader economy of forest products that provide an income to Ethiopian households.[6]

Wild coffee exists in about 400,000 hectares of Ethiopia's forest, including some of its last remaining old-growth forests in the Kafa, Sheka and Belete-Gera regions. These forests sequester high amounts of carbon, support a range of biodiversity and provide the genetic base for high-quality Arabica coffee. The Kafa Forest alone contains over 5,000 varieties of coffee. While much of Ethiopia's coffee is harvested from commercial plantations and smallholder gardens, a large number of local communities have access to forest, where they collect wild coffee.[7]

To help improve the value of Ethiopian wild coffee, organisations such as Technoserve and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) are working to improve quality and traceability. This includes working with cooperative unions, training local communities on collection practices (ensuring only the best crops are harvested), building centralised drying stations and constructing raised drying beds (which improve the quality of the cup). A number of coffee companies, such as Moya Coffee, Original Foods, Solino and Happy Goat, are bringing this high-value product into European and North American markets.

Glossary

communities - used as an expansive term to describe forest-dependent communities. This includes indigenous peoples and governments as well as rural and local communities who depend on the forest and forest resources as their main source of food and livelihoods as well as culture, history, health and many other aspects of their lives. This term is not intended to be definitive and includes people who live near forests but have agricultural livelihoods and use forests to supplement their consumption and income-generating activities, as well as rural people whose main income comes from labour supplied to forest-based commercial activities.

degraded land – Land that has lost some degree of its natural productivity due to human-caused processes.

deforestation hotspot – An area of forested land that exhibits statistically significant patterns of forest loss over time, likely related to human activities. See page 12.

forest frontier – A zone of land around deforestation hotspots, which includes recently degraded land, land under active human cultivation and remaining standing primary forest. See page 12.

Intergovernmental Panel on Climate Change (IPCC) – A body of the United Nations, dedicated to providing the world with an objective, scientific view of climate change, its natural, political and economic impacts and risks, and possible response options.

Paris Agreement – The Paris Agreement is an international treaty that seeks to reduce the emission of greenhouse gases. The agreement is sponsored by the United Nations Framework Convention on Climate Change (UNFCCC) and came into effect on November 4, 2016.

primary forest – Naturally regenerated forest of native species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed.[8]

regenerative business models – 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 re-growing forest.

REDD+ – Reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries, REDD+ was launched in 2008 as a UN Collaborative Program.

standing forest – see *primary forest*

Sustainable Development Goals – The Sustainable Development Goals (SDGs) are a global agenda, adopted by countries in 2015, with a vision of ending poverty, protecting the planet and ensuring that all people enjoy peace and prosperity.

tropical forest belt – The equatorial zone, typified by warm temperatures, high humidity and relatively constant year-round sunlight in which the naturally occurring forests of this region occur (see *primary forest*).

CHAPTER 1:

Sealing the forest edge where it is currently exposed

Road infrastructure development in Bia-Juabeso, Western Ghana
Stuart Clouth/P4F

Forest loss is exceptionally complex, multi-faceted and dynamic. Historical patterns can be drastically altered by a change in political regime, almost overnight. New drivers of deforestation (such as more sophisticated and targeted illegal activity made possible by technology) mean interventions must constantly evolve. However, underlying almost all forms of forest loss is humanity's accelerating demand for resources – food, commodities and land – which carve vast chunks out of tropical forest each year. Understanding patterns of loss, and underlying drivers, is critical to forming effective intervention strategies.

This report uses a recognised "hotspot" methodology (see page 12) as the basis to define, both quantitatively and spatially, the current "frontier" between human development and remaining tropical forest, and the drivers of forest loss in these places. What emerges is an extremely complex and intricate pattern of human development penetrating primary forest – including roads, railways, agricultural production and human settlement. This belt of land – 600 million hectares across the tropics – is defined in this report as the "forest frontier" of the coming decade. It is within this frontier that regenerative business models must be urgently and widely scaled.

FIGURE 1

Global satellite analysis reveals the 21st century tropical forest frontier

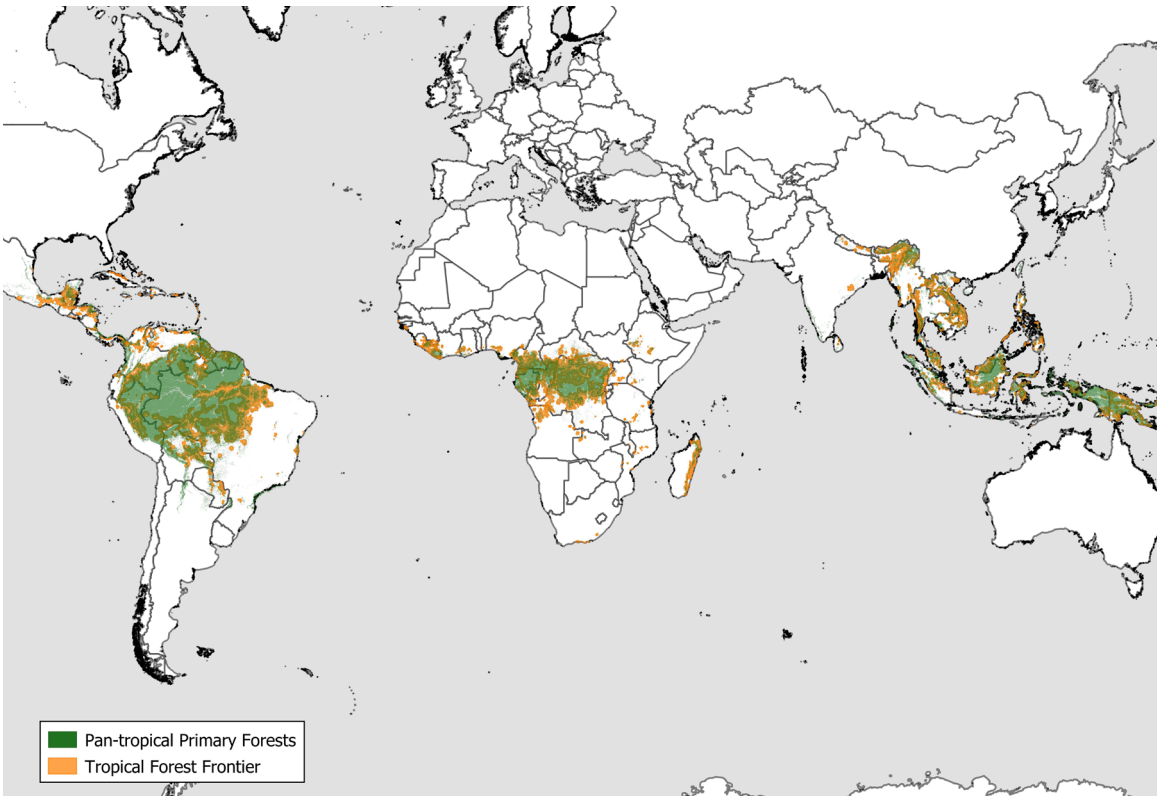


FIGURE 2

The forest frontier in South America shows where human development is driving the loss of primary forests

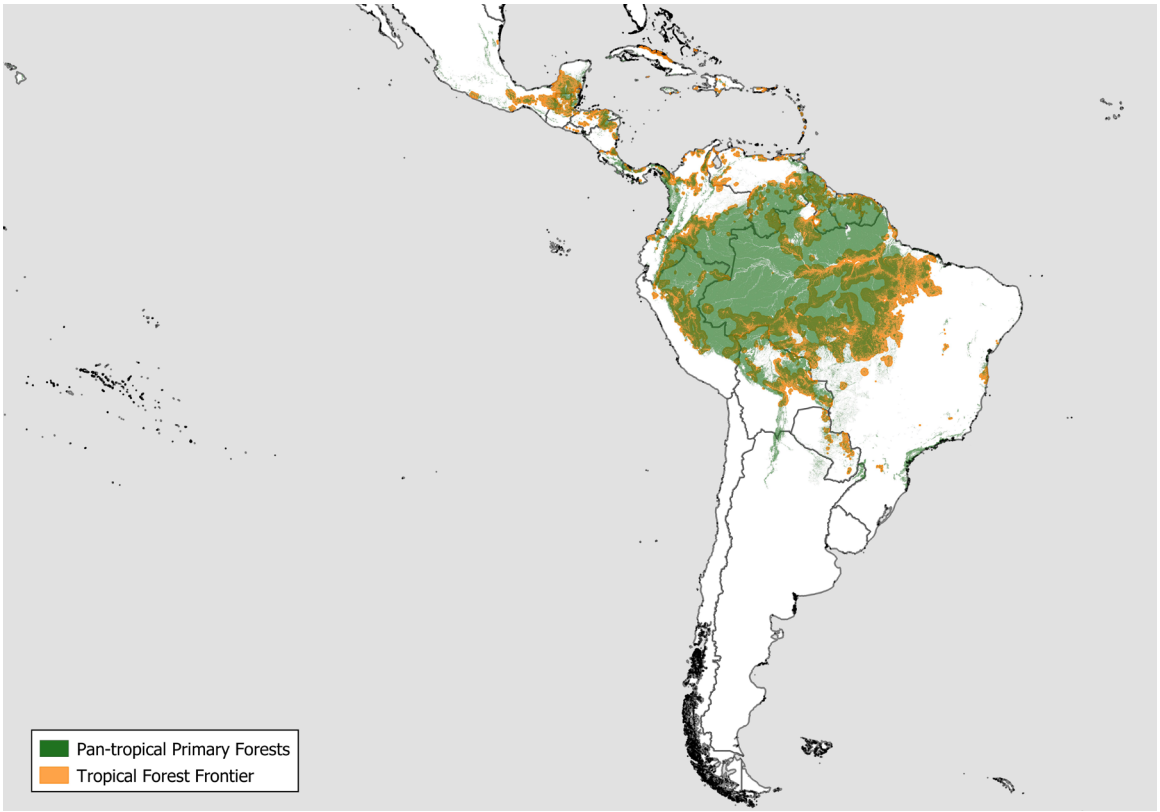


FIGURE 3

The forest frontier in Southeast Asia

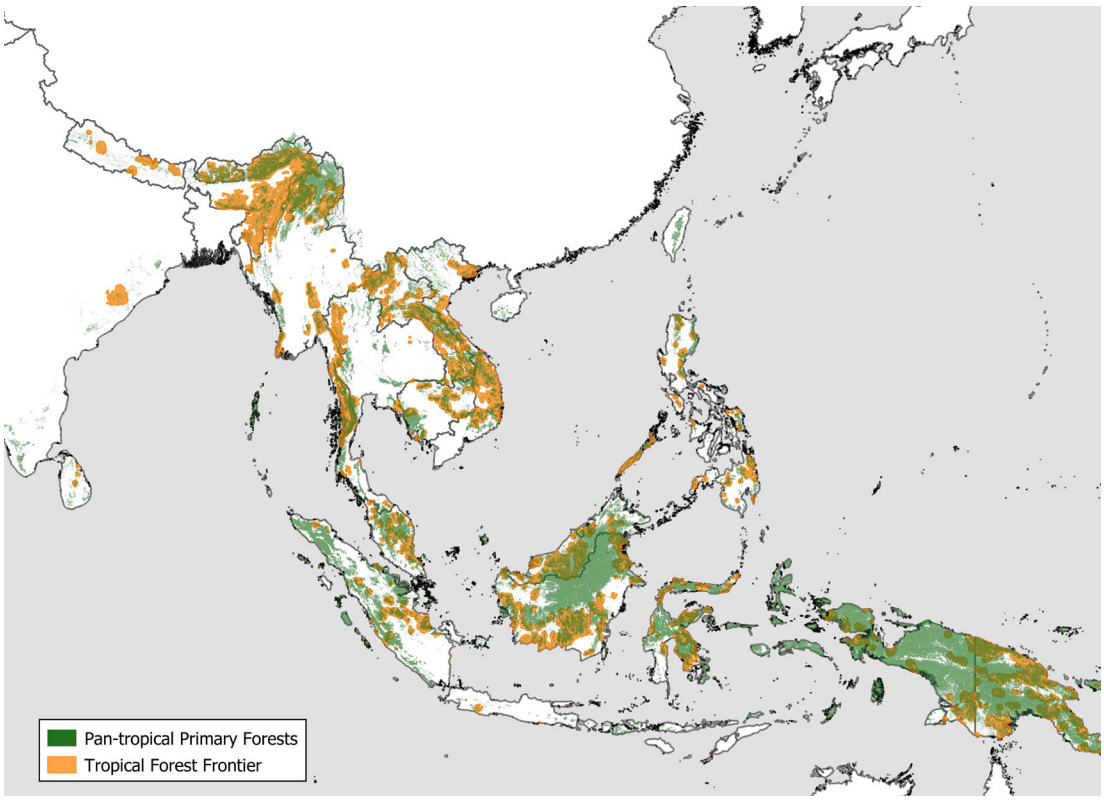
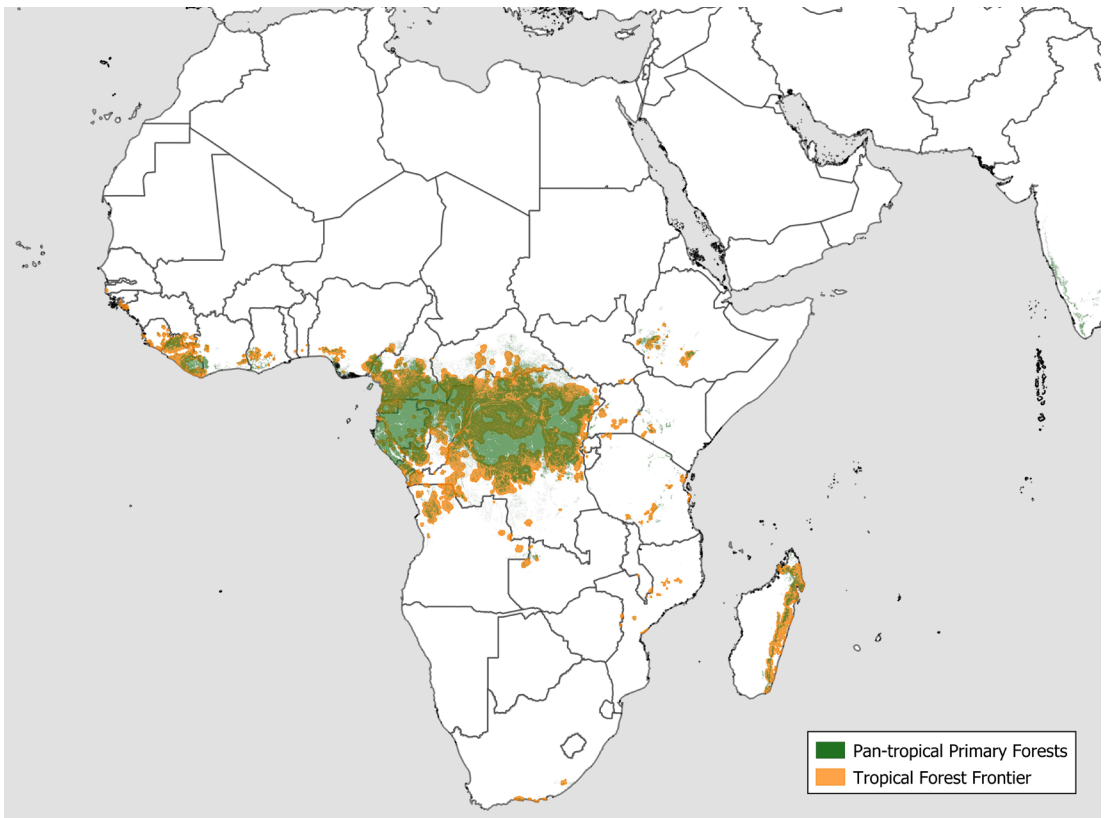


FIGURE 4

The forest frontier in Africa



BOX 1

Methodology for identifying the tropical "forest frontier"

Vast amounts of tropical forest loss are driven by human activities at the forest edge. As such, areas where forest is being pushed back and replaced with other land uses is both a human development and climate "frontier".

To identify the location and extent of this tropical forest frontier, historical patterns of loss were examined, using a hotspot analysis. The term "hotspot" has been used across disciplines to describe a region or value that is higher relative to its surroundings. Here, we defined a hotspot as an area that exhibits statistically significant clustering in patterns of forest loss over time – locations where observed patterns are not likely the result of random processes or of subjective cartographic design decisions; they represent places where there are underlying processes at work. The identification and classification of forest-loss hotspots followed the "Emerging Hot Spot Analysis" methodology developed by Harris et al. (2017).[9]

Around these identified hotspots, a buffer area of 5km was added in all directions. This was to include areas of land directly around hotspots and therefore include both recently deforested land[10,11,c] (to understand the drivers of that forest loss) and currently intact forest[12,d] (to include some of the most vulnerable areas of standing forest). Once this buffer zone around hotspots had been established, the nature of the land within this defined area (the forest frontier) was examined. Any geographical areas of overlap between these three datasets were resolved by simply using the dataset with the most recent timeseries.

N.B. Past patterns do not necessarily predict the future: the hotspot methodology is not intended as a tool for explicit predictions or modelling of future loss. However, long-term, statistically significant patterns of past loss do identify areas of current and future concern and can therefore be used as a strong proxy on which to guide strategies for intervention. For further information on future deforestation risk, see resources such as *Saving Forest at Risk* by WWF, or the TRASE initiative which seeks to highlight deforestation risk driven by agricultural commodities and global supply chains.

c. Dataset used to determine agricultural land was a combination of NASA Global Food Security-support Analysis Data, and WRI data (see source). Dataset used to determine degraded land: Wide-scale, mosaic and remote restoration opportunities, as identified by University of Maryland and WRI produced Restoration Opportunity map (see source).

d. Dataset used to determine primary forest published by the University of Maryland (see source).

Effective intervention in just 20 percent of remaining tropical forest would be transformational

Together, tropical forests and their soils contain more than 900 billion tonnes of carbon dioxide equivalent[13] - more than twice the world's carbon budget to restrict warming to less than 1.5-degrees Celsius.[14] But all tropical forest is not equal. Currently, 380 million hectares of primary forest – equivalent to around 20 percent of all remaining tropical forest – lies in the forest frontier. Forest at the frontier has high potential for impact, due to its strategic position.[e] Already exposed and vulnerable through recent human activity, this forest must be immediately and decisively protected, and it is here that huge progress can be made towards protecting the around 1.5 billion hectares of forest that lies behind the frontier.[15] Despite the potential of this strategy, it should be noted that restoration and protection efforts should not be *exclusively* limited to this area. Interventions must also make provision for those areas where human threat is not *yet* high.[f]

Three major categories of land in the forest frontier are where alternative models must urgently be applied

Geospatial analysis reveals how historical and current drivers of land use change have resulted in three land categories which dominate the almost 600 million-hectare forest frontier (see also Figure 3). These are:

- **The standing forest zone.** Around 380 million hectares of primary forest.[g] The result of undisturbed ecological and evolutionary processes over millennia. Forest that has not been disturbed by industrial scale land uses (e.g. major logging, mining, roads) but which may have some exposure to low-level and low-impact human use (e.g. used by indigenous communities for foraging). Highly complex habitat with extremely rich biodiversity and ecosystem services.
- **The agricultural zone.** Around 70 million hectares of active agricultural land. Here a combination of subsistence and commercial agriculture has converted forest into production land. Some of the most significant commodities dominating this land category are beef, soya, palm oil, coffee and cocoa – the demand for which is often driven from outside tropical forest countries. Over time, unsustainable practices often reduce agricultural productivity to such an extent that it is abandoned and left as uninhabited, degraded land – the degraded zone.
- **The degraded zone.** Around 120 million hectares of currently degraded land. Here unsustainable use and extraction of natural resources is occurring or has recently occurred. Land is either in transition (e.g. there has been a recent harvest or forest clearance), is under (shifting) small-scale agriculture or, such is the degree of environmental degradation (deforestation, disappearance of species, air and water pollution), the land has been abandoned altogether.

Each of these three land categories is currently underperforming across economic, social and environmental dimensions. Degraded land in particular has spread widely, causing catastrophic environmental declines over time. This in turn reduces social and economic value of the land to such an extent that it drives human re-settlement to new areas, pushing back the frontier. Current agricultural practice often has devastating environmental consequences (e.g. by degrading soils and generating pollution) whilst low productivity practices force continual expansion into standing forest – and the destruction of the environmental services it provides: water cycles, soil health and pollination. Contrastingly, the benefits currently delivered by standing forest are not sufficiently valued, or appropriately distributed by society. Forest benefits are enjoyed by the entire planet, whilst the benefits of felling the forest are accrued privately and concentrated in the hands of a few, leading to inevitable over-exploitation.

e. As described in Box 1, the hotspot analysis used to identify the forest frontier is not a spatially and temporally explicit predictor of future risk but uses past patterns of loss as a strong proxy for future vulnerability.

f. Countries with currently high levels of forest cover, and low levels of deforestation, must also be urgently and decisively supported in their efforts to maintain such valuable stocks of standing forest. Political agreements which deliver finance to these countries in return for continued low levels of deforestation (such as REDD+) are a vital mechanism.

g. See glossary for definition.

Early stages of planting Kemiri Sunan trees in Indonesia
PT BAS, 2019

Soils are replenished through increased shading and moisture
PT BAS, 2019

Restoring degraded soils with the Kemiri Sunan tree

PT Bumi Agrindo Sejahtera and PT BIS

The Kemiri Sunan biofuel project is a regenerative business development in Indonesia. The kemiri sunan tree is able to grow on dry and degraded land, such as ex-logging, -mining and -palm oil concessions, and restores the chemical and physical properties of depleted soils which would not recover through natural regenerative processes.[16] The tree produces oil, extracted from seed kernels, which can be processed into a high-quality, efficient biofuel, whilst also restoring soil conditions that allow natural forest regeneration. The oil yield per hectare is the highest of any vegetable oil[17] – pilots reveal yields are potentially more than double that of palm oil produced for biodiesel purposes. Supported by policies established by the Indonesian government to support ecosystem restoration, this model creates the opportunity for communities to actively restore soils and generate positive livelihood opportunities. A 30,000-hectare plantation on degraded land in Flores, Indonesia, is in the early stages of development; its challenge is to prove the yield potential at scale and industrialise the processing to biofuels and other end-products. Through its shares in the company, the local community will receive 80 percent of the profits.

> **“There are millions of hectares of land in an unproductive condition. By developing this tree we can turn this unproductive, deforested land into more productive plantations...into something better for the people there.”**

Komaza microforestry seedling nursery, Kenya
Sephonias Jack/P4F

Komaza phone app product, Kenya
Sephonias Jack/P4F

Protecting African forests through microforestry

Komaza

Komaza[h] works in Kenya to establish micro tree farms that produce timber for sale into high-value industrial markets (such as veneer, plywood, briquettes), using waste materials as a sustainable source of fuelwood. To do this, Komaza partners with smallholder farmers: the smallholder provides the land and labour and Komaza provides seeds, training and support on optimising production, logistics, the industrial process, marketing and sales, and finances the value chain. Komaza's innovative model enables smallholders to gain an income from their previously unproductive land and, because there is no need for purchasing land and labour, enables trees to be planted 65 percent more cheaply than on traditional commercial plantations.

h. Featured in the Case Study catalogue.

CHAPTER 2:

Understanding the three categories of regenerative business models

Cinta Raja Rainforest Restoration Site in Gunung Leuser National Park (GNLP) in Sumatra, Indonesia

Identifying the most effective area for intervention is only the first step. Creating the mechanisms and incentives to keep forest standing, and to encourage forest restoration, is what can transform today's largely degenerating forest frontier into a productive, resilient and globally valuable forest economy. Creating such an economy requires a combination of well-enforced regulatory and fiscal policies and socio-economic incentives that reward sustainable management and protection of forest more highly than single-use extraction.[i]

In the tropical forest context, regenerative models generate value from the protection and restoration of forests. In doing so, they provide tangible incentives to keep forests standing, or even to regrow them over time. The varied models which exist can be grouped into three key categories:

- Models which create value from standing forest
- Models that incorporate forest protection into agricultural production
- Models which create value from re-growing degraded forest

i. See the sister paper *Public Sector Measures to Conserve and Restore Forests: Overcoming Barriers* (World Resources Institute, 2019).

Therefore, for each of the land categories described in Chapter 1 – standing forest, the agricultural zone and the degraded zone – a corresponding category of regenerative business model exists. Each category is described in detail on the following pages. In addition, and to bring these categories to life, this report curates a catalogue of real-world case studies: 25 active regenerative business models from over 10 countries on three continents, cumulatively covering more than 2 million hectares. These case studies are summarised briefly in Chapter 3 and included in full in Appendix A.

