GOOD GROWTH PARTNERSHIP
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RESTORATION IN AGRIFOOD LANDSCAPES: WHAT'S WORKING?

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About FOLUR

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FOLUR is an integrated programme designed to transform food systems by mobilising sustainable production landscapes in eight major commodities (livestock, cocoa, coffee, maize, palm oil, rice, soy and wheat) and 27 countries. Led by the World Bank and supported by the Global Environment Facility, FOLUR collaborates with the Global Landscapes Forum, Food and Agriculture Organization of the United Nations, International Finance Corporation, United Nations Development Programme-led Good Growth Partnership, and World Resources Institute-led Food and Land Use Coalition.

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Introduction

The need to restore degraded land and ecosystems is one of the biggest challenges facing the world today. Land degradation negatively impacts the well-being of over 3 billion people and costs more than 10% of global GDP through the loss of biodiversity and ecosystem services.[1]

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If past trends continue, 95% of the Earth's land could be degraded by 2050, with devastating impacts on food security and forcing hundreds of millions of people to leave their homes.[2] Deforestation and land degradation linked to agriculture are responsible for around a quarter of global greenhouse gas emissions,[3] while the loss of nature undermines progress on multiple Sustainable Development Goals.[4] Unsustainable agricultural practices are damaging the planet, threatening livelihoods, and putting our ability to feed 8 billion people at risk.

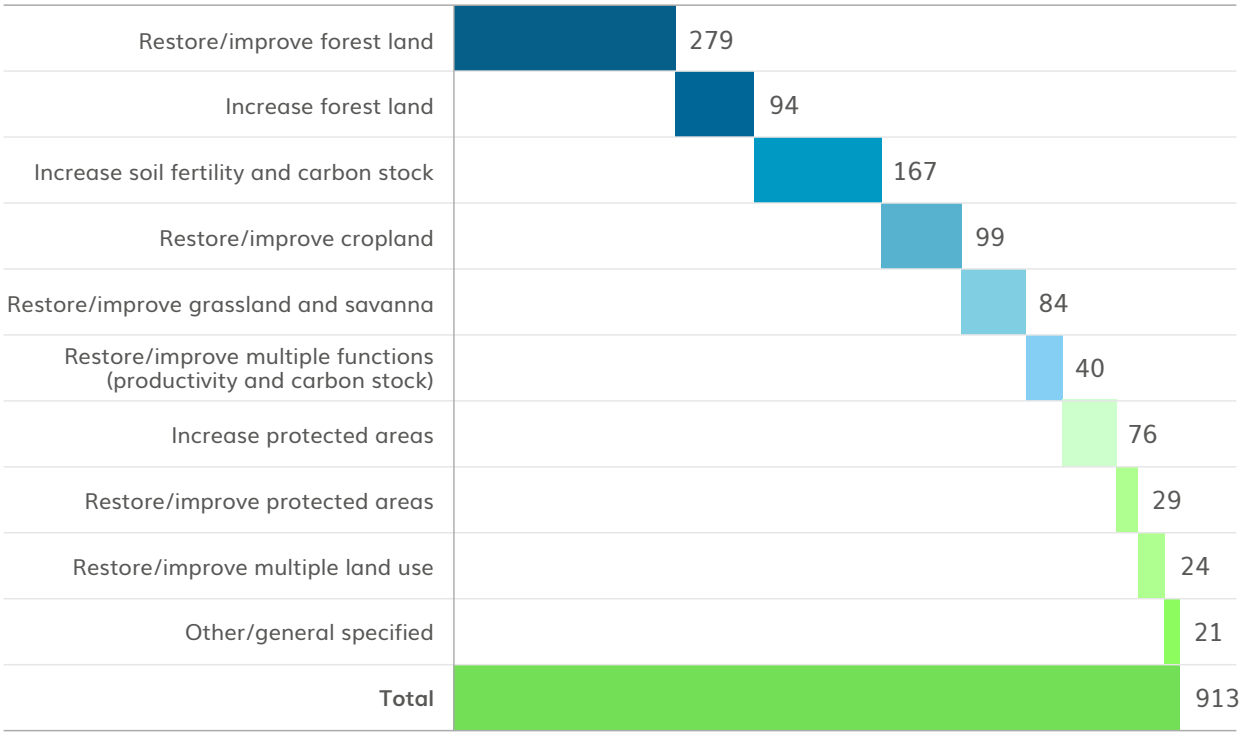
Against this backdrop, the United Nations has declared 2021–2030 the Decade on Ecosystem Restoration, aiming "to prevent, halt and reverse the degradation of ecosystems on every continent and in every ocean."[5] Numerous global and regional frameworks, commitments and initiatives have been launched to support this effort.