FIGURE 6

Three major categories of regenerative business models exist, which correspond to three geospatially derived land categories in the forest frontier

Value from Standing Forest

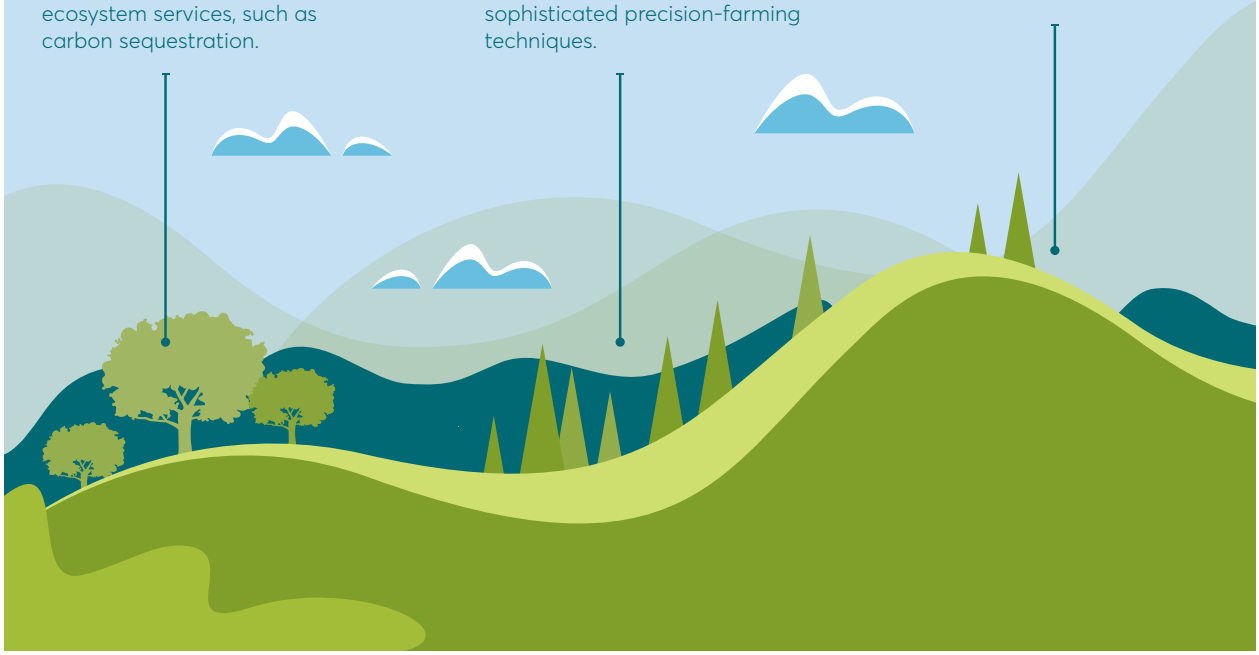
Standing forest models can generate immediate revenues, with upfront development costs as low as $20 per hectare, through the low-impact harvest of products such as nuts and resins or the delivery of ecosystem services, such as carbon sequestration.

Agricultural Production-Protection

Production-protection models can generate revenues of several thousand dollars per hectare, whilst reducing costs through reduction in artificial fertilisers and pesticides, and the utilisation of increasingly sophisticated precision-farming techniques.

Value from Forest Regrowth

Value from forest regrowth models can generate multiple, parallel cash flows – as diverse as biocoal, bioplastics and biochar - from different plant species, which are particularly suited to local conditions.



Category 1: Creating value from standing forest

WHAT ARE "VALUE FROM STANDING FOREST" MODELS?

These models depend upon harnessing the high variety, value and productivity of naturally growing forest products and environmental services in standing primary forest. They do not include timber plantations or other forms of man-made, plantation forests. When implemented, high-value, low-intensity value chains are created. They are high-value because the products and services which are produced by intact forests generate high market value per unit, and low-intensity because the impact on forest is minimal or almost non-existent.

WHY ARE THEY SO IMPORTANT?

The ecosystem value of primary forest is higher than any man-made attempt at recreating or mimicking it.[18] Preserving standing forest has a twofold, additive impact: not only does it maintain the extraordinary array of products and services provided by forests, it also prevents the negative impacts of their disappearance (which produce some of the most harmful environmental impacts on the planet). Furthermore, standing tropical forest provides the home, livelihoods and cultural heritage of millions of indigenous community members.

WHAT ARE THE DIFFERENT EXAMPLES OF THIS MODEL?

TABLE 1

Different examples of the "value from standing forest" category

Sub-type	Description	Applicability	Example business models
Payments for ecosystem services	Payments to communities or owners of the forest for the benefits that those forests provide (either to specific groups of beneficiaries, or the global community as whole). Examples of the services provided by functioning forests: carbon sequestration and storage, climate regulation, water filtration, biodiversity protection.	Applicable where organisations or individuals are looking to "offset" a liability or damage incurred elsewhere, by financing the protection of forest habitats. Also applicable where there is a clear and direct beneficiary of a specific ecosystem service, who is willing to pay for that service, and thus provide an economic incentive for forest protection or restoration.	A "downstream" beneficiary (e.g. a hydropower company) willing to pay an "upstream" land manager for the protection of forest around a mountain watershed, in order to maintain effective water flows.
Wild forest production	Foraging and harvesting of products from within natural forest, with minimal disturbance to the ecosystem. Does allow for some undergrowth clearance, but no canopy or tree management.	Areas of intact primary forest, particularly with local and traditional communities living within or alongside the forest. Opportunity to provide additional income and livelihood opportunities for these communities, often based on existing traditional practices.	Harvesting of wild-grown fruit and nut species for human consumption (e.g. brazil nut). Additional edible commodities (e.g. forest honey). Plant material for the cosmetic and pharmaceutical industries (e.g. "Dragon's Blood").

TABLE 1 (Cont'd)

Different examples of the "value from standing forest" category

Sub-type	Description	Applicability	Example business models
Ecotourism	Tourism services in natural areas that both conserve the environment and improve the well-being of local people.	Areas of forest with outstanding natural beauty, or with particularly high biodiversity or cultural heritage.	Visitors attracted by the unique floral and faunal biodiversity of tropical forests (e.g. "birds of paradise" of Papua New Guinea, or the gorillas of the Congo basin).
Reduced impact logging	Selective timber harvesting of specific high-value species, minimising disturbance and maintaining maximum ecological functionality of the forest, following internationally accepted standards of best-practice.	Areas of intact or minimally disturbed forest, where mature, high-value timber species exist. Most effective when conducted on the outskirts of forest, to minimise the impact of infrastructure required for timber extraction (e.g. roads or pathways).	Sensitive harvesting of hardwood species for construction of high-end furniture (e.g. teak, mahogany, rosewood).

Kemiri Sunan fruit, Flores, Indonesia
P4F 2019

Gathered Brazil nuts, Vale do Amanhecer legal reserve settlement, Brazil
Marcelo Camargo/Agência Brasil

A commercialised Brazil nut cooperative

COOPAVAM

An example from Brazil's forest boundary shines a light on how diverse, integrated and socially equitable economies can be created around standing forest. A decade ago, the organisation COOPAVAM established a cooperative of smallholders and rural settlers that bought and processed the Brazil nuts sourced mainly from indigenous communities located in a region with one of the Amazon's highest deforestation rates – the northwest of Mato Grosso. The Brazil nut is a non-timber forest product endemic to the region and highly valued in consumer markets for its exceptional nutritional value. By strengthening indigenous land tenure, creating community land management plans and implementing a profitable business model of Brazil nut harvesting and processing, COOPAVAM has emerged as an incredibly effective tackler of forest degradation.

Currently, the cooperative has offtake agreements in place to sell Brazil nut oil to Natura, one of the largest cosmetics companies in the world and owner of brands such as The Body Shop. By 2020 COOPAVAM expects to improve livelihoods of 4,000 collectors and bring 1.2 million hectares of forest into sustainable use. Based on the foundation of a deforestation-free Brazil nut business, this model has delivered much more than that: it has provided the basis on which an entire local forest economy and social ecosystem – education, healthcare, private enterprise – has been built.

Category 2: Agricultural intensification with a mandate to protect and preserve

WHAT ARE "AGRICULTURAL PRODUCTION-PROTECTION" MODELS?

These models involve improving production efficiency, and therefore reducing the environmental impact, of agricultural activities in proximity to forest landscapes. To do so, improved agricultural practices (particularly sustainable intensification) are combined with effective land use planning, robust local governance and incentive and reward mechanisms for forest protection. The result is increased productivity per hectare, the protection of forest with highest conservation value and in some cases the restoration of previously degraded land.

As sustainable intensification is implemented, a gradual shift towards regenerative agriculture is required. This has the potential to maintain yields, while at the same time promoting soil health, reducing use of chemical inputs, and increasing the diversity of healthy, planet-friendly foods produced and consumed.

Productive regenerative practices combine traditional techniques, such as crop rotation, controlled livestock grazing systems, low-till agriculture and cover crops, with advanced precision farming technologies and new bio-based fertilisers and pesticides. New technologies that drive productive regenerative agriculture are continually emerging.

WHY ARE THEY IMPORTANT?

Agricultural expansion, both by smallholders and larger organisations, is the dominant driver behind more than half of all tropical forest loss.[19] Finding business models that can both deliver enhanced agricultural output and mitigate forest loss can deliver "triple wins": rural development; domestic economic growth; and protection and restoration of forests on a large scale (and all their associated benefits, including those directly necessary for agricultural production such as water cycles, pollination, etc.)

WHAT ARE THE DIFFERENT EXAMPLES OF THIS MODEL?

TABLE 2

Examples of the "value from agriculture production-protection" regenerative business model category

Sub-type	Description	Applicability	Example business models
Increasing agricultural productivity using sustainable practices	Increasing the yield and permanence of productivity on existing agricultural land in combination with improving forest protection governance at the landscape level to prevent agricultural expansion into adjacent forest areas.	Current areas of agricultural land which directly border or are adjacent to natural forest. Is relevant for both smallholder and commercial farming situations.	Certified commodity production (e.g. oil palm, soy, cattle)
Shade planting for agricultural production	Planting of trees to enhance or protect the production of agricultural crops.	Areas that have high potential for certain crops, but which can also support or benefit from the presence of specific tree species (ideally native varieties).	Shade-grown cocoa Shade-grown coffee

TABLE 2 (Cont'd)

Examples of the "value from agriculture production-protection" regenerative business model category

Sub-type	Description	Applicability	Example business models
Tree farming	The planting of specific tree species known for their commercial harvesting potential.	Areas in which the commercial output from reforestation is the primary aim, but in which ecosystem outcomes, such as carbon sequestration, are also desirable.	Restoration of degraded land to certified rubber or timber plantations
Landscape-level governance	Coordination of multi-stakeholder strategic planning and governance of both agricultural and conservation activities in landscape. Model based on membership fees or share of transactions.	Any mixed forest and agricultural landscape, particularly those linked to areas of special scientific interest or biodiversity significance.	Landscape managers in commodity landscapes

Bonga coffee forest landscape, Ethiopia
Stuart Clouth/P4F

Cocoa pod on pilot farm shows fleshy parts, which are used to produce cocoa butter
Stuart Clouth/P4F

Resilient and productive cocoa landscapes

Touton

Around 70 percent of the world's cocoa comes from Ghana and Côte d'Ivoire as their forest areas offer the temperature, rainfall and shade needed for the trees to thrive. Cocoa is Ghana's most important agricultural commodity, accounting for roughly $2.3 billion in agricultural exports[20] and supporting the livelihoods of some 2.5 million rural farmers and their dependents. However, cocoa production has historically been a huge driver of deforestation in Ghana, responsible for more than a quarter of the country's forest loss. To tackle this challenge, Touton has established a licensed buying company, in partnership with the Ghana Forestry Commission and Ghana Cocoa Board, to process cocoa beans into semi-finished products and sell them directly to clients. It is leading a consortium of partners that aims to achieve a sustainable, deforestation-free cocoa landscape in Juabeso-Bia, Ghana. A key part of the work is establishing a Landscape Management Board, with active participation from communities. This landscape-wide framework will provide strong safeguards that ensure the product is deforestation free – a major marketing premise of the brand. By combining a landscape-wide governance framework with ground-level support to farmers, the initiative will drive improved productivity and livelihood security in a way that reduces encroachment and deforestation in surrounding primary forest. By 2020, the project will deliver socio-economic benefits to an estimated 150,000 people and preserve approximately 160,000 hectares of forest reserve.

> **"To be able to address deforestation it requires that you engage totally with the communities that you work with**

Category 3: Creating value from forest regrowth on degraded land

WHAT ARE "VALUE FROM FOREST REGROWTH" MODELS?

These models centre on restoring previously degraded land and returning that land to a state that is as close as possible to natural forest. They use a diverse mixture of regrowth vegetation that increases both above- and below-ground biodiversity and biomass. They do not include monocultural plantations. By mimicking natural ecosystems, and by working with species that are particularly well suited to specific environmental conditions, forest regrowth models can restore increased environmental and economic productivity.

WHY ARE THEY SO IMPORTANT?

There is an estimated 100 million hectares of degraded land within the forest frontier alone. The natural productivity and value of this land has been severely impacted, reducing its economic, social and environmental value. Restoring degraded land can support livelihoods and increase economic productivity by restoring soils and water, deliver climate change mitigation by sequestering carbon and enhance biodiversity and other key ecosystem services outcomes (clean water, reduced erosion, enhanced soil fertility, etc.).

WHAT ARE THE DIFFERENT EXAMPLES OF THIS MODEL?

TABLE 3

Examples of the "value from forest regrowth" regenerative business model category

Sub-type	Description	Applicability	Example business models
Regrowth of natural forest for compliance or voluntary purposes (payments for environmental services)	Deliberate regrowth of forest on currently degraded land, funded by payments from organisations on a compliance or voluntary basis, but with the desire to achieve specific ecosystem services outcomes (e.g. carbon sequestration or biodiversity increases).	Areas of degraded land that are a direct result of the organisation now paying for its restoration (e.g. at a project site) or areas which have been identified as being particularly valuable to restore (e.g. peatland).	Mining companies paying for the restoration of lands which their activities have damaged Commodity producers, such as oil palm companies, that have incurred liabilities from historical deforestation activities Restoration incentivised by 'downstream' benefactors such as drinking water providers
Regrowth to productive forest systems	Regrowing areas of degraded land with the intention of creating a productive forest (e.g. timber, edible commodities) through active management.	Degraded land in which relatively high levels of human activity can be implemented (i.e. the area is accessible), which will grow back closed forest canopy over time	Planting of indigenous species that are not cut or have very long rotation periods but can be utilised for food, energy or other products

A farmer climbs up a palm sugar tree to collect sap in West Kalimantan, Indonesia
Panos Pictures 2019

Profitable reforestation with the REBUILD model

Arsari

As a result of unsustainable timber extraction and commodity production, large areas of degraded land exist in Indonesia. This degraded land not only represents a huge cost to Indonesia, due to the environmental damage incurred and the lost productivity of degraded land, but a novel opportunity: to create new forms of value from restoring this land and returning it towards its natural state. Decades of research and pilots have led to the creation of a tropical forest 'recipe': "REBUILD", a set of steps and seed combinations that can be applied to degraded land, and which develop in harmony over time. This range of multicultural food and forest species grows on degraded soils and, as it matures, regenerates soil, increases biomass and biodiversity and generates a range of income streams. These income streams – as diverse as sugar and biocoal for energy, bioplastics and a biochar fertiliser – present the opportunity to restore degraded areas of land profitably and hence at massive scale.

> **REBUILD is about a new start for nature that helps people - and still does so in a profitable way**

Sustainable cattle ranching in Brazil
Andrea Carlini; Pecuária Sustentável da Amazônia

Sustainable cattle ranching in the Amazon

Pecuária Sustentável da Amazônia

Traditional cattle ranching practices in Brazil exhaust vegetation and soil and result in falling production, forcing producers to expand into new areas to maintain or increase production.

Pecuária Sustentável da Amazônia (PECSA) is a sustainable livestock management initiative. PECSA establishes partnerships with producers who lease their land and part of their herd to PECSA for seven to ten years, in return for a share of the proceeds from the livestock production. PECSA takes on management of the farms, including pasture reform (from degraded pasture to high productivity pastures), livestock intensification (increasing the number of cattle per hectare and improving herd management), reforestation (in areas that do not comply with the forest code) and farm staff training (to perform these new activities effectively). PECSA then establishes zero-deforestation agreements with farmers and demands zero deforestation from calf suppliers, verified through GIS monitoring before every calf purchase. PECSA achieves economies of scale on both the purchase of inputs and in offtake agreements, making sustainable, deforestation-free, semi-intensive cattle production systems viable.

Our purpose is to make cattle ranching in the Amazon deforestation-free. We can produce much more on existing areas – and if we do that, then there is no need to clear more forest

Acai gathering in Colombia
P4F

Colombian Pacific Açaí

Naidiseros del Pacifico SAS

The açaí tree is indigenous to the eastern Amazon, with the highest occurrence in the estuary of the Amazon River where it grows in both seasonally and permanently flooded forests. Local communities in açaí-growing regions of Colombia have been consuming the "super berry" for decades. More recently, claims of a wide range of health and therapeutic benefits have led to growing demand in international markets.[21] In 2016 a non-governmental organisation, Fondo Accíon, started a pilot project of açaí collection and processing with Naidiseros del Pacifico SAS, a private company set up in 2015 by seven community councils as public shareholders.

Naidiseros del Pacifico generates revenue for local communities by collecting, processing and commercialising açaí fruit. Local communities collect fruit from the palm trees, then the pulp is extracted in collection centres and packed for selling, mainly as frozen paste for high-end beverage companies. The project aims to have 56,000 hectares of forest under active sustainable management by 2020.

CHAPTER 3:

Introducing a set of real-world, regenerative examples

Brazilian forest landscape
P4F

From more than 200 reviewed examples from dozens of countries, this report curates a catalogue of real-world case studies: 25 active regenerative business models from three continents and four regions, cumulatively covering more than 2 million hectares.[22] These case studies are listed in the table below and each described in detail in Appendix A.

Regenerative business models can address the current failings in and around tropical forests, halt current spirals of natural capital depletion, restore and regenerate forest, and deliver livelihoods and economic value (see Figure 3). Examining the real-world regenerative business models which exist today provides an evidence base from which to derive important insights.

Regenerative forest businesses demonstrate:

- **Economic viability (potential).** That protecting and restoring forests can provide real financial returns, alongside social and environmental benefits. Use of the word "potential" is a reminder that the sector is nascent, that most businesses are still at an early stage of development but that they are showing a path to profitability, with manageable risk profiles.
- **Diversity and productivity.** That there are a vast and inspiring range of ways in which this economic and social value can be generated within forest landscapes – from physical forest products, to environmental services.

- **Innovation.** Many ventures are early-stage and are experimenting with novel and innovative business model approaches and/or technologies.
- **The need for market, policy and financial support.** Clear policy, market and financial interventions are required to lay the foundations on which these models can establish and scale (see the recommendations section in Chapter 4).
- **A new sector emerging.** Taken collectively, these models provide evidence of the emergence and growth of a new regenerative sector.

Beyond these overarching findings, each case study contributes to a collation of detailed insights on barriers currently preventing these models from scaling, as well as clear recommendations on how these can be overcome in Chapter 4.

TABLE 4

Regenerative business model examples captured in the Case Study Annex

I.D.	Case Study name	Description	Location
Value from standing forest			
1	**COOPAVAM: the Brazil nut cooperative**	Harvesting the endemic, nutritious and high-value Brazil nut provides viable livelihoods for indigenous communities and farmers in the Amazon.	Brazil
2	**Naidiseros del Pacifico SAS: Colombia Pacific acai Colombian Pacific açaí**	The native açaí tree, with highest occurrences in the estuary of the Amazon, produces a "super berry" which is highly prized in international markets.	Brazil
3	**Ecosystem Restoration Concessions**	Bespoke legislation incentivises private sector companies to develop commercially viable protection and restoration models in dedicated "Ecosystem Restoration Concessions".	Indonesia
4	**PT ABT: "Dragon's Blood" resin**	Extracting the "Dragon's Blood" resin from the rattan palm provides a valuable income stream to land owners, driven by demand from Chinese medicine.	Indonesia
5	**Javara and PT ABT: Wild forest honey**	Flavoured by forest flowers the honey from this charismatic bee species is rich in vitamins, minerals and amino acids whilst its unique social and environmental story provides strong appeal for consumers.	Indonesia
6	**Ethiopian native forest coffee**	Ethiopia contains an astonishing variety of wild coffee varieties – more than 5,000 in a single forest – whose rich taste and cultural significance create premium value for local harvesters.	Ethiopia
7	**PT Ekosistem Khatulistiwa Lestari and PT Sampit: Jelutong, a natural high-quality latex**	The unusual latex resin of the native jelutong tree is used as a natural base for new and distinctive chewing gum products.	Indonesia

TABLE 4 (Cont'd)

Regenerative business model examples captured in the Case Study Annex

I.D.	Case Study name	Description	Location
8	**Forestwise: The illipe nut**	Harvesting the illipe nut from the forest floor and extracting its nut butter provides a rich, premium and forest-friendly alternative to shea or cocoa.	Indonesia
9	**Lestari Capital: long-term finance for conservation**	An innovative market platform which uses historical environmental liabilities from commodity players to protect and restore forest in the long term.	Indonesia
10	**Kilombero Valley Teak: quality Tanzanian timber**	The native mpingo tree is one of the most economically valuable timbers in the world. Sustainable harvesting by communities allows them to attract premium prices for use in the creation of musical instruments.	Tanzania
Value from sustainable agricultural production-protection practices			
11	**Africa Tree Fund: innovative restoration finance**	A new vehicle that will provide finance at a competitive rate, hence incentivising organisations and local farmers to plant millions of new trees in African landscapes.	East Africa
12	**Nitidae: a sustainable cashew value chain**	Zero-deforestation commitments from local producers generates high prices, and incentivises farmers to implement forest protection measures whilst growing this nutritious and drought-tolerant crop.	Mozambique
13	**IDH: Initiative for Sustainable Landscapes**	A public-private partnership provides a financial incentive to farmers to sustainably intensify livestock production, and hence protect the last tracts of Kenya's iconic Mau Forest.	Kenya
14	**Komaza: microforestry**	This innovative model establishes micro tree farms that produce high-value timber for sale into international industrial markets.	Kenya
15	**Pecuária Sustentável da Amazônia: sustainable cattle ranching**	By establishing rigorous agreements with farmers, this approach allows extensive, deforestation-linked cattle ranching to be transformed to semi-intensive, deforestation-free beef production.	Brazil
16	**PT Bumi Agrindo Sejahtera and PT BIS: The Kemiri Sunan tree**	This resilient tree can grow on poor or marginal land, such as ex-logging, mining and palm oil concessions, and restores the properties of depleted soil whilst producing large quantities of high-quality, efficient biofuel.	Indonesia

TABLE 4 (Cont'd)

Regenerative business model examples captured in the Case Study Annex

I.D.	Case Study name	Description	Location
17	**PT Royal Lestari Utama: Sustainable natural rubber production**	Aiming to become a global leader in sustainable rubber, this model uses the production of latex from rubber trees for the creation of high-quality tyres for heavy vehicles and aircraft, while protecting and restoring forests and biodiversity.	Indonesia
18	**Olam Partnership: livelihoods and landscapes**	Technical assistance and interest-free loans enable cocoa farmers to increase their productivity, yield and income and hence refrain from illegal deforestation.	Ghana
19	**Forest-smart agriculture**	Supply a niche, export market by developing a "rainforest cocoa brand" within biologically diverse agroforestry systems in the Greater Gola landscape.	Liberia
20	**Touton: partnership for productivity, protection and resilience of cocoa landscapes**	Establishing a landscape-wide framework for deforestation-free cocoa provides branding benefits for a private cocoa company, and increased prices for farmers.	Ghana
21	**Cemoi: preservation of forests through professional cooperatives**	By re-introducing and preserving non-cocoa shade trees in and around cocoa orchards, Cemoi increases biodiversity and mitigates the effects of climate change, whilst producing a valuable commodity.	Côte d'Ivoire
22	**Miro Forestry: sustainable charcoal**	A new method of sustainable charcoal uses existing waste from certified timber production to create a prized fuel.	Ghana
23	**Adum Banso: sustainable palm oil**	Production-protection agreements engage local communities to increase the productivity of palm oil fields via improved management practices, and reductions in deforestation.	Ghana
Value from forest regrowth			
24	**Arsari: REBUILD model**	Demonstrating the concept of "profitable restoration" this unique "recipe" of plant species generates income streams and job opportunities whilst also restoring large areas of degraded habitat.	Indonesia
25	**Xingu Seeds Network**	Seed collectors are paid for the sustainable collection of more than 200 native tree species, which are used in reforestation programmes to comply with the Brazilian Forest Code.	Brazil

Cashew nut fruit

Building a sustainable cashew value chain

Nitidae

Deforestation in Mozambique's Zambézia province is almost exclusively driven by small-scale subsistence agriculture practices, where forest is cut and burnt to clear land for crops, predominantly maize and cassava. Cashew nut trees are naturalised in east Africa and the nuts provide a highly nutritious and rich energy source. The trees tolerate a wide range of conditions, including drought and poor soil.[23]

Social enterprise Nitidae has initiated a project to distribute thousands of cashew trees to local subsistence farmers in Mozambique, which will be delivered along with training on conservation agriculture and quality orchard maintenance. This is coupled with a processing facility, due to be completed in 2020, which guarantees purchases of nuts produced with sustainable and zero-deforestation practices, incentivising forest protection measures.

Farmers harvest ripe illipe nuts that fell from the endangered ***Shorea stenoptera*** tree in the forest in Sintang regency, West Kalimantan, Indonesia. The nut from this species is a principal source of a vegetable fat called 'tangkawang' or 'Borneo tallow', or sometimes 'Illipe'.
Panos Pictures 2019

Unlocking the value of the illipe nut

Forestwise

The sacred tengkawang tree is endemic to the Kalimantan region of Indonesia and under significant threat from encroachment and logging. However, this tree produces significant quantities of illipe nut butter, a premium substitute to shea or cocoa butter well suited to the cosmetics industry, and which local Dayak communities have utilised for centuries for skin care.

Ripe illipe nuts fall to the forest floor where indigenous communities collect them by hand with little or no disturbance to the forest ecosystem. Forestwise, a private company, trains community members to sun dry and quality-test the nuts – this simple processing generates significantly higher income from subsequent selling of the nuts. The trees can live for up to 300 years, fruiting every three to five years and producing up to 800kg of nuts per season[j]. Forestwise buys the nuts directly from forest communities and stores them under optimum conditions to ensure a continuous supply outside of the harvesting season. When needed, the nuts are processed into crude or de-colourised, triple-filtered illipe nut butter at their processing plant. The improved economic value of the illipe nuts and fair benefit sharing throughout the process incentivises the communities to protect the rich standing forest from which the illipe nuts are harvested and brings high-end products and ingredients to national and international cosmetic markets.

j. Local community estimates

CHAPTER 4:

Overcoming current barriers to achieving rapid scaling

Field workers plant new trees and take care of newly planted ones at the Cinta Raja Rainforest Restoration Site in Gunung Leuser National Park (GNLP) in Sumatra, Indonesia.
Panos Pictures 2019

As the case study catalogue demonstrates, innovative regenerative forest business models are already being deployed across the tropical belt: from landscape-scale partnerships with large corporates to new pharmaceutical and cosmetic products being sustainably produced in forest ecosystems. But they are too small, and too few. Desktop analysis reveals that regenerative business models currently cover around 60m hectares of the forest frontier – equivalent to just 10 percent of the total area (see Figure 5).[k] The challenge now is to rapidly scale them up, so that they can form an effective and complete 'seal' to the Forest Frontier by 2030 and realise the shift to a prosperous forest economy. This urgency is driven by 'FOLU Growing Better' report analysis which shows that by stopping global deforestation within the next decade we maintain a chance of keeping within a 1.5 Celsius climate warming pathway. The regenerative business models showcased in this report can provide a critical part of that solution by protecting the remaining tropical forests behind the forest frontier.[24]

Closing the forest frontier will require visionary leadership and direction setting – a direction driven by the imperative of an unfolding climate emergency – and the commitment and practical mindset to translate that into action. Massive rises in public protection and enforcement are essential. But alone they are not enough. Analysis for this paper reveals that, even under the most ambitious scenario of increases in public Protected Areas, more than 300 million hectares of land surrounding tropical forest will

k. Best estimates based on available location data of recorded projects. Further work is required to map all projects, including indigenous lands.

need to be under additional forms of sustainable management by 2030.[l] This equates to compound annual growth rates of regenerative business models of more than 20 percent over the next decade.[m]

Today's realities at the forest frontier involve extractive models, social injustice, and the replacement of highly complex and valuable forest ecosystems with monocultural plantations. How to shift from this? How to kick-start a regenerative transition and create a diverse, productive and resilient buffer that can seal off critical deep forest behind it? Firstly, by closely examining the barriers that have historically held back this transition.

WHAT CAN EXISTING PROJECTS TEACH US ABOUT BARRIERS TO SUCCESS?

An analysis of existing case studies provides clear learnings about the barriers to success and insights as to how these regenerative business models can be helped to scale across the 600-million-hectare tropical forest frontier. Each region and regenerative business model brings its own unique challenges, yet certain themes and learnings are consistent.

Weak policy frameworks, entrenched mindsets and behaviours, lack of information and data available to key actors, and restricted access to the right types of capital are all important factors. Further detail on these and other current barriers are provided below, whilst the later sections of this chapter lay out a series of recommendations.

POLITICAL AND REGULATORY[n]

- **Lack of regulatory and policy incentives:** Current policy and regulatory frameworks do not sufficiently support or enable regenerative practices. For example, there are currently little or no tax reductions or other incentive schemes for concession holders who choose to engage in value from standing forest business practices, versus those that practice extractive commodity production who often are subsidised throughout their value chain.
- **Lack of regulatory sanctions:** Current frameworks do not create a level playing field between extractive and regenerative businesses. Insufficient policies exist to sanction unsustainable practices, in some cases even favouring them (e.g. forest concessions being made available at well below their real economic value, encouraging maximum extraction and expansion). Furthermore, governments in many developed countries have created mandates which have unintentionally increased deforestation pressures, notably in the case of bioenergy.

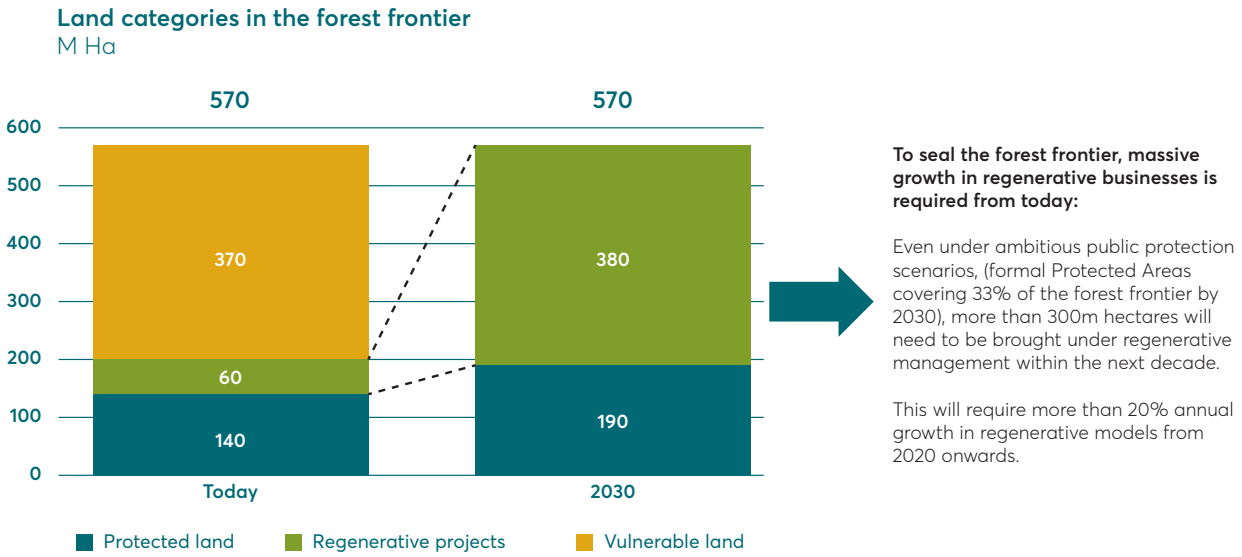
l. Assumes a maximum of 33 percent of the forest frontier under formal protection by 2030, in line with targets of the Global Deal for Nature.

m. Assumes a constant forest frontier land area at 2019 levels (~600m ha).

n. For an in-depth review of public policies in relation to forests, refer to the sister paper published separately: *Public Sector Measures to Conserve and Restore Forests: Overcoming Barriers.* World Resources Institute, 2019.

FIGURE 7

Required scaling up of regenerative business models and protected land over the next decade to effectively seal the forest frontier



To seal the forest frontier, massive growth in regenerative businesses is required from today:

Even under ambitious public protection scenarios, (formal Protected Areas covering 33% of the forest frontier by 2030), more than 300m hectares will need to be brought under regenerative management within the next decade.

This will require more than 20% annual growth in regenerative models from 2020 onwards.

- **Corruption and weak enforcement**: Enforcement capabilities are often deeply under-resourced and underfunded, particularly in less economically developed countries. Lack of information (e.g. land data and records) or corrupt practice mean that encroachment and forest conversion can happen, even at large scale, without accountability or punishment. Estimates suggest that trade in illegal forest products is as much as US$100 billion per year.[25] However, national and international law enforcement agencies have, with some strong exceptions, not treated this as a priority crime.

ECONOMIC AND FINANCIAL

- **Insufficient access to upfront and working capital:** Certain regenerative businesses can require upfront financing to establish. Often, the one-off capital requirements for this (albeit low in relative terms) prove too high for local actors or indigenous communities. For example, certain forest harvesting models can require processing facilities, but without capital to establish these facilities local communities are unable to generate the end-product (e.g. an extracted oil) that has market value. Working capital facilities are largely non-existent for novel products or commodities that are not well established in today's markets.

- **Limited access to (impact) investors:** The relatively low (by international standards) investment requirements for many forest-based businesses can make it challenging for larger (institutional) investors to commit capital. Similarly, there is very little awareness in the impact investment market about the nature of these businesses and their investment characteristics (investment requirements, return profiles, etc.) meaning that large sections of the market remain unaware of the opportunity. The commodity merchants specialising in agriculture are focused on a very small representation of the full breadth of potentially lucrative tropical forest commodities.

- **Unproven, uncertain or misunderstood risk-return profiles:** Some regenerative businesses are new, sometimes unproven and mainly unfamiliar to most markets. This increases the perceived risk-return profile and reluctance to invest for potential investor groups. The difficult environments in which these businesses operate (e.g. remote locations, poor infrastructure) mean that revenues and returns can have a degree of unpredictability, yet it is often the unfamiliarity with the sector and location that is the largest barrier. In contrast, the business model of converting forest to monocultural commodity production is well known.

- **Establishment and transition costs and time-lags:** There remain perceived or real transition costs moving from unsustainable deforestation practices to sustainable regenerative practices. For example, producers may need to reduce the size of their current production area, incurring an opportunity cost of bringing land into restoration. Similarly, in the absence of functioning ecosystem service markets, models that restore degraded land can have long time periods before first cash-flows are generated.

BEHAVIOURAL AND SOCIAL

- **Lack of individual incentives:** In current political and regulatory climates, the incentive to change is often severely lacking. For example, lack of clarity of land tenure allows a small number of individuals to wield significant power and reap benefits across large tracts of land. Their incentives to shift to a transparent, more distributed, land-tenure model are low.

- **Entrenched mindsets and behaviours:** The history of forest-based business is one of extraction and unsustainable practice. Shifting cultural and behavioural practice away from traditional or historical means can be difficult and require long time periods; one such example is cocoa producers being reluctant to shift to climate-smart practices, despite the potential of increased yields.

- **Insufficient investment in establishing trusted partnerships:** Regenerative models often rely on public-private partnerships, including with communities. These require a significant degree of trust on all sides to maintain the relationship, particularly in areas with fragile land tenure regimes. Trust is a vital component for market interest in payment for ecosystem services.

TECHNOLOGICAL, OPERATIONAL AND MARKET

- **Supply instability:** Certain models involve the development of a new or niche product (e.g. illipe nut for cosmetic products, or "Dragon's Blood" resin known for use in natural herbal remedies). Many models need a secure supply to maintain relationships with buyers. However, prediction can be difficult in the case of wild harvesting models, where nature commands the harvesting cycle, with climate impacts increasing this unpredictability.

- **Uncertain or insufficient demand:** Consumer awareness remains low of the impact of a vast range of currently produced commodities and supply chains on deforestation (e.g. cocoa, coffee, soy, palm oil). The major multinationals have struggled to develop reliable deforestation-free supply chains, partly because buy-in to that concept has been far from universal and has not yet created a "race to the top" with consumers.
- **Weak traceability and accountability:** Linked to both supply and demand market barriers, the lack of transparency and accountability in supply chains makes it extremely difficult for regenerative products to create market differentiation, or for unsustainable commodities to be held accountable for their negative social impact.
- **Lack of information:** Despite huge improvements in our understanding of forests – such as their irreplaceable role in the global carbon and climate cycles, and factors driving their loss – major information gaps remain. This includes a current information failure on how to maintain and restore the complex and deeply interrelated ecosystem services gained from natural ecosystems.
- **Immature or emerging technologies:** Where products are being developed for niche or premium markets there are technical challenges related to meeting international quality standards, particularly for cosmetic and food markets. These can relate to quality assurance, refrigeration needs, or highly skilled processing requirements.
- **Lack of capacity and awareness:** This applies to both the supply and demand sides of the business model landscape. Supply side: on-the-ground actors often lack the experience or skillset to identify, establish and grow regenerative businesses (e.g. indigenous communities may require technical assistance in the processing and packaging of a forest product). Demand side: Traders, as an example, may not understand the long-term opportunity in regenerative business models and will therefore not provide offtake agreements that solve some of the economic and financial barriers facing suppliers.

FIGURE 8

Summary of important barriers currently preventing regenerative models from scaling

Low Medium High

Barrier category	Specific barrier	Relevance to different business model categories: Standing Forest	Production-Protection	Forest Regrowth
Political and regulatory	Lack of regulatory and policy incentives	High	High	High
	Lack of regulatory sanctions	High	High	Low
	Corruption and weak enforcement	High	High	Medium
Economic and financial	Insufficient access to upfront and working capital	High	High	High
	Limited access to investors	High	High	High
	Unproven or uncertain risk-return profiles	High	Low	High
	Establishment and transition costs and time-lags	Low	High	High
Behavioural and social	Lack of individual incentives	High	Medium	Medium
	Entrenched mindsets and behaviours	High	High	High
	Insufficient investment in establishing trusted partnerships	Low	Medium	Medium
Technical, operational and market	Supply instability	High	Medium	Medium
	Uncertain or insufficient demand	High	Medium	High
	Weak traceability and accountability	High	High	Low
	Lack of information	High	High	High
	Immature or emerging technologies	Medium	Medium	High
	Lack of capacity and awareness	High	High	High

Field workers plant new trees and take care of newly planted ones at the Royal Lestari Utama plantation in Sumatra, IndonesiaPark (GNLP) in Sumatra, Indonesia.
P4F

Sustainable natural rubber production

PT Royal Lestari Utama

Natural rubber is harvested in the form of the latex from rubber trees. In 2016, 93 percent of global natural rubber plantations were located in Southeast Asia. The tyre-making industry consumes 75 percent of this rubber. Natural rubber's elasticity, plasticity, high wear and heat resistance make it a vital raw material for tyres and no satisfactory substitute has yet been discovered, especially for use in high-quality tyres for heavy vehicles and aircraft.

To address the need for sustainable rubber supply, three private entities, including major tyre producers Michelin and Barito Pacific Group, have joined to create PT Royal Lestari Utama (RLU). The goal of the project is to become a global leader in producing sustainable natural rubber, with full vertical integration from plantation to product (re-milled latex).

The RLU plantation is split across Jambi (70,000 hectares) and East Kalimantan (18,000 hectares), on land which has suffered severe deforestation and degradation in the last two decades. Rubber will be planted on around 34,000 hectares, ensuring best operational, environmental and social practice. The remaining area will be used for community partnership programmes (CPPs), conservation and restoration. Through this work, RLU will produce a sustainable natural rubber supply that results in positive social and conservation outcomes. Michelin and Barito Pacific Group will gain significant benefits from securing a sustainable supply of natural rubber, allowing it to hedge against competitors during high resource prices, differentiate itself from lower-cost producers and secure long-term supply by avoiding rubber plantations switching to palm oil.

Demonstrating how wild forest honey is collected from a sialang tree
Stuart Clouth/P4F

Wild Forest Honey

Javara and PT Alam Bukit Tigapuluh

The giant honey bee builds its honeycombs in the sialang tree in tropical Indonesian forests. Flavoured by forest flowers and rich in vitamins, minerals and amino acids, the honey's great taste, health benefits and strong social and environmental story appeal to consumers.[30]

PT ABT, an Ecosystem Restoration Concession in Jambi, is partnering with ethical Indonesian food producer Javara to build a transparent value chain and brand for the luxury and premium honey market. Working across nearly 39,000 hectares of lowland tropical forest, the honey will be harvested using a sustainable harvesting process.

By 2020, ABT intends for its honey to be a recognised premium brand in Indonesia, with annual production at two to five tonnes. This could provide an increase of up to 20 percent on current income for the forest communities involved in the honey harvesting and processing. For ABT, the revenue from forest honey in the ERC is estimated at around one-third of the overall ERC operational costs including costs of conservation efforts for that area. A broad variety of other forest products are in the process of being commercially utilised, paving the way towards cash-positive ecosystem restoration management.

> **This honey is special. Collected from the wild forest, everything is genuine and natural. According to the surrounding plants, beehives hanging in every tree offer distinct taste.**

A practical and urgent set of 10 recommendations, backed up by best-practice examples

Outlined below are a set of recommendations, built to address the barriers outlined above. Also included are best-practice examples of where regenerative solutions are already being applied, that aim to serve as a source of both guidance and inspiration. These recommendations have a deliberate focus on businesses and their partners but will be impossible without urgent and fundamental fiscal and policy shifts, not only by tropical forest countries, but by all countries whose economic and environmental footprints leave a mark on the forest frontier. As such, they are not intended to exhaustively cover all requirements needed to achieve such a regenerative transition. Our sister paper sets out these clear policy recommendations. [26]

FOR FARMERS, FOREST STEWARDS, LAND HOLDERS AND THEIR INVESTORS

1. **Establish businesses focused on ecosystem restoration and protection and leverage all value streams to improve returns and cashflow timings.** First and foremost, the recommendation is for new actors to enter the space of regenerative businesses. Business models that place restoration and protection of natural capital at the centre of their value proposition not only provide the means to better understand the complex benefits provided by nature but are also a future-proofed and resilient investment. Nature-based business models offer the chance to generate a diverse and integrated set of revenues, across different time-scales. With some of these being available very quickly, and others maturing over time, natural production systems can provide effective diversification, reducing the exposure to production risks (such as disease) and market fluctuations (driven by factors out of control of the individual producer) to which monocultural production systems are vulnerable.

   Example of best practice today: This report offers a rich catalogue of examples. An example not covered in the case catalogue is the Katingan-Mentaya project in Indonesia, which is not only one of the world's most significant climate protection projects, but also delivers critical protection for biodiversity and income streams for local communities. The largest programme of its kind, the carbon it sequesters is equivalent to taking 2,000,000 cars off the road each year, whilst the vital peatland it protects provides home for nearly 50 endangered or vulnerable species, including the iconic orangutan.[27] These environmental and social services, which are delivered by the project and its resident communities, are financially rewarded: payments are made for the preservation and restoration of land by organisations who wish to compensate or offset the environmental externalities generated by their operations (e.g. carbon emissions created through the manufacturing of goods).

2. **Partner with local communities to reach markets for their regenerative products.** Indigenous groups and other local communities are a major land holder across the tropical belt and have, through many generations, built unique knowledge of surrounding nature and ways to harness products and benefit in a long-term and balanced way. Their scale of production, unfamiliarity with national or international markets and business approaches are some of the challenges holding them back from fully monetising this knowledge. So-called "market access players" can unlock these value chains by establishing the needed industrial processes to produce market-ready products and applying their business skills, networks and access to capital, hence allowing communities to access new markets.

Examples of best practice today: Forestwise[o] works in the heart of Borneo with Dayak communities to bring cosmetic products from wild forest production to international markets. The Dayak communities have legal rights to utilise the non-timber products of their forests and employ their unique knowledge of the area, seasons and native biodiversity to collect items such as illipe nuts and sap from trees. Forestwise has built local storage and production facilities, where the raw input is converted into semi-finished (e.g. illipe butter) or finished goods (soap) before being sold to cosmetic manufacturers/retailers like Lush, or directly to end consumers.

Komaza[p] works in Kenya to establish micro tree farms that produce timber for sale into high-value industrial markets (such as veneer, plywood, briquettes), using waste materials as a sustainable source of fuelwood. To do this, Komaza partners with smallholder farmers: the smallholder provides the land and labour and Komaza provides seeds, training and support on optimising production (e.g. logistics, implementation of an industrial process, marketing and sales). Komaza's innovative model enables smallholders to gain an income from their previously unproductive land and, because there is no need for purchasing land and labour, enables trees to be planted 65 percent more cheaply than on traditional commercial plantations.

3. **Secure land tenure and sustainable intensification services for local communities.** There is clear evidence of the positive effects of secure land tenure on productivity, forest protection, fire prevention and other broader social and economic impacts. Across the tropical forest frontier, national governments are putting in place regulations to support land tenure for smallholders and indigenous communities. However, these groups often need help in order to secure their legal rights. The private sector can facilitate land tenure processes in their supply or production areas, which in turn will lower their own operational risks. Combined with sustainable intensification and support on best agriculture practices, the plantation holder can help increase economic productivity for the local communities, and thereby stabilise the landscape.

   Example of best practice today: Sinar Mas is working with communities located in the surrounds of their concessions in Indonesia, as well as with local government actors, to ensure community tenure and forest protection are embedded in local law and spatial planning. The company has already mapped hundreds of thousands of hectares of community land and forest and is supporting the legal process to recognise the zoning and tenure of this land. In a parallel process, Sinar Mas is offering intensive support on best agriculture practices to the same communities to enhance their production and strengthen their livelihoods.

4. **Invest in ecosystems as a risk management strategy.** Both the management and understanding of environmental risks, including forest impacts, remain inadequate. Companies with direct exposure and reliance on natural systems, agricultural and commodity producers in particular, should invest in protection of natural ecosystems and active restoration to secure the environmental services they deliver; services such as pollination, clean water and climate regulation on which their businesses depend. Not only this, sustainable investments today can protect organisations from future regulatory or reputational risk in relation to environmental liabilities or externalities. To deliver the appropriate results of ecosystem management, it is crucial to incorporate

o. Featured in the Case Study catalogue.

p. Featured in the Case Study catalogue.

it into business processes (for example, in employee performance management). Targets should be explicitly linked to natural capital rather than current measures which are heavily focused on financial capital. This is just as true for plantation managers as it is for purchase departments, marketing teams and executive decision-makers.

Examples of best practice today: Michelin and Barito Pacific have engaged in a natural rubber plantation joint venture.[q] *Here, a relatively small proportion of land (less than 40 percent) will be planted in industrial rubber while the rest will be left for conservation, restoration and community partnership programmes. Protecting non-production areas secures their core environmental services, ensures the partners are compliant with current and future legislation and allows them to secure a positive consumer reputation. The establishment of wildlife corridors further mitigates one of the core risks for their young rubber trees: the risk of destruction by migrating elephants.*

New Forests, a sustainable assets investment manager, has three investments in Southeast Asia that all set aside substantial areas for protection and conservation. Their investment approach focuses on certified plantation forestry with an emphasis on technological and silvicultural improvements and a rigorous approach to environmental and social values and good governance. New Forests has a Responsible Investment Policy and operates a company-wide Social and Environmental Management System (SEMS) designed to systematically identify, manage, and report on social and environmental issues and potential impacts. The SEMS ensures a consistent approach to social and environmental management across all investment activities and enables monitoring of performance, operational and management controls, and continual improvement.

5. **Direct research and innovation budgets towards solutions which mimic nature.** Four billion years of evolution has created exceptionally complex, interrelated and dynamic natural ecosystems which regulate and deliver environmental services. However, humanity's understanding of this complexity is limited – from a lack of understanding about individual components of the system (e.g. species), to their properties (e.g. chemical make-up) to how they interact (e.g. the dependence of different elements of the system to each other). By investing to understand these systems, humanity can unlock a vast and untapped library of solutions.

   Example of best practice today: REBUILD[r] *is a promising programme in Indonesia which builds on decades of forest research by creating a re-planting regime for degraded land which aims to mimic the richness and productivity of natural forest, increase biodiversity whilst also producing a range of commercially viable products. Although further testing is needed, significant investments in both the research and continual development of this mixed agroforestry system have enhanced understanding of the delicate dynamics of forest ecosystems, and hence how to restore them in a way that maximises both environmental outcomes and benefits to humanity. The system is able to produce more than 30 goods (such as biofuel sources, biocoal, natural fertilisers, food, timber and feed stock) at the same time as regenerating forest.*

FOR THE FINANCE, INSURANCE AND COMMODITY TRADING SECTORS

6. **Establish innovative and/or concessional finance and insurance mechanisms and trading platforms to scale regenerative practice at ground level.** An increased focus on regenerative businesses can be a future-proofed and resilient investment. As stated above, natural production systems can provide effective diversification, reducing the exposure to production risks (such as disease) and market fluctuations which are driven by factors out of control of the individual producer and to which monocultural production systems are vulnerable. In addition, natural production techniques provide protection from regulatory or reputational risk in relation to environmental liabilities or externalities. However, few finance, insurance and

q. Featured in the Case Study catalogue.

r. Featured in the Case Study catalogue.

trading houses are proactively engaged in this area, and significant further engagement is required by philanthropical and development finance. These institutions need to invest dedicated resources into understanding the opportunity and build up internal capacity to engage with this new and increasingly important area. Capturing the full benefits and opportunity will require new tools, systems and expertise.