The Kunming–Montreal Global Biodiversity Framework, adopted by the parties to the UN Convention on Biological Diversity in 2022, includes a target to restore 30% of all degraded ecosystems by 2030. Under the Bonn Challenge, countries have committed to begin restoring 350 million hectares of degraded and deforested landscapes by 2030.[6] The Freshwater Challenge, launched in 2023, seeks to accelerate the restoration of 300,000km of degraded rivers and 350 million hectares of degraded wetlands by 2030.[7] Efforts are also under way to restore mangroves[8], peatlands,[9] and other terrestrial and marine ecosystems.[10]

Effective ecosystem restoration can bring multiple benefits. Protecting and restoring nature can provide more than a third of the emissions reductions needed by 2030 to keep global warming below 1.5°C,[12] while also supporting climate resilience and adaptation. Globally, every $1 invested in forest restoration can generate $7-30 in economic returns.[13] Regenerating degraded farmlands through agroforestry and other agroecological approaches can improve yields and soil fertility, strengthening food security and farmers' livelihoods while also bringing benefits for biodiversity and the climate.[14]

Figure 1

Global land restoration commitments by 2030, million hectares



Source: Adapted from UNEP (2022).[11]

Despite commitments and many successful examples of restoration under way, action still falls short of what's needed to meet global goals on climate, biodiversity and sustainable development. Land restoration initiatives encompass only a fraction of the area of degraded land ripe for restoration, while degradation continues elsewhere.[15] Many restoration pledges remain unfunded.[16]

The latest Conference of the Parties to the UN Convention on Biological Diversity, held in Cali, Colombia in October 2024, brought diverse voices to the table but ultimately fell short of financing conservation and restoration at the scale needed.

In this publication, we outline some of the key challenges and barriers to restoration within commodity production landscapes, and present three case studies – from Latin America, Africa and Asia – showing how projects are overcoming these challenges. Key insights from these cases are discussed in the conclusion.

FOLUR and restoration

Restoration is one of the key themes of the Food Systems, Land Use and Restoration Impact Program (FOLUR), which seeks to transform global food systems by promoting sustainable landscapes and value chains. Supported by the Global Environment Facility (GEF) and led by the World Bank, FOLUR partners collaborate through a Global Platform and run projects in 27 production landscapes, focusing on the value chains of eight commodities: beef, cocoa, corn, coffee, palm oil, rice, soy and wheat.

Agriculture is the leading driver of deforestation and land degradation, with the production and trade of the eight FOLUR commodities contributing a significant proportion of this.[17] Despite various commitments in recent years, deforestation and land degradation are continuing, and restoration efforts within production landscapes are not yet happening at the pace and scale required. Countries need the resources, capacity and knowledge to plan and deliver effective restoration projects, while the private sector needs support to develop new operational approaches, business models and partnerships.

FOLUR has supported the development of this briefing to showcase effective approaches to restoration involving FOLUR partners and production landscapes, which offer opportunities for learning, replication and upscaling. By sharing what's working, we aim to support greater collaboration across value chains so that commodity production can make a positive contribution to restoring ecosystems and creating resilient landscapes.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Challenges and barriers to restoration

Bridging the financing gap

Although restoration brings long-term benefits, it has high upfront costs. While there are no comprehensive global estimates of the total funding needs and current spending on restoration, it's clear that existing spending falls far short of what's required. UNEP estimates that finance for nature-based solutions – actions to protect, conserve, restore and sustainably use and manage ecosystems to addresses societal challenges – is currently US$154 billion per year, less than a third of the US$484 billion needed per year by 2030 to meet climate, biodiversity and land degradation targets.[18] More than 80% of current finance comes from governments – though spending on restoration is dwarfed by government expenditure on environmentally harmful subsidies to fisheries, agriculture and fossil fuels, estimated at US$500 billion to US$1 trillion per year.[19]

Private sector involvement

As the major contributor to deforestation and unsustainable production, the private sector has a key role to play in reversing these impacts and restoring resilient productive landscapes. Private sector investment decisions have a strong influence on landscape change, and with public budgets under pressure from multiple competing demands, investment from corporations and private finance institutions is critical to bridging the restoration finance gap.[20]