Examples of best practice today: The Tropical Landscapes Finance Facility is facilitated by UN Environment, World Agroforestry Centre, ADM Capital and BNP Paribas. This dedicated financing mechanism is catalytic because it mobilises international capital markets via secured development funding, allowing conservation to be built into mainstream commodity production.

The Responsible Commodities Facility coordinates a suite of activities to promote the production and trade of responsible commodities in Brazil, starting with soy and corn. It provides competitive credit lines for producers that meet certain eligibility criteria. For example, the facility creates incentives for farmers that restore unproductive cleared lands. The facility works with existing commodity traders and links with an electronic exchange to facilitate the commercialisation of responsible commodities.

7. **Embrace real-time, open-access information systems to enable better risk management of environmental externalities in existing portfolios and value assessment of regenerative businesses opportunities**. Many members of the financial sector have signed up to sustainability standards and rely on certification to inform their portfolio choice. More is needed. The financial sector can take advantage of its portfolio position to invest into information systems that might not be economically attractive – or feasible – for the individual producer. Remote sensing and other technology solutions provide increasingly better and cost-efficient ways to understand our natural systems and assess risks in the land use value chains. Intelligent algorithms allow processing of previously unthinkably large volumes of data and to begin an era of "radical transparency": where the true nature of environmental and social impacts is understood by users through the provision of standardised, credible and easily accessible information. This can lead to a larger focus on regenerative practices and increased risks associated with unsustainable ones.

   Examples of best practice today: Bluenumber is a solution to digitise today's largely analogue commodity value chains. It can identify and engage workers, farms, mills and distribution points within complex value chains and thereby enable information flows and full transparency. Through Bluenumber's analytical services, it helps detect risk patterns, inefficiencies and vulnerabilities in the value chain. This can help ensure compliance with regulation, mitigate reputational risks and reduce delivery risks.

FOR BUSINESS ASSOCIATIONS, ROUNDTABLES AND OTHER CONVENING INSTITUTIONS

8. **Encourage and endorse moratoria and similar policy and voluntary business initiatives to motivate better land use planning.** Businesses should anticipate future requirements to pay for environmental externalities and liabilities, both historic and anticipated. Moratoria of different kinds are a first step towards this, and are widely used by policymakers to signal the value of nature and incentivise protection. Moratoria should be endorsed and actioned by the business community involved in deforestation-risk practices (e.g. production of agricultural commodities) to help build better land use practices across the sector, and create a level playing field for change. Therefore, detailed land use plans, and environmental externality calculations should be used to set ambitious and future-proofed targets. Tools and technologies must be further invested in which better define forest types, characteristics and values, to distinguish natural forest areas requiring full protection from fully degraded or agricultural land which can be targeted for production or restoration.

   Examples of best practice today: The

High Carbon Stock (HCS) Approach is a methodology that distinguishes forest areas for protection from degraded lands with low carbon and biodiversity values that may be developed into commodity production. The methodology was developed by business and civil society members with the aim to ensure a practical, transparent, robust, and scientifically credible approach that is widely accepted to implement commitments to halt deforestation in the tropics, while ensuring the rights and livelihoods of local peoples are respected. The HCS Approach is now being used across several high deforestation risk commodities such as palm oil, rubber and pulp and paper.

The Soy Moratorium in Brazil was driven by the private sector, helping to reduce soya's share of recent Amazonian deforestation from one fifth to less than 1 percent.[28]

9. **Implement systems of payments for environmental services.** Associations can incentivise regenerative practices by implementing a voluntary system of payments for the delivery of environmental services and penalise environmental externalities and liabilities. Payments for environmental services (PES) can tip the financial equation to make regenerative practices more economically attractive than destructive ones for the individual farmer, and hence provide the catalyst for scaling these models across value chains.

   Examples of best practice today: The Roundtable for Sustainable Palm Oil (RSPO)[s] *members have agreed to compensate for historic deforestation liabilities by making conservation payments into High Conservation Value (HCV) and High Carbon Stock (HCS) landscapes. The Sustainable Commodities Compensation Mechanism (SCCM) enables RSPO members to effectively allocate these conservation outcome payments to communities or other forest stewards.*

   The Carbon Offsetting Scheme for International Aviation (CORSIA) is the airline industry's global, market-based measure to address climate change challenges, aiming to stabilise net CO_2 emissions from international civil aviation at 2020 levels. First activities will begin in 2021 and forestry is explicitly included as a mechanism by which airline emissions can be offset, hence providing an opportunity to channel capital towards forest protection and restoration.

FOR MARKETING AND SALES PROFESSIONALS

10. **Connect consumers with nature and people.** There is a global rise of climate awareness that is catalysing individual action, from climate demonstrations to climate-conscious consumption patterns. By implementing previous recommendations such as reducing the number of steps in a value chain through market access players, to leveraging today's technology, consumers can be linked directly with individual farmers and foragers, as well as the nature on which those farmers and foragers depend. Creating this link meets the increasing consumer demand for more ethical value chains that help solve the climate crisis. It provides all actors with better information, increasing transparency, fairness of pricing and enables more responsible consumer behaviour. This is also an enormous opportunity for marketing and sales professionals to truly connect the consumer with the origin of everyday products (such as food, beverages, fuel, cosmetics, furniture, medicine) and to tell human, climate and biodiversity stories behind each product. The most creative companies already have the opportunity to provide consumers with exclusivity of supply down to an individual farmer, plant or tree level. A novel and powerful way to retain consumers.

    Examples of best practice today: A range of niche brands are being established that connect the end-consumer with individual farmers or nature. For example, the range of native and wild products in Indonesia's forests have inspired companies such as Javara to launch sialang honey, where the consumer can connect with the foragers that harvest the wild honey from specific sialang trees. The consumer knows exactly which tree the honey is harvested from and will know the story of the nature surrounding it. Slow – a new coffee brand – provides unprecedented connection between an individual coffee enthusiast with an individual coffee farmer. Slow offers the service of continued supply of coffee from that same farmer, and a unique range of ways to connect with the full production process, including regular and personal updates from the farmer, news from the community and insights into how the farmer restores forests and thereby fights climate change.

s. Featured in the Case Study catalogue.

Mr Khamtai from Houay Way Village demonstrating Slow Coffee products
Slow Coffee

Shortening the coffee value chain

Slow Coffee

The coffee industry today is characterised by challenges, both social and environmental. The structure of coffee value chains can be complex, with low levels of transparency. Upstream, the smallholder producers are exposed to large swings in prices and predatory sourcing practices. Furthermore, coffee is naturally a well-suited plant for agroforestry cultivation, an increasing number of farms globally are unshaded monoculture plantations, contributing to deforestation and soil degradation. The trend is further exacerbated by the generally low prices in today's market.

Slow offers an alternative model. It directly connects smallholder farmers practicing regenerative coffee agroforestry or wild forest coffee collection to business and private customers, under long-term contracts or a subscription service. By cutting out middle-men, the farmers obtain higher prices for their crop and a voice to retain customers. This in turn incentivises farmers to maintain their climate and forest conservation practices, high-quality coffee production techniques as well as to share relevant information about these practices. In return, customers have an exclusive and unique experience that increases their loyalty and likelihood of future purchases.

A call for collective and system-level action

As the recent and catastrophic tropical forest fires in the Amazon, Congo and Indonesia basins demonstrate, current human activity is pushing tropical ecosystems – and the planet – to the brink. We have a narrow window in which to shape a new agenda for tropical forest economies, and less than a decade to implement it.

To create diverse, productive and socially equitable forest economies that can provide livelihoods and security to millions of the world's poorest people, and protect the world from runaway climate change, business actors and policy decision-makers must act with immediate effect. They must revolutionise the scale at which natural capital investments are made, forge bold, unprecedented and innovative partnerships in forest economies and transform the way in which environmental benefits and externalities are reflected.

Change will not be easy, or simple. New regulatory foundations may be complex and painful to implement – and require the acknowledgement and acceptance of trade-offs. Substantial financial investments must be made, both by private and public actors, such as the implementation of a liquid payment for environmental service markets across the globe that includes services from tropical forests.[t]

Inspiration can be drawn from the case study level, to the country level and extended to a view of the opportunity across the tropical belt. At the case study level, the rich and varied range of regenerative models showcased in this paper prove what is already being done in and around vulnerable forests. At the country scale, the progress Indonesia can demonstrate since the devastation of the 2015 fires shows what can be achieved when effective policies and implementation are combined: a more than 40 percent decrease in primary forest loss compared to losses from 2002–2016.[29,u] Unfortunately, this positive story might be fragile. Brazil was demonstrating significant results in reduction of forest loss over the period of more than a decade, largely driven by policy and enforcement initiatives. With a new government in place, the deforestation rate in Brazil is increasing again at alarming speed.

Collective and system-level action is thus needed to solve this challenge. There is a chance to combine the right policies and enforcement to showcase a credible direction for tropical nations and regions. The private sector needs to step in and make that change more permanent by establishing regenerative businesses at the local level that lock in positive land use management for the coming decades and even centuries.

The opportunity is there to be taken. It is there in the astonishing abundance of natural forest products that can be harvested, processed and sold to create secure and equitable livelihoods. It is there in the unique mix of productive tree species that can be planted to restore economic, environmental and social value to currently degraded and devastated landscapes. And it is there in the trusted and lasting partnerships being formed for the first time between leading global organisations and farmers and foragers of the forest.

The opportunity is there. But it will be gone unless we choose to seize it.

t. The FOLU Growing Better report argues for a US$20–50 billion annual payment for environmental markets.

u. As of September 2019.

BOX 2

The protection of Southern Sumatra's remaining forests – an emerging story of new policy direction followed by regenerative business models delivering the potential for sustained forest protection

The story of Southern Sumatra – although still facing many challenges – provides the early signs of a system-level change story initiated by government policies and followed by private action. It shows not only how regenerative models can establish and mature in a landscape, but also how they can be combined to create an effective, diverse and productive forest economy. Southern Sumatra's progress involves the building blocks of effective policy, the entrepreneurialism of "first-mover" private actors and the demand of both corporates and civil society to create change.

The enabling conditions

The right policy foundations are fundamental to the establishment of any successful forest economy. In response to the devastating deforestation impacts of industrial-scale agriculture and commodity production, the Indonesian government laid the framework for change to happen. In 2011, it announced a moratorium on further conversion of primary forest. In parallel, the international community continued to build policy and financing signals: the evolution and strengthening of the international REDD+ mechanism, and the 2014 New York Declaration on Forests. At a more granular level, Indonesia introduced a licensing system that not only set ambitious targets for increased community forestry ownership, but also incentivised the involvement of the private sector in the restoration of forest (previously the private sector could only manage plantations). It also took huge steps to address the deeply damaging information gaps that existed on the status of land ownership in different parts of the country by creating "One Map": a single source for all government and private land use planning, and a way to solve overlapping or illegitimate land use claims. The above activities came on top of extensive national parks in the area, and national/international government support for improving the management of these parks.

The regenerative business pioneers

Enabled by this policy-setting, pioneers began to invest time and resources into Southern Sumatra's forests. Independent actors saw the future financial viability of regenerative models and took out long-term agreements on forest concessions (up to 95 years). One actor is the tropical agricultural commodities company, SIPEF, which has a restoration concession on the border of a national park. SIPEF can use this restoration concession to settle potential RSPO compensation claims in its plantation business and is also utilising it for wild forest production. Hutan Harapan and Alam Bukit Tigapuluh are two other restoration companies owned by, amongst others, internationally known NGOs such as WWF, RSPB and Frankfurt Zoological Society. Their combined aim is to protect an area roughly twice the size of Singapore. They produce forest goods to finance their own operations, and to create jobs and income opportunities for local communities. Around Bukit Barisan Selatan national park, a sustainable buying consortium, including global brand names like Nestle and Olam International, are being facilitated by the Wildlife Conservation Society (WCS) to source sustainable coffee, cocoa and other agroforestry products. The agroforestry production works as an economically productive buffer around the national park and in return for forest stewardship the local farmers receive premium prices for their beans and other products. The Michelin and Barito Pacific joint venture on natural rubber plantation, featured elsewhere in this report, is also operating in this landscape.

BOX 2 (CONT'D)

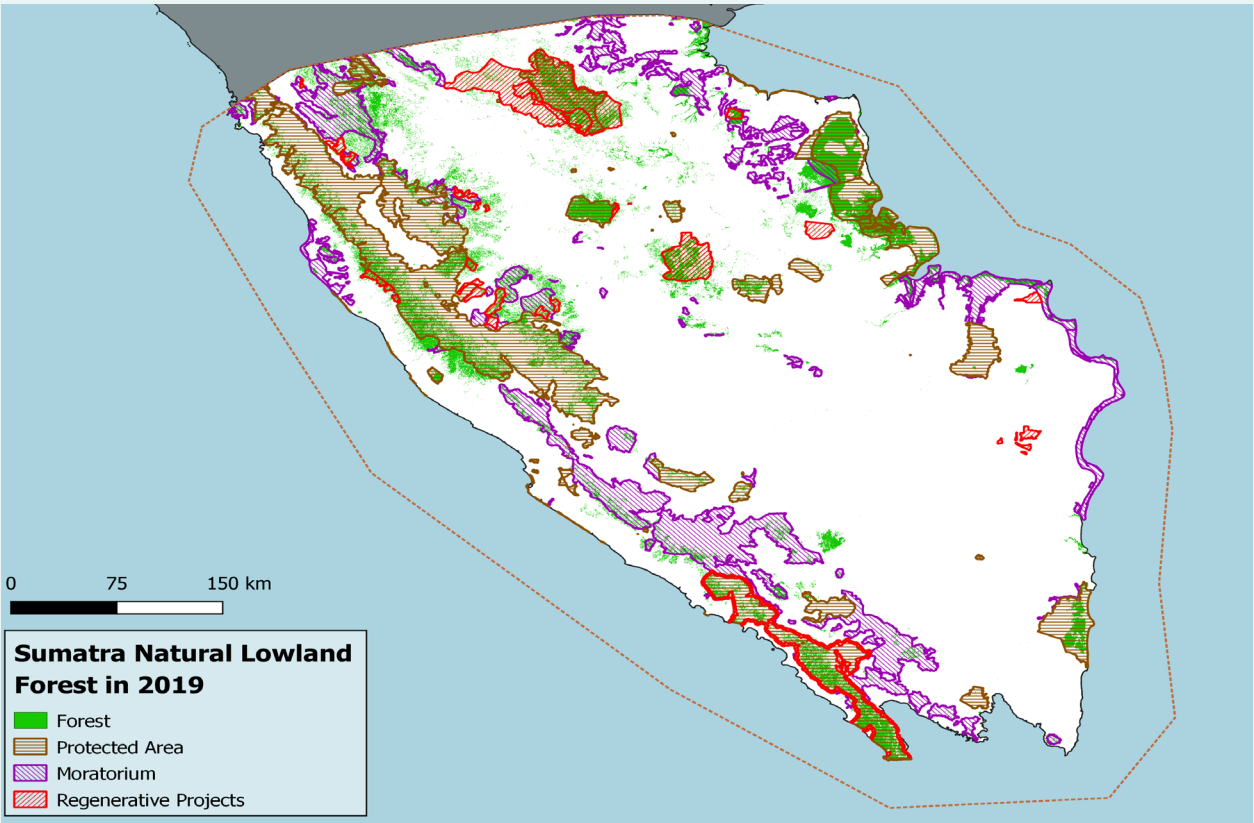
The results

Today, as much as 80 percent of Southern Sumatra's remaining lowland forest landscape is under the protection of an integrated network of public policy initiatives and regenerative business models (see snapshot below).[v] Although there remains huge work to be done, and significant parts of Sumatra remain deeply under threat, there are nonetheless many positive lessons to learn. This 'mosaic' of regenerative models and public protection mechanisms at the forest edge is cumulatively helping to secure most of Sumatra's remaining forest, whilst effectively creating a new, regenerative asset class. In total, this network covers >1 million hectares of natural forest in one of the most carbon-rich and biodiverse areas of the planet; total forest and peat carbon stored here is estimated to be more than 16 billion tonnes, or around 4% of the remaining global carbon budget for a 1.5 degrees world. This collective action of policy, private and civil society actors show how system-level action could be achieved over time.

v. SYSTEMIQ analysis, 2019

FIGURE 9

A current snapshot of Southern Sumatran forest management, achieving approximately 80 percent coverage of remaining forest



*Protected area includes grand forest parks, national parks, nature reserves, nature recreation parks, hunting parks and wildlife reserves.

Data Source: Indonesia Primary Forest in 2000 (Margono et. al., 2012); Indonesia Forest Cover Loss 2001-2018 (Hansen et al., 2019); Indonesia Landform (Margono et al., 2012)

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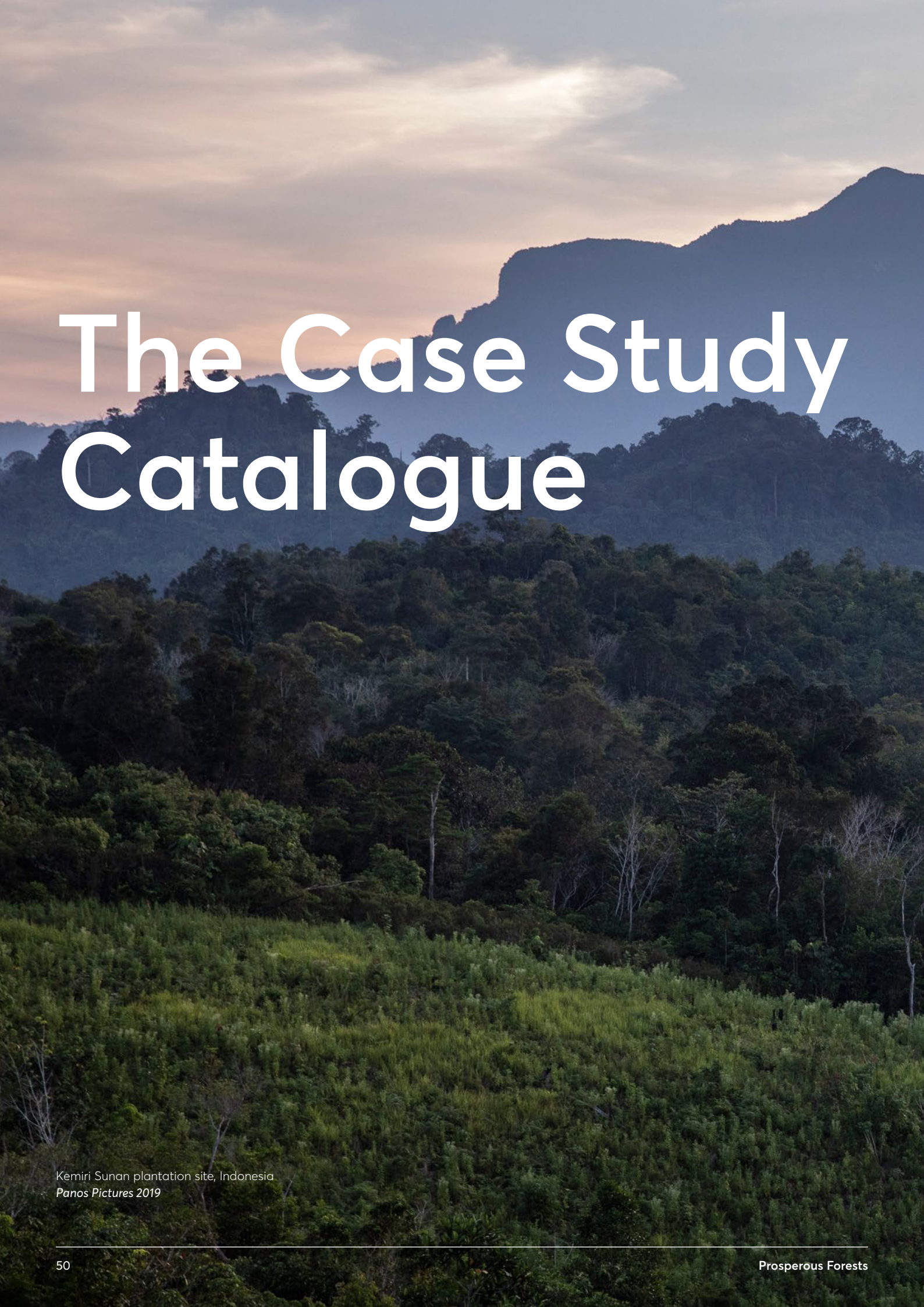
The Case Study Catalogue



Kemiri Sunan plantation site, Indonesia
Panos Pictures 2019

EAST AFRICA

Ethiopian native forest coffee

COMPANY: 58 farmer cooperatives, Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ), a government development agency; TechnoServe, a non-governmental organisation; coffee brands: Happy Goat Coffee Company, Original Food, Union Coffee, Moyee Coffee and Solino Coffee.

PROJECT LOCATION: SNNP Region[1] (Kaffa, Sheka, and Bench Majji zones) and Oromia Region (Bale, and Illubabor zones), Ethiopia

ARCHETYPE: Creating value from standing forest

THE CHALLENGE

Coffee grows in about 400,000 hectares of Ethiopia's forest, including some of its last remaining old-growth forests in the Kafa and Sheka regions.

These forests sequester high amounts of carbon, promote biodiversity and provide the genetic base for high-quality Arabica coffee. The Kafa Forest alone contains over 5,000 varieties of coffee.

However, agricultural expansion and fuel wood demand have led to the loss of a third of Ethiopia's natural forest[2] and, despite the evidenced potential of Ethiopian forests to produce high-quality coffee varieties, coffee is currently sold at commodity-grade prices.[3]

Selling Ethiopian forest coffee as a premium-value crop could provide an urgently needed incentive for farmers to support forest conservation.

VALUE CREATOR

Ethiopia is the largest producer of Arabica coffee in Africa and the fifth largest coffee producer in the world,[4] with coffee generating 5 percent of the country's GDP and nearly a third of its foreign currency earnings.[5] The sector employs 25 percent of the country's population, around 20 million people, 95 percent of whom are smallholders working on one or two hectares of land.

An estimated 45 percent[6] of the country's total coffee production is 'wild' and grown in forested areas, forming part of a broader economy of forest products that provide an income to Ethiopian households.[7]

THE REGENERATIVE MODEL

While much of Ethiopia's coffee is harvested from commercial plantations and smallholder gardens, a large number of people have access to forest containing wild coffee.[8]

There is potential to sell this as a premium-value crop, but that requires formal recognition of quality and geographic origin, and the existence of a market.

To help address this, GIZ, leveraging over 10 years of forest coffee value chain improvement experience in Ethiopia, are working to improve quality and traceability. This includes working with cooperative unions, training farmers on harvesting practices (ensuring only the best crops are brought to drying stations), and building centralized drying stations and constructing raised drying beds (which improve the quality of the product).

On the demand side, TechnoServe are creating internationally recognised Ethiopian coffee brands. As global coffee companies create and manage their own brands, Ethiopian forest coffee brands will be incorporated as new product lines across multiple coffee buyers and retailers. Coffee brands such as Happy Goat Coffee Company, Original Food, Union Coffee, Moyee Coffee and Solino Coffee are introducing this wild forest coffee to European and North American markets.

CURRENT IMPACT

To 2018, GIZ had built ten drying stations, serving nearly 2,500 farmers, and around 7,500 farmers had been trained in harvesting and processing.

Demand has been established: in a survey of 300 international coffee buyers undertaken by Partnerships for Forests to examine the potential for wild coffee production, 95 percent of respondents were interested in purchasing Ethiopian forest coffee and the quality, deforestation-free and social impacts associated with it.

- **Economic and social value**: the improved forest coffee cup quality generates better prices for farmers, thus incentivising this mode of production. The improved value chain will ensure around 10,000 farmers will benefit from selling premium wild products that may not previously

have been harvested, securing higher prices in the speciality coffee market, and receiving almost 60 percent of the final export price. To date, farmers have received roughly 30 percent increases in their sales prices.

- **Environmental value**: an emphasis on quality and origin supports the development of transparent supply chains, and high-value products commanding high prices incentivize better community forest management on roughly 110,000 hectares.

FUTURE POTENTIAL

The project has developed replicable supply and demand models. By working with already established participatory forest management and cooperative groups, and by building centralized drying stations, the model would also work in the Bale and Illubabor regions.

BARRIERS, AND THEIR MITIGATION

If the benefits of producing forest coffee in this way are not clear, farmers are unlikely to invest time and resources in new harvesting techniques and processing systems. This issue can be addressed through training, access to finance and ensuring that farmers experience the benefits the wild crop brings.

Africa Tree Fund: Innovative reforestation finance

COMPANY: Criterion Africa Partners, a private equity firm investing in the forestry sector in Sub-Saharan Africa; The Nature Conservancy, a leading international conservation organisation

PROJECT LOCATION: Tanzania, Kenya, Uganda, Malawi

ARCHETYPE: Value from sustainable agricultural production-protection

THE CHALLENGE

Africa accounts for just 3 percent of global GDP and 15 percent of the world's population, but 22 percent of global wood consumption[9]. It is estimated that about one third of the total demand is met through unsustainable extraction of natural forests and imports, contributing to both alarming rates of forest loss (Africa loses forests at the world's highest rate—almost 3.5 million hectares per year) and a trade deficit in forest products approaching USD $2 billion per year[8].

To sustainably meet the demand for wood, between one and two million hectares must be planted across the continent every year between now and 2030. [8]

Without such a significant intervention it is expected that the bulk of the demand will be met through imports and increased unsustainable exploitation of natural forests across the continent.

VALUE CREATOR

The Tree Fund (TF) is an innovative fund aiming to make investments in the forest sector, managing and producing timber for use in construction, manufacturing and fuel wood in domestic and export markets.

THE REGENERATIVE MODEL

The TF is designed to incentivize forestry organizations and farmers to plant millions of commercial-use trees by providing finance at an affordable rate.

Unlike previous funds, which have focused solely on financing, the TF will deploy capital through mutually reinforcing development facilities (DF) and financing facilities (FF).

The DF will identify organisations that are appropriate for investment and provide technical assistance and seed funding grants for pilot or early stage ventures.

The FF will provide debt, and possibly equity, financing to established, bankable forestry companies and financial institutions, secured against their production areas and balance sheets. By taking planted trees as collateral, the TF can offer much lower interest rates than those of unsecured loans and so has the potential to transform the financing of tree planting for production and long-term conservation.

The forestry companies will use funds to plant up existing land banks or replant harvested areas, and to fund new out-grower programmes or expand established ones. The FF will also provide debt financing to local financial institutions to help them expand their existing agricultural portfolio to include agroforestry schemes.

CURRENT IMPACT

This project is still at the business plan stage, and in the process of setting up the fund. When in place the project aims to deliver:

- **Economic and social value**: improved livelihoods for thousands of smallholder farmers. Some organisations have reported that tree planting and other related farm interventions can increase average incomes by USD $200 per year (an increase of over 66 percent) over a 20-year period, whilst Partnerships for Forests modelling suggests that farm returns can double in some scenarios. Diversifying livelihood options with trees also provides a pension-like product to smallholders. Portfolio modelling suggests a gross fund IRR to investors of 5 percent after losses, reducing to 1.5 percent after management fees and other fund costs are taken into account. The adoption of agroforestry systems also supports climate change adaptation as, for example, trees are likely to be much more resilient to periods of extreme drought than annual crops.
- **Environmental value**: relieving pressure on natural forests through expanding the supply of fuelwood and industrial wood from farms and plantations. Trees that fix nitrogen or provide shade can also increase crop yields.

FUTURE POTENTIAL

Although Eastern Africa is the initial focus, there is scope to expand to other countries in sub-Saharan Africa, once the model is proven.

BARRIERS, AND THEIR MITIGATION

There is a risk that a downturn in market prices may mean businesses and smallholders are unable to meet their repayment obligations. To counter this, all Tree Fund investments will be secured against the assets (in the form of trees) and balance sheet of the borrower/investee company.

Forestry and agroforestry investments are also subject to a number of biophysical risks, e.g. fire, pests and diseases, which can damage or destroy trees. Ensuring that all businesses and smallholders have appropriate protection measures in place is therefore a priority.

Finally, uncertainty around land tenure is an investment risk and can lead to delays and increased transaction costs that need to be resolved prior to investments being made.

The Tree Fund will apply a rigorous investment approach and strong environmental, social governance framework to all potential investments. Opportunities will only be funded if both financial return on investment and environmental and social impact per dollar deployed are compelling.

Building a sustainable cashew value chain

COMPANY: Nitidae, a social enterprise

PROJECT LOCATION: Gile National Reserve, Zambézia province, Mozambique

ARCHETYPE: Agriculture production–protection

THE CHALLENGE

Deforestation in the Zambézia province is almost exclusively driven by small-scale subsistence agriculture practices, where forest is cut and burnt to clear land for crops, predominantly maize and cassava.

Between 2001 and 2016, the province lost 5 percent of its forest cover (approximately 544,000 hectares) to these agricultural practices, as well as charcoal production.[10]

At the same time, and despite once being a global leader, Mozambique's cashew nut production has not fully recovered from drastic reductions since the civil war in the 1980s and early 1990s, and is limited by ageing and poorly maintained orchards.

Notwithstanding these challenges, there is great potential to increase the market value of such alternative crops, which account for nearly 60 percent of smallholder farmers' income.

VALUE CREATOR

Cashew nut trees (*Anacardium occidentale*) are naturalised in east Africa and the nuts provide a highly nutritious and rich energy source.

The trees tolerate a wide range of conditions, including drought and poor soil, and start producing nuts about three years after planting. There are full yields of 30 kilograms of nuts after 8–10 years and the trees are productive for about 30 years.[11]

THE REGENERATIVE MODEL

Nitidae will oversee the distribution of 45,000 fruit trees and 30,000 cashew trees, and 5,000 cashew nut producers will be trained on: conservation agriculture techniques, including agroforestry systems; quality, so

that their products to meet international standards; and orchard maintenance techniques.

Nitidae will also establish a processing facility in Zambézia, supplied with raw cashew nuts by smallholders from around the Gile reserve. The facility will guarantee purchase from producers who commit to reducing unsustainable farming and deforestation practices.

These measures will increase cashew production in Zambézia in a sustainable way and help to maintain a reliable and adequate supply for the processing facility.

This 'no deforestation' product will command a higher price, enabling producers to have better incomes and so incentivizing forest protection measures.

CURRENT IMPACT

Currently at set-up stage, a business plan is being developed which will include a series of analyses and financial plans and consider innovative opportunities, such as utilizing cashew shells as a source of energy.

A communication system, Kohiwa—that rapidly informs producers of market dynamics and up-to-date market prices via newsletters, local community radio and text messages—is also being trialed.

- **Economic and social value**: The processing facility, due to be completed in 2020, will create new jobs and increase the added value of local production of cashew by fostering vertical integration. Farmers and their families and communities will benefit from an expanded market for their cashew nut production and higher prices for producing and selling deforestation-free cashews. As alternative crops like cashew nuts account for nearly 60 percent of smallholders' income, increased volumes and prices would have a significant impact in the communities living in the production area.
- **Environmental value**: as well as incentivising smallholders to reduce deforestation, the project supports the Zambézia Integrated Landscape Management Program (ZILMP)[12] REDD+ jurisdictional program to achieve significant carbon reductions by 2025 via reduced and avoided deforestation.

FUTURE POTENTIAL

If successful, the project could be replicated in other cashew-growing regions in east Africa and beyond.

BARRIERS, AND THEIR MITIGATION

Mozambique's agricultural markets are weakened by a reluctance to adopt innovative, socially and environmentally beneficial production and marketing practices. This can be partially addressed through the training that the project offers to smallholders, and the incentives provided through increased income for a premium, no-deforestation product.

Also, investment in the cashew industry is limited by a restrictive policy environment, so raw cashew nut farm-gate prices in Mozambique are around half what they are on the international market—a significant shortfall for the country and its local producers. The hope is that producer guarantees and improved information access will help farmers advocate for and achieve their rightful market price.

Initiative for Sustainable Landscapes (ISLA)

COMPANIES: Primary partners, on the livestock project: IDH, The Sustainable Trade Initiative, non-governmental organisation; SNV, non-governmental organisation

PROJECT LOCATION: Mau Forest, Kenya

ARCHETYPE: Agriculture production–protection

THE CHALLENGE

The Mau Forest Complex (MFC) is Kenya's largest closed-canopy montane forest and provides vital ecosystem services, including climate regulation, flood mitigation, conservation of biodiversity and carbon storage.

The last two decades have seen land use change and unsustainable resource extraction reduce the MFC by more than 25 percent. The South West MFC reserve is less than two thirds of its original 95,356 hectares size, recorded in 1932.[13]

A 2016 study[14] showed that although overall the current South West Mau forest area had not been intruded upon, a significant area along the eastern boundary had been reduced to grassland or scrub through heavy encroachment by grazing livestock.

The remaining forest continues to be threatened by degradation due to illegal activities including livestock grazing, wood extraction for charcoal and firewood, fire and poaching.

VALUE CREATOR

Protecting the forest supports the production of key Kenyan commodities and so supports national GDP and local livelihoods. For example, the Mau Forest ecosystem supports the production of more than 60 percent of tea in Kenya. The rain needed for tea production is modulated by the location and density of the forest, and the rich forest ecosystem contains natural enemies that keep potential pests in check, preventing a need for the use of chemical pesticides.

In 2014, Kenya produced 445 million kg of tea, valued at USD $1.20 billion, making the tea sector the leading foreign exchange earner at 27 percent of GDP. The tea industry also supports 640,964 producers (including about 600,000 smallholders) and more than five million Kenyans directly and indirectly.

THE REGENERATIVE MODEL

Livestock is the biggest threat to forests, but forest grazing is a very inefficient production method. Switching from forest grazing to use of fodders, such as maize, could triple a cow's average daily milk yield.

These increased yields would provide a financial incentive for farmers to switch methods and would complement efforts to improve and enforce forest access regulation.

The Initiative for Sustainable Landscape (ISLA), formed to protect the South West Mau forest, is a public–private partnership that brings together key stakeholders to implement an integrated forest protection action plan that addresses deforestation and removes cattle from the forest.

IDH, currently leading ISLA, develops local capacity by training farmers on more efficient, zero-grazing practices. The programme also supports better access to dairy markets by connecting farmers to processing companies.

Pressure on the forest will also be reduced via production–protection agreements between government agencies, local communities and livestock buyers.

The move away from forest grazing supports conservation and increases farmer incomes.

CURRENT IMPACT

To date, 200 farmers have been able to increase average milk yield by 50 percent, from four to six litres per day.

- **Economic and social value**: for the average household the increased yield provides 18 litres of milk a day. Allowing for the two litres consumed at home, farmers are able to sell 16 litres per day increasing their daily income from KES 168 to KES 448 (GB £1.28 to £3.41). By the end of the pilot in September 2019, average milk yield per cow is expected double again, to 12 litres per day.
- **Environmental value:** once the ISLA model has been fully scaled up, a game-proof fence will limit the communities' access to the forest and so restrict cattle from grazing on 40,000 hectares of forest.

FUTURE POTENTIAL

Once the forest protection plan is in place, the project will start seeing the results of forest restoration from the removal of cattle in the forest. IDH is due to scale up the model in September 2019.

The ISLA approach is replicable in other regions, through a similar model of public–private partnerships to conserve large landscapes.

BARRIERS, AND THEIR MITIGATION

Of the 24,000 cattle currently grazing in the forest, half belong to absentee owners who live outside the area, but the programme currently only works with those living in the vicinity of the forest.

The current landscape model is fully dependent on funds raised in the early phase of the programme, led by IDH. For the programme to be sustainable after IDH exits, the newly set up trust fund, which will be managed by a board of trustees, needs to be fully operational, with strong management, leadership and engagement from private sector players.

Quality Tanzanian Timber

COMPANIES: Mpingo Conservation and Development Initiative (MCDI), non-governmental organisation; Kilombero Valley Teak Co (KVTC) Ltd, private company

PROJECT LOCATION: Ruvuma, Lindi, Pwani and Morogoro districts, Tanzania

ARCHETYPE: Creating value from standing forest

THE CHALLENGE

Forests are vital sources of wood for construction and energy, and key ecosystem services such as climate amelioration, water supply and reducing soil erosion.

The Tanzanian mainland has 48 million hectares of forest, with 97 percent made up of trees of natural origin.[15] A growing labour force expects these assets to create new income opportunities, while a growing consumer base generates demand for raw materials and their by-products.

The annual sustainable wood harvest only provides about 70 percent of estimated annual demand.[14] This annual deficit is met by overharvesting or illegal harvesting, which degrades forests and lowers their productivity.

VALUE CREATOR

The project focuses on Forest Stewardship Council (FSC) certified timber, particularly the mpingo tree (*Dalbergia melanoxylon*). The mpingo grows in a wide range of conditions throughout sub-Saharan Africa and is extremely slow growing—not reaching harvestable age for 70 to 100 years.

The tree improves soil fertility by fixing nitrogen, is good at maintaining soil stability and mature trees have the ability to survive fires.

It is one of the most economically valuable timbers in the world, used mainly in the manufacture of high-quality musical instruments and for carving (although the twisted growing habit of the tree means that only 10 percent of the felled wood is suitable for these uses).

However, the forest ecosystems that the mpingo is part of are being lost at a rate of 0.7 percent per year,[14] and so models that enable local communities to benefit from their high economic value would incentivise forest protection.

THE REGENERATIVE MODEL

MCDI has been a pioneer in setting up and supporting Village Land Forest Reserves (VLFRs), legislated for by the Tanzanian government to incentivise forest protection by giving communities the authority to own and manage the forests around their village.

As they do not pay government royalties, VLFRs have a market advantage, selling at a lower price or drawing higher profits than royalty-paying commercial companies.

The VLFR model is premised on a mutually beneficial transfer of skills, knowledge, networks and market access.

In this case, MCDI helps KVTC's mission (conserving the forests surrounding their teak plantations) by organizing their local communities into VLFRs. The communities then manage the standing forest and locally elected Village Natural Resources Committees (VNRCs) ensure that village land use plans are followed.

In return, KVTC helps the VLFRs to access markets for their timber products and leverages their extensive business experience to help MCDI become a financially viable organization.

CURRENT IMPACT

The work currently involves 20 villages and around 200,000 hectares of forest are under sustainable management. An example of the benefits bought by the scheme can be seen in one village, Nanjirinji A, where MCDI has worked since 2008.

- **Economic and social value**: being part of a VLFR has earned the village USD $412,660. The VNRC decides where to invest this money, and has so far built a borehole, classroom and community market place.
- **Environmental value**: 83,538 hectares of forest are under sustainable management.

FUTURE POTENTIAL

MCDI's FSC group-certificate could generate between GB £3 and GB £5 million annually through sales of sustainable timber. However, communities supported by MCDI currently have a market for less than 5 percent of full production potential. The program seeks to increase timber sales to around GB £0.5 million (14 percent of the annual potential).

KVTC will implement the same model in the neighbouring forests, utilising trees which can be used for both timber and charcoal production.

MCDI is designing a financially sustainable model, based on receiving a percentage of the sales made by the VLFR and possibly being paid for logistical help for buyers accessing remote forest areas, so that it is less reliant on donor funding.

BARRIERS, AND THEIR MITIGATION

Sustainable forestry relies heavily on preferential demand for sustainable products. If this demand does not materialise, the viability of the model is challenged in the long run.

Also, the model is underpinned by an assumption that VLFRs will not be charged royalties on wood products. Currently, there is no legislation (i.e., tax exemption) facilitating or incentivizing private sector players to partner with communities to manage their forestry assets, which weakens the economics of the model. MCDI and KVTC will engage with key officials to negotiate a possible tax exemption for the model in order to improve the economic viability of the project.

Protecting African forests through microforestry

COMPANY: Komaza, social enterprise

PROJECT LOCATION: Kilifi, Kwale and Nyandarua regions, Kenya

ARCHETYPE: Agriculture production-protection

THE CHALLENGE

Fuelwood supplies over 80 percent of Africa's primary energy and is the leading driver of forest degradation and second leading driver of deforestation.[16] While alternative energy sources will grow with time, wood will continue to be Africa's primary energy source for many decades to come.

Also, as populations and economies grow and urbanize, by 2030 Africa's demand for industrial wood is set to grow by 300 percent, with a supply deficit exceeding USD $30 billion.[15]

While this is attracting some private investment, it is unlikely that large-scale forest plantations will meet this deficit. Without new models, deforestation will continue and Kenyan consumers will pay high prices for imported industrial wood.

THE REGENERATIVE MODEL

Komaza works to establish micro tree farms that produce timber for sale into high-value industrial markets (such as veneer, plywood, briquettes), using waste materials as a sustainable source of fuelwood.

To do this, Komaza partners with smallholder farmers. The smallholder provides the land and labour and Komaza provides seeds, and training and support on optimising production.

Komaza's innovative out-grower model enables smallholders to gain an income from their previously unproductive land and, because there is no need for purchasing land and labour, enables trees to be planted 65 percent cheaper than they are on big plantations.

By planting on pockets of degraded or unproductive smallholder land, so-called microforestry, Komaza aims to restore degraded farmlands through reforestation while enabling farmers to earn life-changing income from tree harvests.

As a result, local consumers have access to sustainable industrial wood and fuel at competitive prices, and pressure on natural forests will be reduced.

CURRENT IMPACT

Komaza has been operating in Kilifi for the past ten years and has successfully scaled its model to Kwale in coastal Kenya. It is working with around 5,000 farmers, has planted 3,800 hectares of trees, and has begun to process some wood and generate sales.

In December 2018, Komaza launched its first operation site in Nyandarua, validating market and farmer data through pilot projects.

In their Series A funding, Komaza raised USD $10 million in equity and grants from a combination of investment funds, philanthropic organizations, and others. In Series B, they have raised USD $2.1 million of a targeted USD $20 million.

- **Economic and social value**: by intercropping and using currently unproductive land, farmers have their existing income and earn additional money from thinnings of the planted trees after 3–6 years, and more significant income from mature harvests from 8–15 years. For example, a family with one and a half hectares of mixed trees can earn 40 percent additional income in the first decade and 250 percent more income in the second decade[17] providing social benefits such as paying for education. The project also focuses on engaging women, and there is a near 50:50 gender balance of participating farmers, providing economic empowerment to women.
- **Environmental value**: the deep-rooted trees are resilient to erratic rainfall, and help stabilise soils and mitigate erosion.

FUTURE POTENTIAL

The work in Kilifi, Kwale and Nyandaruwa has enabled the model to be well developed and tested in differing geographic and climatic conditions, so the model is ready for a large-scale rollout across Africa and other developing regions facing similar environmental, social and economic challenges.

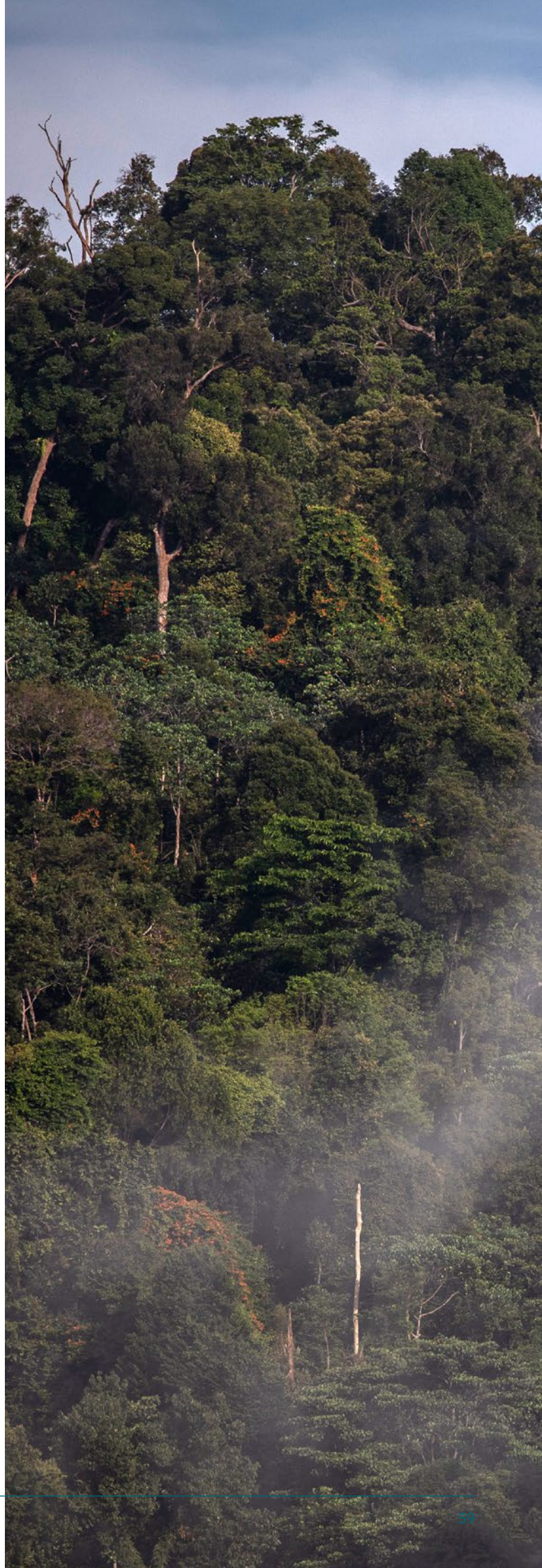
BARRIERS, AND THEIR MITIGATION

Komaza's expansion relies on the development of a robust expansion strategy and in preparing business management processes and related data systems, in particular integrated data systems, to store all farmer-related information and planning systems to support scale-up.

Also, a well-articulated business plan is being developed for their Special Purpose Vehicle for Smallholder Forestry Finance, designed to give a clear and structured portfolio for investors.

Komaza's model involves hundreds of field staff serving farmers in their villages, and so expansion must be supported by comprehensive policies and procedures to transform Komaza from an early stage venture initiative to a systematically managed forestry company.

Given this, it is now critically important for Komaza to ensure its operational model can be capitalised and financially sustainable.



LATIN AMERICA

Xingu Seeds Network: harvesting native forest seeds

COMPANY: Xingu Seeds Network (ARSX), network of native seeds collectors

PROJECT LOCATION: Mato Grosso, Brazil

ARCHETYPE: Creating value from forest regrowth

THE CHALLENGE

Deforestation and degradation are a continuing threat to Brazil's Amazon and Cerrado biomes. Between 2000 and 2015, the Amazon Biome lost more than 20 million hectares and the Cerrado lost more than 23 million hectares.

Brazil's Forest Code and the Nationally Determined Contributions require the country to restore 8 to 12 million hectares of forest by 2030 to counter past deforestation.[18]

These large-scale reforestation requirements are resulting in an increasing demand for native tree seeds.

VALUE CREATOR

Seeds from more than 200 native forest trees are available.

THE REGENERATIVE MODEL

The ARSX is a network of around 500 native seed collectors located in the Xingu basin headwater, which stretches across both the Brazilian Amazon forest and the Cerrado biomes.

The network originated in a 2004 campaign to recover and protect river springs and stop deforestation. It was initiated by the non-governmental organisation Instituto Socioambiental (ISA) in partnership with indigenous leaders from the Xingu Park, the oldest indigenous territory of Brazil covering around 2.6 million hectares and home to 16 different tribes.

The ARSX central administration separates requests for native forest seeds into lists and distributes them to groups of collectors, according to availability and capacity. The collected seeds are then processed and sold by ARSX.

ARSX trains the collectors on, for example, best practice for collecting and pre-processing, safety, pre-processing techniques and species identification. The amount collectors are paid depends on (1) the species, (2) difficulty of collecting, (3) difficulty of pre-processing, (4) technological innovation in collecting and pre-processing and the demand for each species.

Alongside seed collection and sales, the ARSX promotes an innovative technique called Muvuca—where a mixture of seeds from several species is planted directly in the forest—which provides a significantly cheaper, more efficient and higher impact forest restoration than that given by the cultivation and planting of seedlings.

CURRENT IMPACT

Since its inception, the ARSX has collected around 200 tonnes of seeds from more than 200 native species and has recovered around 6,000 hectares of degraded forest along the Xingu and Araguaia Basin and in other regions of the Amazon and Cerrado.

ARSX has grown significantly since its inception with more than 500 collectors in 2018. It is now the biggest provider of native seed in Brazil.

- **Economic and social value:** currently seed collectors are divided in three groups: indigenous, rural settlers and peri-urban. Seed collection supplements their other activities (hunting, fishing, cassava growing and cultural rituals for indigenous communities; food and cash crop cultivation for rural settlers, and sometimes 100 percent seeds collection for peri-urban collectors, given low opportunities with formal jobs) making up 15 percent, 30 percent and up to 100 percent of their annual income, respectively.
- **Environmental value**: seed collection protects biodiversity and raises the economic value of the standing forest for actors who could otherwise be engaged in activities that caused forest degradation. The end result is reforestation of natural forest.

FUTURE POTENTIAL

The ARSX model is not specific to a particular landscape or environment and so is suitable for scaling and replication in other regions of Brazil and beyond. For example, the ISA seed collector network is currently trying to replicate its model in the Southeast of Brazil.

BARRIERS, AND THEIR MITIGATION

Overall the business model is fairly costly to run and has struggled to grow and scale up in response to emerging markets for restoration.

Seeds are sold for very low prices compared to those that could be achieved on the market, which reduces revenue generating capacity. In 2018, operational (e.g. human resources and the maintenance of a warehouse) and quality assurance costs were greater than revenue, so ARSX relies on donor support and is not yet financially sustainable.

Since all revenues are redirected to collectors, there is low to no reinvestment in the business, and the ARSX lacks business skills, human capital and sales and marketing strategies, all of which restricts their access to more complex markets and their capacity to grow.

ARSX is attempting to address the above challenges through a professionalization of their organisation, and has a credible pathway to break-even.

Sustainable cattle ranching in the Amazon

COMPANY: Pecuária Sustentável da Amazônia (PESCA), private company

PROJECT LOCATION: Alta Floresta, Mato Grosso, Brazil

ARCHETYPE: Agriculture production–protection

THE CHALLENGE

Historically, extensive cattle ranching in Brazil has been a way to claim territory over unoccupied land. Traditional cattle ranching practices exhaust the soil and result in falling production, leading producers to open more land to continue or increase production levels.