Corporate investment in resilient commodity supply chains has the potential to be a significant source of restoration finance. Many corporations see a clear business case for investing in restoration activities in regions where they operate or source from. Market-driven incentives for businesses to finance agroforestry, regenerative agriculture and active restoration include meeting climate commitments, strengthening the long-term sustainability of their supply chains, and enhancing (or avoiding damage to) their reputation and brand.[21]

However, other sources of private finance for restoration remain limited, despite the growing interest in green finance. For example, although green bonds worth over half a trillion dollars were issued in 2021, the bulk of this was invested in renewable energy and low-carbon buildings and transport, with just 5% going to activities in the land sector.[22] For asset managers, restoration is often seen as a high-risk market, with the return on investment too low to justify the risks.[23] Many restoration activities do not generate direct financial returns, benefits are realised over long timescales, and projects often take place in complex regulatory environments, all of which may present barriers to banks and investors.[24]

Trade-offs and synergies

Ecosystem restoration can raise questions of trade-offs between different objectives, including biodiversity conservation, climate change mitigation, food production and human well-being.[25] These trade-offs are likely to be particularly pronounced in landscapes where large-scale restoration competes for land with commodity production as well as local needs. But there are also potential synergies: for example, in coffee growing areas, shade canopy cover has been found to significantly increase carbon storage, hurricane resistance, bird species richness, food crop richness and farm resilience without affecting coffee yields.[26] Sylvopasture systems that combine trees, fodder and livestock can have higher yields than monoculture pastures, while improving carbon sequestration, soil health, water quality, biodiversity and animal welfare.[27]

Replicability, scalability and capacity gaps

Current global commitments envisage restoration on an unprecedented scale. There is an urgent need to develop projects that can be replicated, adapted and scaled up. As well as the technical aspects of ecosystem restoration, it's important to consider how the policy environment, governance systems, funding mechanisms, and coordination among institutions, sectors and stakeholders can enhance replicability and scalability.[28]

Capacity-building is also critical to enable restoration at scale. A global capacity needs assessment by the Food and Agriculture Organization of the United Nations (FAO) identified multiple capacity gaps and outlined recommendations for developing capacities of individuals and organisations across sectors and scales. Key priority areas for capacity development are financing, stakeholder engagement, technical capacities and supportive policies for restoration.[29]

Case study

Atlantic Forest Restoration Pact in Brazil

The Atlantic Forest is one of the most biodiverse biomes on Earth and also one of the most threatened.[30] Once spanning over a million square kilometres along Brazil's Atlantic coast and extending into Argentina and Paraguay, centuries of deforestation and degradation – driven largely by agricultural expansion – have reduced its original forest cover to just 8-22%,[31] much of it now existing in fragmented patches.

The Pact for the Restoration of the Atlantic Forest, formed in 2009, is a collective initiative that aims to restore 1 million hectares of degraded land by 2030 and 15 million hectares by 2050. The Pact brings together government institutions, private companies, NGOs, local people, landowners and the scientific community to coordinate restoration efforts and share resources across 17 states in Brazil, Argentina and Paraguay. The Pact focuses action on "certified territories", strategic areas where coordinated activity between large numbers of actors can increase the speed and scale of restoration. It also promotes communication and training efforts and monitoring of environmental, social and economic outcomes.

A variety of forest restoration approaches are used. At one end of the spectrum is natural regeneration, which can occur close to remaining areas of natural forest. At the other is active planting, using saplings grown in nurseries from seeds collected from the forest, and ongoing maintenance. In between, assisted natural regeneration involves local people intervening to help trees and natural vegetation to recover – for example by fencing off cattle or removing invasive species.[32]

Figure 2

How do different restoration techniques bring value to people and planet?