The Amazon region, in particular, has suffered greatly from deforestation driven by cattle ranching, which accounts for 80 percent[19] of current deforestation—a cycle that began in the late 1960s with support from the national government at the time. Approximately 45 million hectares of deforested Amazon in Brazil are now cattle pasture.[18]

VALUE CREATOR

Amazon Brazil has approximately 200 million head of cattle and is the largest exporter in the world, supplying about one quarter of the global market.[18]

THE REGENERATIVE MODEL

PECSA was created in 2015 as a spin-off from the local NGO Instituto Centro de Vida (ICV), with an initial investment from Althelia Climate Fund, who remain the main investment partner.

PECSA establishes partnerships with producers who lease their land and part of their herd to PECSA for seven to ten years, in return for a share of the proceeds from the livestock production.

PESCA takes on management of the farms, including pasture reform (from degraded pasture to high productivity pastures), livestock intensification (increasing the number of cattle per hectare and improving herd management), reforestation (in areas that do not comply with the forest code) and farm staff training (to perform these new activities effectively).

PECSA establishes zero-deforestation agreements with farmers and demands zero deforestation from calf suppliers, verified through GIS monitoring before every calf purchase.

As PECSA buys inputs collectively, it is able to use increased bargaining power to achieve better market prices.

The model creates revenue by managing the transition between extensive cattle ranching production systems to semi-intensive production systems.

CURRENT IMPACT

PECSA has partnerships with six farms, managing 10,000 hectares of pastures and around 30,000 cattle. Results show productivity (e.g. improved cattle weight gain and better dairy product quality) that is five to seven times the regional average[20] as well as increased income.

In order to increase impact on land under sustainable management, Partnerships for Forests is helping PECSA implement a complete sustainability assurance system (including cattle traceability for cattle ranching intensification) in partnership with the non-governmental organisation Imaflora and the Sustainable Agriculture Network (SAN).

- **Economic and social value:** producers are paid a percentage on the cattle sales (based on specific previous economic results of each individual farm). PECSA demands that their suppliers do not have any issues with modern slavery, and workers on the farms PECSA lease benefit from training in newer technologies for cattle ranching, which can lead to better salaries.

- **Environmental value**: the PESCA model reduces the carbon impact of producing beef by around 80 percent compared with traditional cattle ranching activity.[21] They also restore forest on the 10,000 hectares of farms they operate and demand that their cattle suppliers' farms, some 33,000 hectares, are not engaged in deforestation and comply with the forest code.

FUTURE POTENTIAL

In a second phase, Partnerships for Forests support could help unlock additional investment from partner investors to expand the project tenfold, to over 100,000 hectares.[22]

By establishing zero-deforestation commitments, PECSA has set an example and a quality standard that could be used for sustainable cattle ranching across the Amazon biome.

BARRIERS, AND THEIR MITIGATION

Like many start-ups, PECSA has faced unexpected problems in its scale-up stage. One of the main challenges is that the model is particularly resource intensive in the first one to two years, but requirements rapidly reduce in the remaining project lifetime and the model is scalable if the resource-intensive start up is staggered.

It has also faced operational and financial challenges including implementation delays and difficulties in closing strategic commercial deals with large retailers, which has led to financial results that were below expectation.

In addition, in 2017, the beef sector in Brazil went through corruption scandals involving sanitary and environmental issues, which affected market prices.[23]

Over the last two years, PECSA has started to implement mitigation strategies to address these challenges. One of these has been transitioning to a new production model, moving from a female- (a more operationally demanding production system) to male-based production system (with higher weight gain potential).

The transition to this more profitable and simpler system and improvements in coordination and operational management of the company are the focus of the next stage of business development.

Brazil nut cooperative

COMPANY: COOPAVAM, Cooperative

PROJECT LOCATION: Mato Grosso, Brazil

ARCHETYPE: Creating value from standing forest

THE CHALLENGE

COOPAVAM operates in the municipalities of Juruena, Juína, Castanheira, Cotriguaçu, Colniza, Aripuanã, Juara and Brasnorte in the north-west of Brazil's Mato Grosso state.

The region contains many indigenous communities and is home to the last preserved forest boundary in the state. In 2017, Mato Grosso experienced 22 percent of all the deforestation in the Amazon, and 85 percent of this deforestation was illegal.[24] These severe environmental losses have significantly affected local communities, and agrarian and social conflicts have become a common reality.[25]

Whilst establishing protected areas can help, the populations inside these areas need to be able to sustain adequate livelihoods without degrading or deforesting the land.

VALUE CREATOR

The Brazil nut is endemic to the Amazon and its high nutritional value, as a source of selenium, magnesium, vitamins and healthy fats, means it is much valued in consumer markets.

THE REGENERATIVE MODEL

COOPAVAM brings together indigenous communities and farmers from the protected area. It pays them above-average prices to collect Brazil nuts from standing forest, so providing viable income alternatives for communities that otherwise could engage in forest degradation or deforestation.

The cooperative processes the nuts into oil, flour and as peeled nuts for use in culinary, health and cosmetic products, and sells these products to local and regional markets.

The project will also put in place Indigenous lands management plans, which will set and monitor standards for protecting the land.

CURRENT IMPACT

COOPAVAM works across a region which is more than 10 million hectares, and engages 500 family farmers from settlements and villagers from three Indigenous Lands. It has 67 registered members, some working inside the industrial unit and some in nut collection.

As well as selling to local and regional markets, the cooperative has offtake agreements to sell nut oil to companies such as Natura, one of the largest cosmetics companies in the world and owner of brands such as The Body Shop.

They have a network of private, governmental and civil society partners and, having started with the use of public grant resources, have developed into a profitable and well-structured business.

- **Economic and social value:** in 2008, middlemen paid community members between R$0.50 to R$0.80 per kg of Brazil nuts. Following COOPAVAM's work in negotiating prices and securing a tax exemption for Brazil nuts, they are now paid R$3.00 per kg.[26] In the last three years, Indigenous associations have participated in around 70 institutional strengthening interventions such as best practice and safety in nut collection, accounting and financial management. COOPAVAM has also established a scheme with the Indigenous communities, giving them a voice in the negotiation of prices and volumes.
- **Environmental value**: the income from collecting, processing and selling Brazil nuts provides a sustainable income for the cooperative members and their families and incentivises the community to conserve the standing forest and to plant Brazil nut trees in their farm reserves.

FUTURE POTENTIAL

By 2020 COOPAVAM hopes to employ around 4,000 local people, bring 1.4 million hectares of standing forest into sustainable use, and catalyse GB £2.8 million of private investment.[27]

With Partnerships for Forests' support, community inclusion and forest protection will be enhanced through Environmental and Territorial Management Plans (PGTA, in Portuguese) for the Indigenous Lands. Through ethno-zoning, ethno-mapping, monitoring and surveillance mechanisms and the mapping of relevant economic activities, there will be a tailored and collectively agreed structure for each of the indigenous associations involved in the COOPAVAM supply chain.

The expected revenue increase from sales will be used to improve PGTA monitoring and surveillance mechanisms.

BARRIERS, AND THEIR MITIGATION

The COOPAVAM model requires a high level of working capital in order to acquire Brazil nuts from the indigenous communities and effectively compete against middlemen operating in the market.

This can be achieved through:

- More and better contacts and contracts with national and international buyers that commit to either better prices or volumes;
- Access to operating capital through advance purchase contracts (before the harvest season) that secure supply.

Colombian Pacific açaí

COMPANY: Naidiseros del Pacifico SAS, private company; Fondo Accíon, non-governmental organisation

PROJECT LOCATION: Choco, Colombian Pacific Region, Colombia

ARCHETYPE: Creating value from standing forest

THE CHALLENGE

Colombia's Pacific coast region had the highest rates of deforestation in the country in 2018 (12 percent of the national total[28]), making it a major hotspot of deforestation due to illicit farming, illegal mining and the expansion of pastureland.

The withdrawal of armed groups that used to control some of the forests under the recent peace process has left a vacuum of power that has led to a spike in deforestation over the past two to three years.

Choco is one of Colombia's poorest and most socially vulnerable regions, the promotion of the wild-forest economy may nevertheless signify a new start for the people of the Pacific coast.

VALUE CREATOR

The açaí tree (*Euterpe oleracea*) is indigenous to the eastern Amazon, with the highest occurrence in the estuary of the Amazon River where it grows in both seasonally and permanently flooded forests.

Local communities in açaí-growing regions of Colombia have been consuming the 'super berry' for decades. More recently, claims of a wide range of health and therapeutic benefits[29], have led to growing demand in international markets, with a global 14 percent compound annual growth rate.[30]

THE REGENERATIVE MODEL

In 2016, the NGO Fondo Accíon started a pilot of açaí collection and processing project with Naidiseros del Pacifico SAS, a private company set up in 2015 by seven community councils as public shareholders.

Naidiseros del Pacifico creates revenue by harvesting, processing and commercializing açaí fruit. Traditional collectors harvest fruit from the palm trees, then the pulp is extracted in collection centres and packed for selling, mainly as frozen paste for high-end beverage companies. The process is highly profitable, with an estimated gross income margin of 40 percent.[31]

Due to the remoteness of the region, the main costs drivers are logistics such as transportation. Other costs involve buying the açaí fruit from the collectors and processing costs including salaries, capital expenditure, electricity, etc. The cost base for harvest, processing and commercialization is broadly in line with other wild forest products.

CURRENT IMPACT

The initial pilot ran between 2016 and 2018, but poor weather during the most important harvest period means that more work (including increasing the collection area, improving processing capabilities and developing a marketing and sales plan), is needed before a full scale-up phase.

- **Economic and social value:** açaí earns each family 131 percent more income than illegal logging, over a multi-year period. In order to meet its legal commitments as an afro-descendant community organisation, Naidiseros ensures that 30 percent of its profits are used to fund the communities' priority issues, such as education, health or infrastructure, as agreed by a community assembly. The remaining profit is used to fund production-related activities, e.g. maintaining crops, managing production areas, verification for REDD, etc. The community councils will regularly report the use of the funds and all community members have the right to query it. Community institutions will also be strengthened via a forest management plan with improved governance, including greater gender equality within the business.
- **Environmental value**: Forest vigilance will be directly improved as Naidiseros SAS collectors travel key waterways for 120 days per year—the same routes that are used for the transport of illegal timber. Collectors will be trained to monitor and report signs of deforestation.

FUTURE POTENTIAL

The project will have 56,000 hectares of forest under active, sustainable management by 2020.

The acai palm is also found in the Brazilian states of Amapá, Amazonas and Maranhão and in Guyana, French Guiana and Venezuela, and this model could potentially be replicated in these regions.

BARRIERS, AND THEIR MITIGATION

Given the nascent nature of the company, financial stability is a challenge and it is still reliant on donor funds. Partnerships for Forests is supporting the first attempt to scale the model. The expectation is that an increase in offtake agreements and new buyers will provide the capital injection and financial stability required for scaling.

Logistics are another key challenge, given the need for açaí to be kept refrigerated after harvesting and the remoteness of the production area. Part of the Partnerships for Forests support will be to hire external consultants to identify the most efficient logistics solutions, with a proposal to potentially combine these with other products being developed in the area.

Given the project location, it also needs safeguards against potential presence of armed groups, so safety safeguards and an improved territorial management plan are needed.

SOUTH EAST ASIA

Ecosystem restoration concessions

COMPANY: Multiple: PT Ekosistem Khatulistiwa Lestari, PT Alam Bukit Tigapuluh, PT. Restorasi Ekosistem Indonesia, PT Restorasi Habitat Orangutan Indonesia, PT Sipef Biodiversity Indonesia, PT Rimba Raya Conservation

PROJECT LOCATION: Sumatra and Kalimantan, Indonesia

ARCHETYPE: Creating value from standing forest

THE CHALLENGE

Indonesia is home to around 10 percent of the world's flowering species, 12 percent of the world's mammals, 16 percent of the world's reptiles and 17 percent of the world's birds.[32] Forests play a vital role in preserving this diversity, as well as in water cycle, soil conservation and carbon sequestration.

Between 1990 and 2000, palm oil plantations in Indonesia increased from 1.7 million to 6.1 million ha, replacing an estimated 1.7 million to 3 million hectares of forest.[33] Between 2001 and 2018, Indonesia lost 25.6 million hectares of tree cover, representing a 16 percent decrease in less than 20 years.[34]

The challenge is to provide an alternative path for Indonesia's forests; to develop sustainable forms of business that are commercially viable, provide a sustainable income for local communities, meet demand for food and other products, and cover the costs of managing ecosystem restoration concessions that protect and restore vital forest landscapes.

VALUE CREATOR

One way of meeting that challenge is to combine a range of sustainable income streams, tailored to the specific location and ecosystem. Key types of business are based around:

- Non-timber forest products (NTFPs) such as honey, coffee, Dragon's Blood, jelutung and rubber that can be harvested from standing forest.
- Payments for ecosystem services (PES)

THE REGENERATIVE MODEL

In June 2004 the Indonesian Ministry of Environment and Forestry introduced Ecosystem Restoration Concession (ERC) legislation, through which the government grants 60-year licenses that place responsibility for restoring and conserving the ecosystem on private companies.

Based on 2.7 million hectares of degraded ex-logging land, companies must manage the concessions for the purposes of restoring the forest and reducing or reversing carbon emissions. Commercial logging is prohibited in these areas until forests are fully restored.

The companies are expected to develop businesses based on NTFPs and PESs. However, companies often have limited capacity to develop and assess sustainable models, so the commercial potential of ERCs remains largely untapped.

Partnerships for Forests is supporting the ERC community to develop a portfolio of NTFP and PES value chains which equitably share benefits between private companies, local communities and other stakeholders.

CURRENT IMPACT

To date, the Indonesian government has issued sixteen ERC licenses, covering an area of around 623,075 hectares, and Partnerships for Forests is working with a consortium of six ERCs whose combined concessions cover a total area of 314,422 hectares.

The project investigates different business opportunities to assess whether they can generate enough revenue to make ERCs viable business ventures. The impact this work is having can be seen in the following profiles:

- Wild Forest Honey
- Jelutong
- Dragons' Blood
- Lestari Capital: long-term finance for conservation

FUTURE POTENTIAL

This approach could lead the way in ERC development. If the existing projects prove to be successful and sustainable, the model could be rolled out to non-participating ERCs (whose concessions cover 270,957 ha) and across 1.6 million hectares of land allocated by the Indonesian government for future ERCs.

Similarly, whilst ERCs are a specific feature of Indonesia, the concept of a concession based around restoration and/or conservation is transferable to any region around the world that has large areas of degraded land.

BARRIERS, AND AREAS FOR MITIGATION

There are a few key barriers to implementing ERCs successfully:

- **Knowledge and skills**: developing new business models requires new skills and capabilities, particularly for ERCs with non-profit backers who may lack the necessary commercial experience. To mitigate these capability gaps, Partnership for Forests helps to co-develop business plans and identifies market access players to partner with.
- **Conflicts of interest**: the ERC holders' mandate to conserve and restore forests may constitute a threat to groups involved in illegal activities (e.g., illegal loggers, wildlife traffickers), and may be perceived as a threat by communities who get their livelihoods from forests or clearing forest for other uses. For these reasons, all business models are assessed for their social impact to ensure there will be alternative livelihoods for all communities, and the development of any new model is carefully communicated.
- **Financial and regulatory**: one of the main issues is the lack of adequate fiscal and regulatory frameworks to support ERCs to generate income from NTFPs and PESs while forests are being restored. This is exacerbated by costs incurred by ERCs: in setting up and managing the ERC; in protection and restoration activities and in land and business taxes. By providing support in piloting and building a mosaic of new NTFP and PES business models, Partnerships for Forests aims to provide ERCs with a path to financial sustainability.

Restoring degraded soils with the Kemiri Sunan tree

COMPANY: PT Bumi Agrindo Sejahtera, private company; PT BIS, private company

PROJECT LOCATION: Flores, Indonesia

ARCHETYPE: Agriculture production-protection

THE CHALLENGE

Indonesia has 24.3 million hectares of degraded land (an area equivalent to the entire UK), largely due to deforestation caused by agricultural expansion.[35] In addition, the Indonesian Government has set an ambitious energy target of 25 percent of the country's energy coming from renewable sources by 2030.

VALUE CREATOR

The Kemiri Sunan tree (*Reutealis trisperma*) can grow on poor marginal land, such as ex-logging, mining and palm oil concessions, and restores the chemical and physical properties of depleted soils.[36]

The tree produces large quantities of kernels, and the oil extracted from them can be processed into a high-quality, efficient biofuel. The oil yield per hectare is the highest of any vegetable oil[35]in lab tests, e.g. more than double that of palm oil in production for biodiesel purposes.

THE REGENERATIVE MODEL

PT BIS is a private company with 80 percent of its shares owned by a local community cooperative. Planting on land that is degraded and otherwise unproductive, the company has created the world's first 30,000 hectares of Kemiri Sunan plantation.

Its partner, PT BAS, buys the nuts for processing into biodiesel for sale to an electrical power generator in eastern Indonesia, and tung oil (used in wood furniture production) for sale to the United States.

CURRENT IMPACT

The first harvest, in 2018, netted 20 tonnes of nuts and was used for research and development purposes. This year's harvest yielded an impressive 100 tonnes from the 600 hectare trial plantation. The crop was processed into around 20 tonnes of oil and sold towards the end of 2019.

- **Economic and social value:** through its shares in the company, the local community cooperative will get 80 percent of the profits from each harvest. More than 100 people from local communities work on the plantation. A social and economic impact assessment started in July 2019.
- **Environmental value**: the project is helping to restore degraded land, transform unproductive land into productive land, and provide a sustainable source of biofuel for Indonesia's ambitious renewable energy transition. In addition, Kemiri Sunan's very high oil yield per hectare reduces the amount of land needed for production, and the trees' long life (75 years) and high, tight and wide canopy help to reduce soil erosion and increase water absorption by the soil.

FUTURE POTENTIAL

Having successfully planted Kemiri Sunan in several degraded areas, the PT BIS model has potential to scale across more than one million hectares of unproductive land in the region.

As a result of an ongoing commercial scale-up project, it is expected that by 2020 approximately 4,000 hectares of currently degraded land will be brought under sustainable management, which will attract and mobilise GB£18m of private investment. It is anticipated that the yield will rise to more than 1,000 tonnes by 2020.

In the short term, Kemiri Sunan's biofuel can help decarbonise the power generation of the many small rural islands of Indonesia, which are currently dependant on diesel generators. In the longer term, it can be used to decarbonise the hard-to-abate sectors, such as heavy-duty road transport, shipping and aviation.

Kemiri Sunan thrives in sandy soils in tropical zones and its resilient properties mean it has potential in other areas of South East Asia and in similar climate zones around the world, e.g. Latin America, where environmental degradation has resulted in large areas of land with poor soil quality.

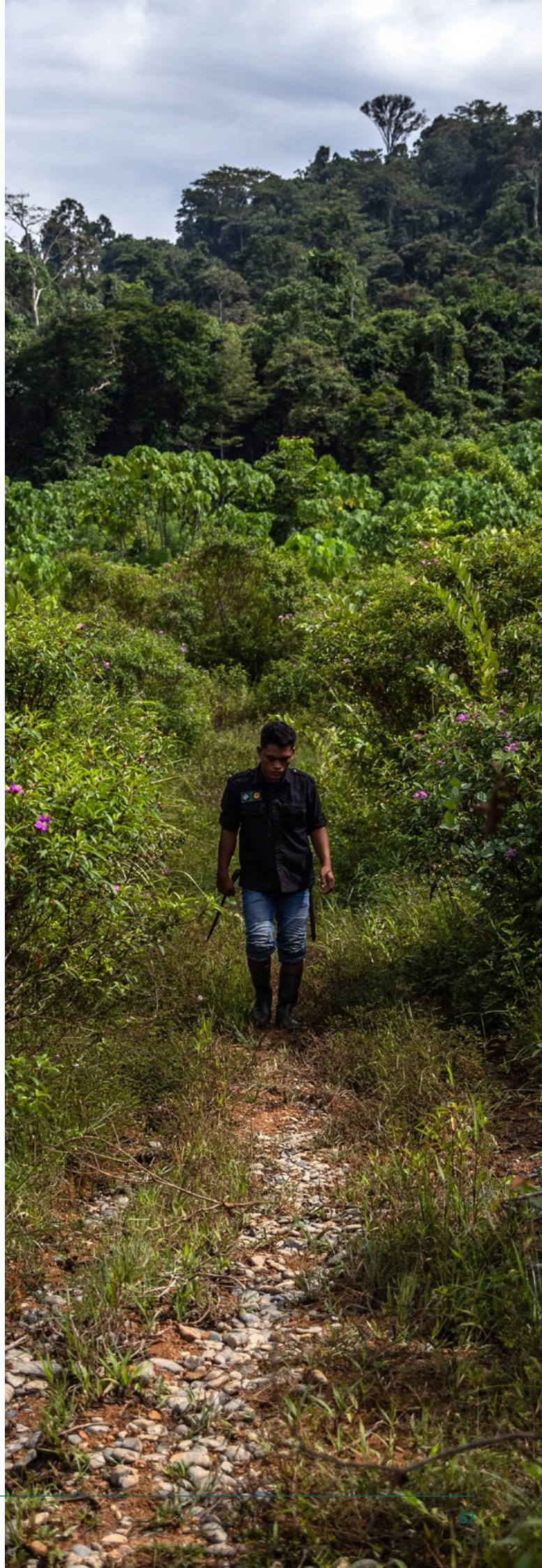
BARRIERS, AND THEIR MITIGATION

Kemiri Sunan requires capital investment of around GB£1.35 million to set up production on a 600-hectare plantation, and around GB£4 million to establish the nut processing and biodiesel refineries and facilities for each plantation. In addition, Kemiri Sunan trees take five years to reach revenue generation, which creates significant cash flow challenges for new plantations.

However, once established, a 600ha plantation can produce 10 tonnes of Kemiri Sunan oil per day, which can be extracted into 2 tonnes of biodiesel per day—a significant potential revenue source.

By developing a proof of concept through PT BIS's model, it should help make long-term finance options more available, which would greatly increase incentives for concession owners to commit and to invest in degraded concessions.

In terms of other mitigation options, investment in marketing would address the fact that Kemiri Sunan products are little known or understood by potential buyers and investors. Investment in research, particularly in automation of processing and industrial uses of oil products, could unlock Kemiri Sunan's potential as an industrial-scale product, establishing this climate-resilient crop as a productive, profitable and sustainable investment proposition.



Unlocking the value of the illipe nut

COMPANY: Forestwise, private company

PROJECT LOCATION: Kalimantan, Borneo, Indonesia

ARCHETYPE: Creating value from standing forest

THE CHALLENGE

The vast majority, 87 percent, of global palm oil production originates in Borneo.[37] Between 2000 and 2017, the old-growth forest area in Borneo declined by 14 percent—a loss of over 6 million hectares —of which 3 million hectares were ultimately converted into palm oil or pulpwood plantations.[38]

In the project area, most of the villages are surrounded by palm oil plantations and are under pressure to also convert their land and forest.

VALUE CREATOR

The sacred tengkawang tree (*Shorea stenoptera*) is endemic to the Kalimantan region and under significant threat from encroachment and logging.

The trees can live for up to 300 years[39], fruiting every three to five years and producing up to 800 kg of nuts per season. These nuts provide high-value illipe nut butter, which is well suited to the cosmetic industry as, e.g., a premium substitute to shea or cocoa butter.

THE REGENERATIVE MODEL

Ripe illipe nuts fall to the forest floor where local communities can harvest them by hand with little or no disturbance to the forest ecosystem. Forestwise trains community members to sun-dry and quality-test the nuts, and this simple processing offers the communities significantly higher income than they would achieve from their normal activities.

Forestwise then buys the dried nuts directly from the forest communities and stores them under optimum conditions (to ensure a continuous supply outside the harvesting season). When needed, the nuts are processed into crude or de-colourised, triple filtered illipe nut butter at their processing plant.

The improved economic value of the illipe nuts and fair benefit sharing throughout the process incentivises the communities to protect the standing forest from which illipe nuts come.

CURRENT IMPACT

A feasibility study[40] has determined that the business model is viable. A processing and storage facility has been built, community engagement activities set up, and direct private investment and sales contracts have been secured: GB £1 million to buy and process around 500 tonnes of dried illipe nut from the 2018 - 2019 harvest.

Currently, there are 21 villages in West Kalimantan working with Forestwise, covering a total area of 140,000 hectares, 90 percent of which is standing forest.

- **Economic and social value:** 600 families (3,000 people) have incomes that are six to eight times higher than their previous income during the illipe nut season, resulting in a 16 percent increase in annual income. The project actively works to ensure that women have the same access and rights in the nut collecting-drying-selling process, and an overall social impact assessment of the project is being undertaken.
- **Environmental value**: Improved income from the trees provides incentives for the communities to protect the 140,000 hectares of standing forest covered by the project.

FUTURE POTENTIAL

This project plans to expand to 50 villages and around 1 million hectares in Kalimantan in the next season. The current project utilises less than 10 percent of the potential illipe nut harvest, so has huge replication and scaling potential. Increasing production quantity could secure a long-term revenue stream for forest conservation and improve incomes for over 1,000 people.

In addition, some strains of tengkawang grow on marsh and peat soils and can tolerate frequent inundations. They grow rapidly and their canopy reduces the temperature of the previously sun–exposed land, so reducing CO2 emissions.[41] These strains have not been cultivated on a significant scale, but there is evidence to suggest that it could be commercially viable.

Further research is needed to understand the replication opportunity for the commodity beyond Kalimantan and Borneo.

BARRIERS, AND THEIR MITIGATION

Achieving the scale-up needs an estimated threefold increase in investment every three years, i.e. GB£3 million in 2022 and GB£6 million in 2025. Although major companies (LUSH,IMCD) are already involved, illipe nut butter is not a well-known product. Site

visits and applied research studies will continue to be used to help buyers and investors to understand the business model. In addition, specialist branding consultants are supporting Forestwise to secure additional demand for illipe butter.

Long-term finance for conservation

COMPANY: Lestari Capital, private company; Roundtable on Sustainable Palm Oil, not-for-profit company; Cargill, private company; Eagle High Plantation, private company; Yayasan People Resources and Conservation Foundation Indonesia (PRCF Indonesia), not-for-profit entity; Rimba Raya Conservation, private company; Infinite Earth, private company

PROJECT LOCATION: Kalimantan, Indonesia

ARCHETYPE: Creating value from standing forest

THE CHALLENGE

Palm oil companies who are members of the Roundtable on Sustainable Palm Oil (RSPO) are obliged to compensate for historical clearance of high conservation value forest areas. In order to gain and maintain RSPO certification, the companies must conduct impact assessments and then finance projects that deliver conservation outcomes for a minimum of 25 years as compensation for any clearance identified.

However, many palm oil companies have limited knowledge and experience of conservation, and many high-quality ecosystem service projects have limited knowledge and experience of working with private sector finance.

So, despite both parties standing to gain significantly from collaborating, they are ill-equipped to maximize this opportunity and work so far has been largely disjointed.

VALUE CREATOR

Payment for Ecosystem Services.

THE REGENERATIVE MODEL

Founded with seed funding from Partnerships for Forests, Lestari Capital (LC) is piloting a Sustainable Commodities Conservation Mechanism (SCCM) in the palm oil sector. The SCCM aims to channel money owed by RSPO certified palm oil companies into high-quality conservation and restoration projects that are certified under internationally recognized standards.

LC identifies suitable conservation projects, undertakes due diligence, and then markets and pitches these to RSPO certified companies on behalf of the projects. LC then brokers contracts between the projects and the companies. The contracts ensure environmental and social safeguards, performance-based payments and effective deployment of funds, which LC monitors and reports on.

This process supports both sets of organisations, and provides independent fiduciary oversight that ties payments to results on the ground and ensures benefits to local communities and the environment. In this way, the SCCM provides a new source of finance for conservation, ecosystem restoration and community forestry projects and creates an effective and efficient path for companies to act credibly and transparently on their sustainability commitments.

CURRENT IMPACT

In the SCCM's initial transaction, the compensation fund from Cargill will finance 25 years of conservation in the Nanga Lauk Village Forest (NLVF). The NLVF is already validated under Plan Vivo Standard and covers 1,430 hectares; 58 percent of which is covered by peat swamp forest and riparian forest, with the rest being occupied by lakes. Together with the surrounding 9,169 hectares of Limited-Production Forest, the area supports the livelihoods of 197 households.

Every aspect of the project creates livelihood opportunities including landscape protection (through forest patrols, orangutan monitoring and forest rehabilitation) and small-scale sustainable commodity production (including fishing, bamboo/rattan products, honey, rubber and ecotourism).

SCCM's second transaction, with Eagle High Plantations and PT Rimba Raya Conservation, will secure more than USD1 million additional funding. This transaction will support habitat rehabilitation across 1,500 hectares of currently non-forested peatland in Central Kalimantan.

- **Economic and social value:** Under SCCM transactions, communities will receive payment for their services in taking care of the forests in their village, and funding and technical support to develop community-based non-timber forest product and ecosystem services businesses.
- **Environmental value**: Payment for ecosystem services supports conservation, biodiversity and community development outcomes in the 2,930 hectare project areas

FUTURE POTENTIAL

The total compensation liabilities for Indonesia's palm oil producers are estimated to be upwards of $160 million.

By 2020, it is expected that approximately 250,000 hectares of forest will be brought under sustainable land use management, and USD35 million of private investment will have been mobilised via LC's SCCM.

The SCCM ecosystem services platform provides a reliable funding source for conservation projects and there is strong potential for scale-up in other commodities, countries and regions.

In addition to this RSPO-led mechanism, LC is working to adapt SCCM to support no-deforestation commitments associated with the New York Declaration on Forests. [42]

BARRIERS, AND THEIR MITIGATION

Having established proof of concept, LC needs to secure new clients. It is working closely with partners that offer RSPO certification services, and through them is offering competitive rates for a full-service solution to redress liabilities associated with the RSPO. In this way, LC aims to secure an additional one to three clients by the end of 2019.

Another critical barrier is securing sufficient supply. LC has already signed 14 MoUs with different conservation, ecosystem restoration and community forestry projects at different levels of project maturity and is proactively developing this pipeline further.

REBUILD: Profitable Restoration

COMPANY: Arsari

PROJECT LOCATION: Kalimantan, Indonesia

ARCHETYPE: Value from Forest Regrowth

THE CHALLENGE

Since the year 2000, Indonesia has lost more than 25 million hectares of forest cover[43], larger than the size of the United Kingdom. Previously home to some of the most biologically diverse habitats on the planet, including homes for iconic species such as orang-utans, clouded leopards and pygmy elephants, the country has suffered massive losses to its native biodiversity. Much of this loss has been driven by the production of agricultural commodities such as palm oil, timber, and pulp and paper.

The challenge is to restore the large areas of Indonesia's lost forests, its native biodiversity and the range of local and global ecosystem services that these forests provide, including carbon sequestration. At the same time, these forests need to be restored in an economically viable way, to prevent them being outcompeted by the alternative uses of land which previously led to their clearance and to provide local communities with livelihoods which do not involve forest clearance.

VALUE CREATOR

The REBUILD Programme demonstrates the vision of "profitable reforestation". By reforesting land with selected species, including native varieties, from which an income can be derived, the REBUILD model generates income streams and job opportunities whilst also restoring large areas of degraded habitat. The agroforestry concept creates large numbers of jobs, increases food security and improves environmental outcomes such as carbon dioxide sequestration, clean water and restored biodiversity.

THE REGENERATIVE MODEL

The model transforms depleted and degraded forests in high-productivity agroforests, using a multi-species reforestation approach. By selecting species which produce saleable products – such as bioenergy, fruits and fibre - the commercial return from each hectare of restored land can be maximised.

For example, the sugar palm plant can produce as much as 60 litres of sugar-rich juice per day. This juice is harvested and converted into a range of products including sugar, ethanol and bioplastics. Importantly, sugar palm plants are most productive in biodiverse forests, providing an incentive to keep forests diverse, and refrain from creating monocultural plantations.

Importantly, the reforestation seed mixes are designed to deliver harvestable products at different points, ensuring that revenue streams are consistently created from the forest. For example, biomass from the existing degraded forests is harvested and used, through a process known as torrefaction, to create biocoal as an energy source. Fast-growing species which produce crops for human use (such as cassava) can be harvested within the first two years, followed by a range of products which mature at later stages – such as those for animal feed and timber.

CURRENT IMPACT

The current project area covers more than 170,000 hectares in eastern Kalimantan. Around 30 percent of this is relatively intact standing forest, whilst 70

percent of the area is made up of degraded land, all of which is planned to be restored and reforested.

FUTURE POTENTIAL

The opportunity to reforest large parts of Indonesia, southeast Asia and the world – tens of millions of hectares - in a biodiverse and productive way.

BARRIERS, AND AREAS FOR MITIGATION

The multi-species mixes are carefully designed to optimise the dynamics between the different species, their suitability to local conditions as well as their productivity and production volumes over time. Given the highly tailored nature of these mixes, they are not a 'one-size-fits-all' solution, with adaptations being required for different local situations.

Mitigations include increased investment into research and development of how different plant species interact, their potential values (including pharmaceutical potential) and building up the relevant knowledge and capacity to be able to deploy this solution in other geographies beyond Indonesia.

Sustainable natural rubber production

COMPANY: PT Royal Lestari Utama (RLU), a joint venture between Groupe Michelin (49 percent) and PT Barito Pacific (51 percent)—all private companies

PROJECT LOCATION: Jambi and East Kalimantan, Indonesia

ARCHETYPE: Agriculture production–protection

THE CHALLENGE

The 400,000-hectare Bukit Tigapuluh (BTP) landscape is one of the last remaining fragments of lowland tropical forest in Sumatra and one of the world's most precious ecosystems and wildlife habitats, home to wildlife such as Sumatran tigers and Sumatran elephants.

Around half of the forest has been lost over the last 20 years. Major issues in the landscape include a lack of patrols and monitoring and a lack of alternative, sustainable business models to create economic sustainability for long-term protection of the remaining forest.

VALUE CREATOR

Natural rubber is harvested in the form of the latex from rubber trees (*Hevea brasiliensis*). Native to South America, the trees thrive in warm, rainy climates, particularly around the Equator.

In 2016, global natural rubber plantations, producing 12.2 million tonnes annually, covered approximately 13 million hectares, with 93 percent of this area in Southeast Asia. 75 percent of this rubber is consumed by the tyre-making industry; natural rubber's elasticity, plasticity and high wear and heat resistance make it a vital raw material for tyres. No satisfactory substitute has yet been discovered, especially for use in high-quality tyres for heavy vehicles and aircraft.

THE REGENERATIVE MODEL

RLU's strategy is to become a global leader in producing sustainable natural rubber, with full vertical integration from plantation to product (re-milled latex).

The RLU plantation is split across Jambi (70,000 hectares) and East Kalimantan (18,000 hectares), on land which has suffered severe deforestation and degradation in the last two decades. Rubber will be planted on around 34,000 ha, with Rubber will be planted on around 34,000 ha, with agronomic advice and technical support from Michelin helping to ensure best operational, environmental and social practice helping to ensure best operational, environmental and social practice. The remaining area will be used for Community Partnership Programs (CPPs), conservation and restoration, with support from Partnerships for Forests and WWF Indonesia.

Through this work, RLU will develop a sustainable natural rubber supply that results in positive social and conservation outcomes. Michelin will gain significant benefits from securing a sustainable supply of natural rubber, allowing it to hedge against competitors during high resource prices, differentiate itself from lower-cost producers and secure long-term supply by avoiding rubber plantations switching to palm oil.

CURRENT IMPACT

Approximately 18,076 hectares of rubber trees have already been planted in 2018.

- **Economic and social value**: the community has been engaged in alternative livelihood schemes, such as smallholder rubber production and sale of vegetables to RLU. The CPPs include the building

of community houses, schools and health clinics and the project aims to improve the livelihoods of 16,000 people in 20 local villages.

- **Environmental value**: RLU have committed to set aside at least 50 percent of the concession for community livelihoods, land restoration and forest and biodiversity conservation, providing habitat for tigers, elephants and orangutans and other unique biodiversity, and improved water supply and soil stability in the two local watersheds. Area patrols and human–elephant conflict mitigation procedures and training have also been put in place.

FUTURE POTENTIAL

The project will be developed in phases and is expected to be completed by 2024, aiming to produce over 55,000 metric tonnes of sustainable natural rubber annually. [42]

At maturity, the rubber plantation will provide almost 10 percent of one of the world's leading tyre manufacturer's (Michelin) global natural rubber supply[44] and employ around 16,000 local people at minimum wage or better.

BARRIERS, AND THEIR MITIGATION

Rubber trees require six to seven years before production and significant capital is required to allow for this long development and repayment timeline, which makes the loan risk too high for shareholders alone. Although RLU is owned by well-established industry giants, RLU faced difficulties in accessing commercial capital with suitable interest rates. However, as this project combines profitable rubber production and conservation, it had the green credentials needed secure preferential financing and has secured long-term, green concessional finance from the Tropical Landscape Finance Facility, with USAID as credit guarantor for the first bond.

The cyclical nature of rubber production and price volatility also present barriers. This is partly mitigated by Michelin's commitment to buy a significant amount of the product.

Wild forest honey

COMPANY: PT Alam Bukit Tigapuluh (ABT), a private company; Javara, private company; Jaringan Madu Hutan Indonesia (JMHI), civil society organisation.

PROJECT LOCATION: Jambi, Indonesia

ARCHETYPE: Creating value from standing forest

THE CHALLENGE

In the last 30 years, agricultural expansion has driven the loss of half (400,000 hectares) of the forest in Bukit Tigapuluh, resulting in widespread loss of biodiversity and habitat.

To address this, the Indonesia Government has legislated for Ecosystem Restoration Concessions (ERCs). These license private companies to operate in specific degraded forest areas for 60 years, building businesses that reduce or reverse carbon emissions, restore or conserve high-value forest ecosystems, and promote sustainable livelihoods.

Keys ways of generating value from ERCs are payments for environmental services (PESs) and the sales of non-timber forest products (NTFPs)[45] such as wild forest honey—a model that has the potential to provide profit for the ERC owner and a fair and reliable income for local communities. [46]

VALUE CREATOR

The giant honey bee (*Apis dorsata*) builds its honeycombs in the sialang (*Koompassia parvifolia*) tree. Flavoured by the rainforest and rich in vitamins, minerals and amino acids, the honey's great taste, health benefits[47] (e.g. alleviating coughs and sore throats) and strong social and environmental story appeals to consumers.

This means that wild forest honey can potentially generate income for the ERC holder and provide jobs and income for communities living in and around the forest, and by doing so provide incentives to restore and protect the landscape.

THE REGENERATIVE MODEL

ABT are partnering with ethical Indonesian food producer Javara to build a transparent value chain and sustainable brand for the luxury and premium honey market.

Working in 38,665 hectares, the honey will be harvested using a sustainable process. Wild forest honey has traditionally been harvested by indigenous people in risky and non-sustainable ways: at night

and without safety equipment, harvesting all available honey and cutting out parts of the hives that contain the young larvae. In contrast, the JMHI process ensures that the harvesters have proper climbing equipment, know which parts of the hives to cut and which to leave, and know the importance of leaving some honey to sustain the larvae. In addition, these specialist harvesting requirements respect the social customs that the indigenous communities have towards the sialang trees and the surrounding forest and so deliver value to the individuals and communities involved.

CURRENT IMPACT

PT ABT have developed a detailed business plan and established a memorandum of understanding with Javara. A pilot is now testing the quality, quantity, market demand and operating model to see if ABT honey can be commercialised.

- **Economic and social value**: Training and sales from the honey pilot provide improved safety conditions and additional income to honey harvesters. In addition, the pilot products include QR codes that allow customers to see the process of local communities harvesting and processing the wild honey. This will help to build social engagement and awareness of the context and needs of the indigenous communities.
- **Environmental value**: Around 22,000 hectares of forest will be better managed through the pilot.

FUTURE POTENTIAL

By 2020, ABT aims that its honey will be a recognised premium brand in Indonesia, with annual production at two to five tonnes[44]. This would provide estimated annual revenues of GB£0.5 million by 2020, which could provide an increase of up to 20 percent on current income for the forest-dependent communities involved in the honey harvesting and processing.[48] For ABT, the revenue from forest honey in the ERC is estimated at around one-third of the overall ERC operational costs (including costs of conservation efforts for that area), thus reducing the dependency on donor funding for forest conservation.[49]

There is also potential to source more honey by linking with other ERCs in the region, and the model could be rolled out to other areas where sialang trees grow.

BARRIERS, AND THEIR MITIGATION

Predicting and securing supply is a challenge as the honey is not common and mapping of the locations where honey can be harvested is limited. A comprehensive census of supply availability has helped build confidence that the business model is viable.

ABT's low production capacity may also create bottlenecks for supply chain actors, so members of the local community will be trained on honey harvesting and processing so that the required quality and quantities are available.

Sialang honey is expensive to harvest as it needs professional tree climbers and payments to the local tree owners. However, this will be mitigated by targeting the luxury and premium honey market to secure high prices.

Jelutong, a natural high-quality latex

COMPANY: PT Ekosistem Khatulistiwa Lestari (EKL), private company; PT Sampit, private company

PROJECT LOCATION: Kubu Raya District, West Kalimantan Province, Indonesia

ARCHETYPE: Creating value from standing forest

THE CHALLENGE

Kubu Raya is made up of 248,000 hectares of non-forest area, 174,000 hectares of plantations and 442,000 hectares of natural forest. Between 2001 and 2017, the region lost 269,000 hectares of tree cover, with a 34 percent decrease since 2000.[50]

To address this, the Indonesian Government has legislated for Ecosystem Restoration Concessions (ERCs). These license private companies to operate in specific degraded forest areas for 60 years, building businesses that reduce or reverse carbon emissions, restore or conserve high-value forest ecosystems, and promote sustainable livelihoods (see also the specific Case Study on ERCs, above).

Keys ways of generating value from ERCs are through a portfolio of payments for environmental services (PESs) and sales of non-timber forest products (NTFPs)[51], such as Jelutong. However, little is known about the supply chain and market potential of Jelutong in Indonesia.

VALUE CREATOR

The Jelutong (*Dyera costulata*) tree's latex resin can be used as a natural gum base for chewing gum. It has a premium commercial value, with a market price that is

more stable than that of rubber and around twice that of synthetic gum base alternatives.

Its ability to grow in waterlogged conditions provides an opportunity to increase the value of peatlands and mangroves, which are frequently under threat of being drained and converted for palm oil cultivation. Jelutong can be planted or harvested from standing forest, providing an income for local tappers while keeping the landscape intact, retaining peatland water and helping to prevent forest fires.

THE REGENERATIVE MODEL

Established in 2011, EKL's ERC covers 14,080 hectares of peatland and mangrove forest that contains wild Jelutong. Working with local communities, EKL will harvest liquid latex and process it into solid crude latex. This will be sold under a long-term partnership agreement with PT Sampit, and processed into a ready-to-use product for the chewing gum industry.

EKL aims to establish a sustainable business that covers its operational costs whilst protecting and restoring the forest. Communities involved in harvesting and collection (which are similar to processes they already use in rubber production), and potentially processing, would gain an alternative livelihood, which would incentivise protection of the peatland that Jelutong thrives in.

CURRENT IMPACT

Partnerships for Forests supported an analysis of Jelutong's commercial uses, standards, market prices, buyers, market size and infrastructure needed to reach market. It is also analysed the supply potential of wild and plantation Jelutong, costs of production in ERCs and potential value chain partners.

Using this information, Partnerships for Forests supported the development of the EKL's Jelutong business plan, developing a clear market entry strategy, production strategy and financing requirements to deliver a profitable business in the early 2020s. The full economic, social and environmental value of the project will be established through these analyses.

FUTURE POTENTIAL

EKL and PT Sampit plan to design a small-scale trial to prove the concept. This will include capacity building for EKL's operating model and product testing with PT Sampit.

In terms of scaling, there is an immediate opportunity to expand to 2,500 hectares with 15 more households. In the longer term, the model could also be rolled out in large sections of the 12 million hectares of peatland in Indonesia.

BARRIERS, AND THEIR MITIGATION

Poor harvesting and tapping processes result in low yield, affecting the price of produced latex, and low volumes make full container shipments difficult, potentially increasing delivered prices to international markets. Ensuring that supply matches the demand that has been established is a key challenge. These supply and logistics issues will be mitigated through community training and building inventory data to improve confidence on long-term forecasts and enable further engagement with the market.

Once production is up and running, identifying additional buyers will be essential. A pipeline of potential future buyers has been identified. However, although initial samples sent to buyers showed potential as a gum substitute, more research is needed in order to ensure compliance with new export markets, such as the EU and US.

Harvesting 'Dragon's Blood' resin

COMPANY: PT Alam Bukit Tigapuluh (ABT), private company

PROJECT LOCATION: Bukit Tigapuluh, Jambi, Central Sumatra, Indonesia

ARCHETYPE: Creating value from standing forest

THE CHALLENGE

In 1985, the forest cover in Bukit Tigapuluh was almost 400,000 hectares.[52] Within three decades, half of this forest was lost, driven by a combination of industrial agriculture and strong economic growth.

To help address this, the Indonesia Government has legislated for Ecosystem Restoration Concessions (ERCs). These contracts license private companies to operate in specific degraded forest areas for 60 years, building businesses that reduce or reverse carbon emissions, restore or conserve high-value forest ecosystems, and promote sustainable livelihoods (see also the specific Case Study on ERCs, above).

Keys ways of generating value from ERCs are payments for environmental services (PESs) and sales of non-timber forest products (NTFPs)[53], such as Dragons' Blood.

VALUE CREATOR

Dragons' Blood (locally known as jernang) resin is a fruit extract of the rattan palm (*Daemonorops draco)*. It is the world's most expensive plant resin—a rare, precious forest commodity that has global demand in medicines and cosmetics. Products have sold at up to USD 700 per kilogram, and the estimated Chinese medicine demand alone (500 tonnes resin annually), is around 20 times the Indonesia's current export volume.[54]

Yet deforestation and unsustainable harvesting mean the wild forest supply of Dragons' Blood is declining rapidly, with the Bukit Tigapuluh landscape experiencing a 60 percent decline in forest in three years.

THE REGENERATIVE MODEL

In 2015, ABT obtained an ERC license to manage 38,000 hectares of ex-logging land in Bukit Tigapuluh, where it plans to harvest and process both wild and agroforestry-produced Dragons' Blood. The wild forest model would employ community members to harvest fruit from wild forest clumps and the agroforestry model would involve them in seedling planting, growth and harvesting.

PT ABT will buy the harvest from the communities and process it into powders. These are sold on, processed and distributed in the traditional Chinese medicine market.

The main operational cost of the business model are purchasing, drying and processing the fruit, and the capital cost for the pilot is initially being borne by Partnerships for Forests.[55]

CURRENT IMPACT

Having developed an initial business plan, PT ABT are developing an operational model for both wild and agroforestry Dragons' Blood, and have identified the private company, Stem Cell United, as a potential traditional Chinese medicine buyer partner.

- **Economic and social value:** 100 hectares of successful planting and harvest will cover the annual operating costs of ABT ERC, and it is estimated to return more than four times the ABT annual operational costs in the long term. The community will benefit from employment (around 30 full-time staff per 100 hectares) on a fair wage. The project would empower indigenous communities (e.g. the Talang Mamak tribe in Semerantihan village) by improving livelihoods and wild harvesting will create jobs for local communities in harvest months.
- **Environmental value**: economic returns provide forest protection incentives for ABT and the communities.

FUTURE POTENTIAL

The hope is the model could be replicated in other areas of Sumatra with similar landscape conditions, and in other areas of Southeast Asia and Latin America where species of the plant are endemic.

The Latin American species is used for cosmetics ingredients for companies like Rodial[56], and the long-term plan for Dragons' Blood in Southeast Asia is to tap into this market and so mitigate fluctuations in the Chinese medicine market.

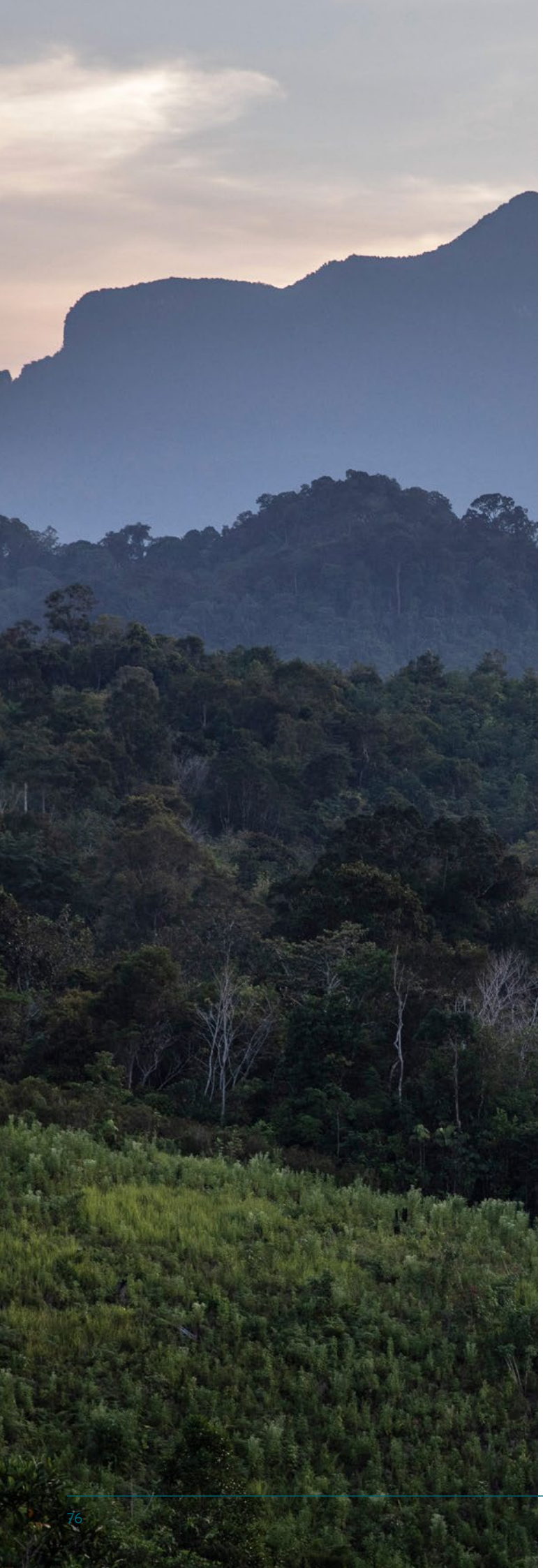
BARRIERS, AND THEIR MITIGATION

Dragons' Blood has a five- to seven-year period from seedling to resin production, creating significant cash flow issues. Other key barriers include declining wild forest area and limited technical capacity in areas such as agroforestry systems, sustainable wild harvesting and fruit handling.