	TYPE	COST	BIODIVERSITY BENEFITS	ECONOMIC POTENTIAL
Natural regeneration	Natural forest regrowth			
	Assisted natural regeneration			
	Ecological restoration			
Active restoration	Small farmer reforestation, e.g. agroforestry, woodlots			
	Commercial, large-scale reforestation			
	Commercial reforestation with safeguards, e.g. certification			

Source: Adapted from Chazdon (2017)[33]

Competition for land use is a potential barrier to large-scale restoration in the Atlantic Forest. The region is dominated by commercial cattle ranching and sugarcane and soybean plantations, but is also home to many small-scale farmers. However, modelling scenarios suggest that restoring 15 million hectares of forest is feasible while increasing crop and cattle production. This will require more efficient and intensive cattle production to reduce the need for pastureland, along with greater support for smallholder farmers to carry out restoration and increase yields on their lands.[34]

Various initiatives combine restoration with productive land use at different scales. For example, farmers grow crops such as coffee and yerba mate in the shade of indigenous trees.[35] At the other end of the scale, Suzano, the world's largest pulp producer, has restored more than 30,000 hectares of native forest alongside its eucalyptus plantations on former cattle pastures.[36] Other economic incentives include carbon credits and payments for ecosystem services – in the municipality of Extrema, for example, farmers receive payments for growing and maintaining native trees around springs and streams that feed local reservoirs and help secure water supplies for 12 million inhabitants in the greater Sao Paulo area.

The Pact has become one of the world's most successful large-scale restoration initiatives and has been recognised by the UN as one of its 10 inaugural World Restoration Flagships. Around 700,000 hectares of land has been restored to date, benefiting around 154 million people in the region through job opportunities, food security and water provision.[37] The restoration has brought significant biodiversity benefits, particularly through the creation of ecological corridors linking forest fragments. In the cross-border Upper Parana catchment, jaguar numbers have increased by an estimated 160%.[38]

Insights

Coordination and collaboration

More than 300 organisations are involved in the Pact. The movement has an elected Coordination Council, which establishes standards, rules, principles and policies, and an Executive Secretariat that provides technical and logistical support to all activities carried out. Regional units coordinate action in different areas, while six working groups focus on thematic areas including restoration economics, public policy, fundraising and communications. This means restoration is well coordinated and focused where it can be most effective, reduces costs, and facilitates sharing of inputs like seedlings and equipment as well as knowledge and best practices.

Enabling environment

There is a strong legal mandate for restoration and conservation. Under Brazil's Forest Code, landowners are supposed to have natural vegetation on 20% of their land as well as in areas important for ecosystem integrity, such as around watercourses.

Economic sustainability

To be enduring, forest restoration needs to be economically viable. Forest restoration could create 1 million jobs in the region by 2030, while also supporting productive land uses.

Case study

Riverbank restoration for erosion control and flood protection in sugarcane plantations in Tanzania[39]

The Kilombero catchment in south central Tanzania is a critical area for biodiversity. The surrounding mountains provide important habitats for wildlife, including several endemic species, while the vast floodplain of the valley floor is one of the largest freshwater wetlands in East Africa, designated as a wetland of international importance under the Ramsar Convention in 2002.

In recent decades, Kilombero has come under increasing pressure from rapid population growth. The fertile soils of the floodplain have led to a large expansion of cropland, livestock and commodity production, including rice, sugar and teak. By 2014, nearly a fifth of the catchment's natural vegetation had been converted to cropland,[40] and wildlife populations have declined significantly.[41] While production in the Kilombero Valley is important to the national economy, the loss of ecosystem services provided by the floodplain – water supply and regulation, climate regulation, erosion control, nutrient cycling and wildlife habitat – has a huge cost: a recent analysis puts this at US$811.5 million over the last 26 years.[42] As a consequence of the loss of critical ecosystem services, small farmers are especially vulnerable to the impacts of climate change.

The IUCN-led SUSTAIN partnership, created to support climate-resilient landscape development in Tanzania and Mozambique, began working in Kilombero in 2015. The work included engaging with sugar value chain actors to develop a multistakeholder partnership focused on improving productivity, strengthening inclusion, restoring ecosystem services and building climate resilience.

Sugarcane cultivation has increased dramatically in the Kilombero Valley, which is home to the country's largest sugar producer, the Kilombero Sugar Company (KSC). As well as having around 10,000 hectares of sugarcane plantations on its own estate, KSC sources sugar for its mills from more than 8,000 smallholders (or "outgrowers") who farm around 19,000 hectares of cane on thousands of small plots.

Through a series of dialogues, the SUSTAIN partnership developed a business case for restoration action at the landscape level, focused on creating riverside buffer zones and planting native trees in these areas. Restoring these riparian forests helps to protect riverbanks from erosion, which in turn prevents the loss of valuable cropland and supports long-term business resilience. It also helps control flooding and buffer against droughts, both of which affect crop yields. In addition, restoring riverbank forests improves river water quality, while boosting biodiversity and benefiting local people by increasing the supply of fuel, edible fruits and livestock fodder. The partnership is also exploring opportunities for women to develop nursery businesses to increase the supply of seedlings to support these restoration efforts.

Through the SUSTAIN partnership, KSC and cane farmers have negotiated new, mutually beneficial cane supply agreements which include commitments to safeguarding and restoring ecosystems. In return, with support from government and the Tanzanian Agricultural Research Institute, smallholders have received support in climate-smart farming and improved agronomic techniques. A shift to drought-tolerant, high-yielding and disease-resistant cane varieties has led to an increase in yields of more than 70% and a 10% increase in sucrose content.

While these actions alone will not be enough to restore the health of the Kilombero wetlands and ensure community resilience, the SUSTAIN partnership has supported wider efforts across the catchment. These have included catalysing investment into sustainable irrigation schemes, governed by local water user associations, and supporting landscape-level planning through multistakeholder partnerships.

Insights

Landscape-level planning

Restoration of ecosystem functions is far more effective when planned and carried out at the landscape level, focusing on critical areas and connectivity, rather than at the level of individual farms. Priority areas for restoration were identified based on discussions with communities and analysis looking at the impact on factors such as sediment export, water flows, recharge, and nitrogen and phosphorus loss.

Multistakeholder dialogue

Multistakeholder dialogues are critical for bringing different actors to the table to understand their needs and interests, manage trade-offs, build trust and form partnerships to address shared challenges.

Productivity improvements

While restoring riparian areas means taking land out of production, this has been more than offset by supporting smallholders to produce higher-yielding sugarcane varieties.

Case study

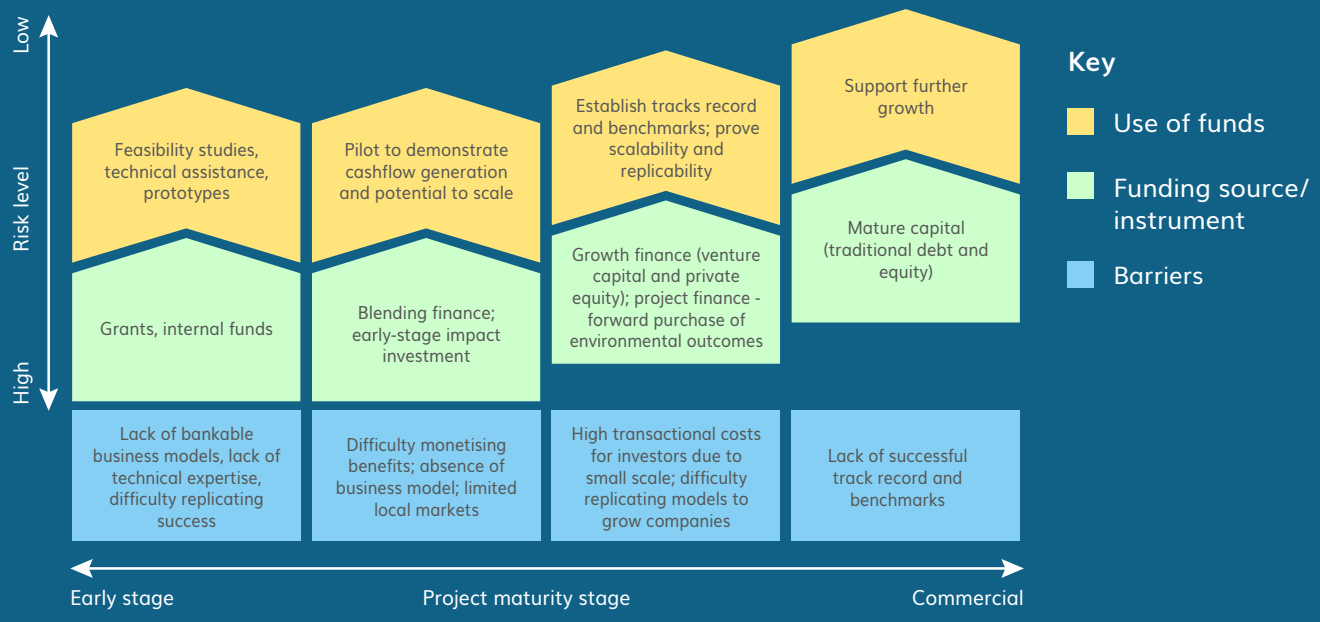
Mobilising funds from commercial banks for forest conservation and sustainable agriculture in Indonesia[43]

Palm oil is Indonesia's most important agricultural export and its largest crop by area, occupying nearly 15 million hectares. Valued at US$17.36 billion, the industry contributes to poverty alleviation and supports jobs and livelihoods in rural areas. However, palm oil expansion also drives deforestation and deadly forest fires in biodiverse tropical forest, including carbon-rich peatlands. This has led to massive greenhouse gas emissions and threatens many endemic and endangered species.