Also, the market is immature and informal, and the business will require a high level of capital expenditure to establish a processing facility and to ensure regulatory approval as a cosmetic/health supplement in US and EU markets.

There are two main ways to address these challenges:

- Building capacity: ABT could work with companies that process and sell resin to train local communities in post-harvest processes;
- Concessional finance: ABT is looking at partnering with universities to develop the initial tissue culture, then securing concessional finance once the seedlings come to maturity.



WEST AND CENTRAL AFRICA

Landscape partnerships in Western Ghana

COMPANY: Olam Ghana, private company; Rainforest Alliance, international civil society organisation; Ghana Cocoa Board, regulatory body for cocoa in Ghana; Forestry Commission of Ghana, regulatory body for forests and forest resources in Ghana

PROJECT LOCATION: Sefwi Wiawso District, Ghana

ARCHETYPE: Agriculture production–protection

THE CHALLENGE

The Sui River Forest Reserve is one of the most important cocoa-producing landscapes in Ghana, but has lost one-third[57] of its forests due to indiscriminate logging, illegal farming and demand for fuelwood.

The landscape is home to around 50,000 smallholder farmers. Many have old farms and limited experience in improved cocoa production, resulting in low yields, poor income levels, limited access to finance, inadequately diversified income sources and little incentive to keep the forest intact.

Helping farmers to increase yields and income would reduce the need to encroach the forest.

VALUE CREATOR

Cocoa grows very well in tropical forest areas and around 70 percent of the world's cocoa comes from Ghana and Côte d'Ivoire, mainly grown by smallholder farmers.

It takes between three to five years for a cocoa plant to yield its first crop, and it can have up to 25 productive years. Each tree producesw about 30 pods a year and each pod contains roughly 40 cocoa beans. Given that it takes around 500 beans to make a pound of chocolate, each tree produces about two pounds of chocolate a year.

THE REGENERATIVE MODEL

The project 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.

To achieve this, a licensed buying company, Olam, will provide technical extension services and interest-free loans in order to enable farmers to increase their productivity, yield and income.

Farmers have offtake agreements with Olam, with incentives (interest-free loans, start-up capital and timber shade trees) and premium payments (an extra USD $80/tonne) tied to sustainable cocoa production and forest protection.

As well as planting shade trees for the cocoa, degraded landscapes will be restored by planting timber trees. Landscape Management Boards (LMBs) will manage activities and will monitor and prevent deforestation through the enforcement of by-laws and the sanctioning of farmers engaged in illegal activities.

The LMBs operate through joint planning and strategy development and devolution of stewardship to local institutions, involving local communities and ensuring the equitable distribution of benefits to them. The result will be improved production that incentivises and enables forest protection and regrowth.

CURRENT IMPACT

Two LMBs are in place, each with a constitution that has been approved by all relevant stakeholders, and a Steering Committee of company representatives has discussed how to govern and guide project implementation at landscape and national level. The Landscape Action Plan and Business Plan have been finalised and the Social and Environmental baseline study has been successfully carried out.

The project has mapped a total of 7,115 farmers onto the Farmer Identification System in order to identify sustainable cocoa sources. This will feed into the verification and traceability system that will be used.

Offtake agreements with schools, restaurants and pharmaceutical companies have been signed by the LMB on behalf of the farmers, securing the sale of snails, soap and honey produced through the additional livelihood activities.

As the project is in pilot phase, the economic, social and environmental value inherent in the model is not yet quantified.

FUTURE POTENTIAL

The next phase will test the business and commercial viability of the forest landscape governance mechanism as a vehicle of landscape change.

This will be complemented by a forest protection mechanism, based on the Landscape Action Plan, which will provide incentives and restore degraded areas through the planting of timber trees. The project seeks to catalyse GB £31 million of supply chain investment from licensed buying companies, including Olam.

As the results of this pilot become known, this model could be replicated in many other cocoa landscapes in Ghana, and potentially in other cocoa-growing countries.

BARRIERS, AND THEIR MITIGATION

The main challenges are resistance to changing farming methods, poor access to credit finance and issues with repaying loans. Also, the LMBs lack a legal mandate to enforce sanctions against those involved in illegal activities.

The plans to mitigate these are:

- Continued farmer education and the motivation of seeing increased and sustained yields;
- Provision of interest-free loans only to trusted farmers who have a guarantee from the purchasing clerk in their village.
- LMBs developing community-based frameworks to manage rewards and withdrawal of rewards for agreed land use practices, and to work with local and national government on more effective policing and enforcement of existing forest protection mechanisms.

Investing in forest-smart agriculture in Liberia

COMPANY: Vainga Agriculture Development & Management Consultancy (VADEMCO); Society for the Conservation of Nature in Liberia (SCNL); Forest Development Authority (FDA); Royal Society for the Protection of Birds (RSPB)

PROJECT LOCATION: Lofa, Gbarpolu and Grand Cape Mount counties, Liberia

ARCHETYPE: Agriculture production–protection

THE CHALLENGE

The 88,000 hectares Gola Forest, recently designated as a National Park, is an area of high-value forest that is severely threatened by deforestation from an expanding population, unsustainable commercial activities and subsistence agricultural production around its margins.

The forest contains a rich ecosystem, including around 900 plant species (including 230 tree species), half of which are endemic to the Upper Guinea Forest area.[58] Sixty animal species are on the IUCN Red List of Threatened Species, including the vulnerable Forest Elephant and endangered Pygmy Hippopotamus. [59]

VALUE CREATOR

Cocoa grows very well in tropical forest areas but is currently small scale in Liberia, with smallholder farmers and local cooperatives that are challenged by inadequate roads, a lack of storage facilities, a lack of familiarity with quality standards and limited access to market information. [60]

It takes between three to five years for a cocoa plant to yield its first crop, with up to 25 productive years. Each tree produces about 30 pods a year and each pod contains roughly 40 cocoa beans. Given that it takes approximately 500 beans to make a pound of chocolate, each tree produces about two pounds of chocolate a year.

THE REGENERATIVE MODEL

The project seeks to develop a Gola Rainforest Cocoa brand and product as a bespoke form of rainforest-friendly cocoa that is produced within biologically diverse agroforestry systems in the Greater Gola landscape.

The model seeks to supply a niche, export-oriented market by standardizing forest-smart cocoa, i.e. cocoa grown in shaded conditions, without fertilizer or chemicals, using forest-friendly agriculture practice and causing zero deforestation.

Cocoa farmers will be trained on agroforestry systems (where trees, food and cash crops are grown in the same landscape) and to increase their production of forest-smart beans, so enhancing their incomes. It will also involve work to ensure a sustainable supply of beans for market and to develop safe and secure transport that maintains the quality of the cocoa.

CURRENT IMPACT

To date, the project has developed a roadmap for the implementation the National Cocoa Development Strategy, including sustainable production, product certification, capacity building for smallholders, access to markets and safeguards.

It has also developed socioeconomic, environmental and biodiversity baseline assessments in the three project areas, a market and supply chain assessment, and a feasibility analysis. The analysis concludes that the export of premium cocoa from forest-edge communities in Liberia's Gola landscape is achievable, given an adequate timeframe and project funding for the duration of business set-up.

- **Economic and social value:** a fair, equitable income for farmers through the sale of cocoa to premium and niche markets, with premium payments of around GB £510 per metric tonne, around 25 percent higher than the current payment[61]. Smallholder cocoa yields are expected to increase by 30 percent, with a corresponding impact on livelihoods. The intervention will impact 300 farmers directly and 1,700 indirectly, growing to around 9,500 people accessing direct investment and technical support over time. Within its target group, the project aims to increase women's participation in the cocoa supply chain from 15 to 20 percent.
- **Environmental value**: preserving the integrity of Liberian rainforest blocks and providing connectivity between remnant forests for wildlife by reducing ecological degradation, based on the principles of sustainable land-use and integrated forest management and conservation across 200,000 hectares of forest.

FUTURE POTENTIAL

The goal is to scale up to include all cocoa farmers farming in proximity to native forest in the Gola Landscape. It is expected that 'Gola Rainforest Cocoa' will be a model for other forest commodities in the landscape, as well as for the production of cocoa across Liberia.

BARRIERS, AND THEIR MITIGATION

The key barriers to operating this model include marketing a new brand of cocoa; replicating and financing the successful Sierra Leone model in a new country; and designing a community forest protection

mechanism that will safeguard the forest, preserve and enhance biodiversity in the region whilst ensuring production at levels attractive to investors and buyers.

This approach will need to deliver enhanced incomes and other incentives, such as income from non-timber forest products, to farmers and communities that support the whole approach and deliver the conservation, forest and wildlife outcomes.

Forest protection, monitoring and management processes also need to be developed using community-based frameworks to mitigate against incursions into the forest. Such frameworks will be required to manage allocation of rewards and withdrawal of rewards for agreed land use practices and lack of compliance respectively, and to work with local and national government on more effective policing and enforcement of existing forest protection mechanisms.

Resilient and productive cocoa landscapes

COMPANY: Touton S.A, private company; Ghana Forestry Commission, government; Ghana Cocoa Board (COCOBOD), government

PROJECT LOCATION: Bia National Park and Krokosua Forest Reserve, Juaboso-Bia, Ghana

ARCHETYPE: Agriculture production–protection

THE CHALLENGE

The 243,561 hectare Juaboso-Bia landscape is a cocoa production hotspot that produces 60,000 metric tonnes each year. Of the 147,374 people who live there, 77 percent are economically active farmers,[62] the majority engaged in growing cocoa.

In recent years agricultural expansion has accounted for an annual loss of nearly 140,000 hectares of High Forest Zone in Ghana, with cocoa the biggest driver for over a quarter of that loss.

Low yields and the resulting low incomes drive farmers to expand cultivation into forests and, coupled with a general lack of forest protection and preservation, results in a vicious cycle of deforestation which in turn threatens the cocoa crop.

VALUE CREATOR

Around 70 percent of the world's cocoa comes from Ghana and Côte d'Ivoire as their forest areas offer the temperature, rainfall and shade needed for the trees to thrive.

It takes between three to five years for a tree to yield its first crop, and it can have up to 25 productive years, each tree producing enough beans to produce about one kilogram of chocolate a year.

The majority of the crop is grown by smallholder farmers, who each achieve an average annual yield of 300 kg/ha. The cocoa is sold to international markets, e.g. USA, EU, Japan and Malaysia, and fetches around USD $1700 per tonne (although this varies year on year).

THE REGENERATIVE MODEL

Touton sells cocoa directly to clients and processes cocoa beans into semi-finished products. It is leading a consortium of partners that aims to achieve a sustainable, deforestation-free cocoa landscape in Juabeso-Bia.

A key part of the work is establishing a Landscape Management Board (LMB), with active participation from communities. This landscape-wide framework will provide strong safeguards that ensure the product is deforestation free—a major marketing premise of the brand.

Touton will also support farmers to increase their average yields (from 300 kg/ha to 1000 kg/ha) and offer premium payments for their cocoa on condition that they adhere to sustainable land use and forest protection practices. It will support this via training on good agricultural practices, farmer business schools, Rural Service Centres that act as information hubs for smallholder farmers, and links to credit facilities and markets.

CURRENT IMPACT

Project partners have held consultations and focus group discussions with communities to validate and finalise the landscape vision and pathway strategy. An LMB has been established and guidelines for good farming practice for climate-smart cocoa (CSC) validated.

The project has also developed a CSC-practice manual and trained nine members of the COCOBOD and Forestry Commission and four from the Rural Service Centre on it.

- **Economic and social value:** increased yields and diverse livelihood options, including additional income from the intercropped timber, will increase farmers' incomes. The wider community will benefit from employment as service providers in the Rural Service Centres, and from additional livelihoods from vegetable production and animal rearing.

- **Environmental value**: with the LMB agreements with communities in place, the entire 243,561 hectares of land is expected to be under sustainable land use by the end of 2020.

FUTURE POTENTIAL

The second phase of the project is currently underway and focusing on piloting and testing the landscape governance model, cocoa agroforestry, deforestation monitoring systems, and climate-smart cocoa production and adoption by farmers started in Phase One.

Touton has committed to investing over GB £100 million over the next five years in order to source climate-smart cocoa beans from the Juaboso-Bia landscape and surrounding areas.

BARRIERS, AND THEIR MITIGATION

The current legal framework does not empower LMBs to impose sanctions on defaulting farmers. To address this barrier, the LMB is supporting the Forestry Commission, which does have a legal mandate to impose sanctions, to monitoring the landscape.

Also, convincing farmers to adopt a new production system is a challenge. Technical extensive services have been provided to local farmers to help address this.

A final challenge to scaling into neighbouring Côte d'Ivoire is that the regulatory, land tenure and marketing and sales systems differ from those in Ghana.

Preservation of forests through professionalising cooperatives

COMPANY: Cémoi, private company

PROJECT LOCATION: Mé, Agneby-Tiassa and Indenie-Djuoblin, Côte d'Ivoire

ARCHETYPE: Agriculture protection–production

THE CHALLENGE

By 2015, Côte d'Ivoire had lost up to 80 percent of its forests[63]—one of the highest levels of deforestation in Africa. This loss was largely due to cocoa farmers expanding into natural forests in order to compensate for low yields.

By reintroducing or preserving non-cocoa shade trees in and around cocoa orchards, farmers can increase biodiversity and mitigate the effects of climate change. Anecdotal evidence suggests that by doing so, farmers tend to obtain a long-term steady and sustained increase in yield, improving livelihoods and incentivising preservation and reforestation.

VALUE CREATOR

Cocoa grows very well in tropical forest areas and around 41 percent[64] of the world's cocoa comes from Côte d'Ivoire, mainly grown by smallholder farmers on one or two hectares of land.

The crop generates approximately 40 percent of the country's export revenues and contributes around 10 percent of its gross domestic product, with around 600,000 farmers and their families and communities reliant on income from cocoa. [64]

THE REGENERATIVE MODEL

Cémoi will work with cocoa farmer cooperatives to equip their members with the skills needed to make their cropping systems more resilient through the introduction of shade trees.

Using a free, prior and informed consent (FPIC) process, farmers will have long-term agreements with Cémoi, committing to reforesting and maintaining trees within cocoa landscapes in return for the provision of chemical inputs and extension services to increase yields, and a guarantee to buy the beans.

Cocoa farmers' incomes are expected to increase through the restoration of their orchards, increases in productivity through improved farming methods, diversifying income through the use of agroforestry (growing trees interspersed with food and cash crops), and getting a premium price for deforestation-free cocoa.

This will ultimately stabilise cocoa landscapes, increase tree coverage and incentivise farmers to reduce pressure on the remaining forests.

CURRENT IMPACT

Five cooperatives, representing 4,000 farmers, have signed up to participate in the project and a memorandum of understanding has been signed, detailing the farmers', cooperatives' and Cémoi's responsibilities and the scope of the intervention and funding. Shade tree planting, improvements to highly degraded off-reserve areas, and traceability and monitoring systems that track cocoa production have been put in place.

Farm mapping is ongoing, with a total of 1,476 farms covering 3,074 hectares mapped so far, and business feasibility studies, baseline analyses, land-use

mapping and a cocoa traceability system analysis are being finalised.

- **Economic and social value:** by shifting to an agroforestry model, it is expected that farmers will receive a 25 percent income increase from current baselines. More community members will be able to work within the value chain, such as in tree planting. There will also be active community participation in the broader reforestation drive.
- **Environmental value**: nurseries have been set up and seedlings will be transplanted in the rainy season, with a target to plant 480,000 trees over the next five years.

FUTURE POTENTIAL

It is estimated that approximately 75,000 hectares will be put under sustainable land use by 2020, attracting GB £42 million of private investment over the project period. In addition, the project plans to scale-up to other regions in Côte d'Ivoire.

BARRIERS, AND THEIR MITIGATION

A major feature of this model is the introduction of shade trees. However, as farmers have practiced sun-based cocoa production for decades, changing attitudes and getting producers to plant trees for the purpose of providing shade on their farms is a challenge. Ongoing education and proof of sustained yields and income should increase farmer uptake and guarantee consistent supply to Cémoi as it invests heavily in the supply chain.

Sustainable charcoal from certified timber production

COMPANY: Miro Forestry (Ghana) Limited, private company

PROJECT LOCATION: Agogo, Ghana

ARCHETYPE: Agriculture production-protection

THE CHALLENGE

Ghana has lost an average of 135,000 hectares of forest per year between 1990 and 2000—an average annual deforestation rate of two percent[65]—and burning forest to clear land for agriculture, timber harvesting, charcoal production and mining have been major contributors to this deforestation.

National forest reserves and privately owned plantations are regularly encroached upon for charcoal production. With high demand for fuelwood and charcoal, incentives for charcoal producers to continue using methods that deforest the land and pose high fire risks are high.

Sustainable timber and charcoal plantation owner Miro Forestry (Ghana) Limited has partnered with the Forestry Commission of Ghana and traditional authorities in Agogo to research and develop an innovative business model for the charcoal industry, in the hope of catalysing a transition to widespread, sustainable charcoal production in West Africa.

VALUE CREATOR

Charcoal is a particularly attractive fuel source as it burns hotter, is lighter to transport and can be stored for longer than cut wood.

It is estimated that 60 percent of all wood taken from forests globally is burnt as fuel, either as cut wood or charcoal. In Ghana, wood supplies 71 percent of total annual energy demand and 90 percent of households rely on cut wood or charcoal for cooking. On average, a 32-kilogram bag of locally manufactured charcoal costs USD $10 in the open market. [66]

Previously, most wood for charcoal production was sourced outside forest reserves but reserves are increasingly being targeted for illegal charcoal production.

THE REGENERATIVE SOLUTION AND MODEL

Miro's pilot project aims to demonstrate a new method of sustainable charcoal production.

Rather than the traditional method of producing charcoal from trees felled from standing forest, the project produces charcoal from the thinnings produced during timber processing, which are usually discarded or burnt.

Miro sells timber and charcoal in the open market. Short- to medium-term trees are sold for timber, and the thinnings used to make charcoal using a prototype green kiln, which is being piloted to test for full commercial viability.

In this way, the project aims to ensure charcoal is made from thinnings rather than the whole tree, so increasing the efficient use of trees and safeguarding the forest.

CURRENT IMPACT

Miro has commissioned several documents:

- a carbon benefit analysis, focused on sustainable charcoal marketing and sales;

- the effects of unsustainable charcoal production on forest degradation;
- the feasibility of developing the mobile kiln and of charcoal production from waste in the sustainable timber industry;
- the development of a results-based monitoring, evaluation and reporting framework;
- a commercialisation strategy for sustainable charcoal production in Ghana and sub-Saharan Africa.

These reports have been completed and are the basis for the ongoing pilot project.

- **Economic and social value:** the project will generate additional income through the use of waste wood for charcoal, and from the premium prices paid for sustainable charcoal. The surrounding communities will learn new methods of charcoal production, gaining around 2,000 local jobs.
- **Environmental value**: in addition to reducing deforestation through encroachment of illegal charcoal production, the project aims to plant 3,000 hectares of new trees each year over the next six years.

FUTURE POTENTIAL

With Partnerships for Forest's support, GB £6 million of private investment is expected to be catalysed by 2020, putting approximately 20,000 hectares of land under sustainable use.

The new charcoal kiln is being tested and results will be shared with sector actors for replication and adoption, with the aim of extending the approach to smallholders and plantation companies across West Africa and potentially the rest of sub-Saharan Africa.

BARRIERS, AND THEIR MITIGATION

Key barriers for this business model relate to how the business is integrated within the community.

The activities of communities surrounding the plantation pose a high risk to Miro's operations. Several hectares of plantation have been lost to bushfires from slash and burn, damaging Miro's expected yields and annual revenue. Also, although Miro continually plants new trees in order to balance trees sold, nomadic herdsmen bring cattle to feed on the young trees or shoots, eating away Miro's tree stock and revenue.

These challenges could be addressed by teaching the community about what Miro is trying to achieve and the advantages the approach has for them.

Sustainable palm oil in Ghana

COMPANY: Benso Oil Palm Plantation (BPPO) a subsidiary of Wilmar Africa Ltd., private company; Proforest Initiative: group that includes both non-profit organisations and companies

PROJECT LOCATION: Adum Banso, Ghana

ARCHETYPE: Agriculture production–protection

THE CHALLENGE

Global demand for palm oil is growing—it is expected to increase by 5 percent each year, reaching 73 million metric tonnes by 2020 and 120–156 million tonnes by 2050.[67]

Ghana's 305,758 hectares of plantations currently produce approximately 244,000 tonnes of palm oil. This does not meet demand, with a local deficit of 35,000 tonnes and a sub-regional deficit of 850,000 tonnes.[68] More than 80 percent of oil palm fresh fruit bunches (FFBs) in Ghana are produced by independent smallholder farmers, but their productivity is only 30 to 50 percent that of large plantations.[69]

The growing local, regional and global demand has led to smallholders expanding production in protected forests and reserves, putting the forests within the Adum Banso landscape under serious threat of depletion with an observed deforestation rate of 3.2 percent per annum in non-protected areas.[70]

VALUE CREATOR

Palm oil is used in many products all over the world, particularly those found on supermarket shelves and in processed foods, from margarine and chocolate to ice cream, soaps, cosmetics, and fuel for cars and power plants.

It is one of the highest-yielding vegetable oil crops, which makes it very efficient in terms of land use and so is the least expensive vegetable oil in the world.[71] But palm oil production is one of the key drivers of deforestation.[72]

THE REGENERATIVE MODEL

The Proforest Initiative–BPPO partnership engages local populations to develop community-owned palm oil fields and increase the productivity of those fields via improved management practices.

As a Roundtable on Sustainable Palm Oil[73] member, BOPP will conduct High Conservation Value (HCV) and High Carbon Stock (HCS) assessments to identify suitable lands for the community oil palm farms. Working closely with communities and following the free, prior, informed consent (FPIC) process, these farms will then be formally established.

After supporting communities to sign FPIC and production–protection agreements, BOPP will offer training on best practice for increasing yields in line with RSPO requirements. Communities will also be trained on management of HCV/HCS areas and on the proper functioning of a newly established forest Landscape Governance Board.

These more proficient smallholder farmers will produce more effective and more sustainable palm oil production and so protect forest. BOPP will also offer offtake agreements that guarantee a market for FFBs harvested by smallholders. In addition, new livelihood options (such as baking and bee keeping) and conditional incentives mean that communities can run more productive farms and meet demand for palm oil without having to encroach into forests.

CURRENT IMPACT

The project has secured a catalytic investment of GB£3.5m from Wilmar International, a leading agribusiness in Asia and Africa, and is being piloted on 1,400 hectares of community-owned land from June 2019.

- **Economic and social value:** current yields of palm oil are around 8 metric tonnes per hectare, translating into a gross margin of USD $33. With Partnerships for Forests support, yield is expected to increase to 15 metric tonnes per hectare by year 2029, giving a gross margin of USD $708.
- **Environmental value**: by developing community palm oil fields, the project aims to put the entire community at the centre of forest protection, with a planned 16,000 hectares of forests under protection and 4,000 hectares under sustainable production.

FUTURE POTENTIAL

By 2020, the project is expected to reach approximately 10,000 community members, bring 20,000 hectares of land under sustainable use and mobilise private sector investments worth GB £15 million.

The initiative has the potential to transform the oil palm sector in the West and Central Africa region, providing a model that can be replicated by other regions and land users. It will also provide a platform for knowledge-sharing and learning through the Africa Palm Oil Initiative (APOI).

There is potential to scale this model, providing there is available land and engagement with communities, once the pilot has been completed and lessons learnt have been documented.

BARRIERS TO SCALING, AND THEIR MITIGATION

As BOPP expands its production of FFBs through the community outgrower scheme, it must be compliant with RSPO standards. Farmers will be trained in the RSPO requirements but there is a risk that some may not be able to comply. Any resulting sanctions would reduce the outgrower scheme's expected volumes.

There is also a risk that communities not involved in this model's conservation agreements will continue the trend of deforestation, highlighting the importance of widespread inclusion where possible.

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A farmer walks back to his traditional boiling station after collecting the sap at a forest in Sintang regency, West Kalimantan, Indonesia.
Panos Pictures 2019

A research report commissioned by the Food and Land Use Coalition

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