Despite sustainability improvements in recent years succeeding in slowing the rate of palm-related deforestation,[44] there are significant opportunities to improve productivity, particularly for smallholders, and to restore degraded forests and peatlands. Many oil palm plantations will also require replanting over the coming years as productivity begins to fall; without support to do this, many producers are likely to encroach further into forests to make up for declining yields. However, all this requires finance – and most producers struggle to access the credit they need to shift to regenerative and sustainable palm oil cultivation. Domestic commercial banks often see this as a risky investment due to the operating context, complexity and the long time horizon over which benefits accrue.[45]

Figure 3

Private finance mobilisation at various stages of restoration project development



Source: Adapted from World Bank (2024)

The United Nations Environment Programme and Dutch bank Rabobank launched the AGRI3 Fund – a blended finance initiative that seeks to unlock US$1 billion in finance for forest protection and restoration, regenerative and sustainable agriculture, and rural livelihoods, including in Indonesia. With backing from donors including the Dutch Ministry of Foreign Affairs, the Global Environment Facility and others, the AGRI3 Fund provides partial credit guarantees and other forms of finance that reduce the risk for commercial banks.

Typically, the fund covers 40–50% of the exposure on commercial bank loans of between US$5 million and US$50 million, with most loans being US$5–10 million. It also assists partner banks to build sustainability conditions into their transactions, manage risks, and develop an environmental and social action plan to maximise positive impacts. In addition, AGRI3 supports projects before and after investment, providing capacity building and technical assistance to help producers enhance their environmental and social impacts and monitor these impacts.

In the palm oil sector, the AGRI3 Fund has potential to drive finance towards protecting and restoring forests and peatlands. Investments can also support producers, particularly smallholders, to increase yields, optimise water and agrochemical use, and adopt regenerative agricultural practices and mixed production models like intercropping. This can bring further business benefits for companies in the palm oil value chain, including reduced supply chain risks, improved reputation, compliance with sustainability regulations and voluntary standards (e.g. Roundtable on Sustainable Palm Oil (RSPO)), and alternative finance sources such as carbon credits and payments for ecosystem services.

Although the AGRI3 model is in its early stages, it has high potential to be replicated and scaled up in emerging markets where producers struggle to access finance for sustainable commodity production.

Insights

Credit risk

Guaranteeing credit risk can leverage private investments for restoration projects by encouraging banks to extend loans that would otherwise seem too risky. By covering a significant portion of the bank's exposure (40-50%), the fund fosters the flow of capital into sustainable agriculture and forest protection efforts, aligning financial incentives with environmental goals.

Environmental and social impacts

Financial support is coupled with technical support, conditions and action plans to maximise positive environmental and social impacts.

Business benefits

There is a strong business case for companies in the palm oil value chain to invest in restoration and regenerative production. This can strengthen long-term security of supply, meet growing demand for sustainable products, reduce costs through efficiency gains, ensure regulatory compliance and enhance brand reputation.

Conclusions

While restoration in production landscapes presents various challenges, successful examples show that barriers can be overcome, bringing multiple positive impacts.

Bridging the finance gap

Innovative finance mechanisms like the AGRI3 Fund are being developed to support restoration. By making strategic use of public funding – in this case to provide partial credit risk guarantees – blended finance initiatives like this can unlock larger-scale private finance to support restoration. Other potential funding mechanisms include carbon credits and payments for ecosystem services, particularly for securing water supplies – both of which are being deployed to support Atlantic Forest restoration. Redirecting the more than half a trillion dollars that governments currently spend on environmentally harmful subsidies will also help to bridge the finance gap to support nature-based solutions and restoration at the scale required.

Private sector involvement

For value chain companies, there is often a clear business case to invest in restoration and regenerative agriculture practices – to ensure long-term supplies, to reduce risks and to comply with voluntary standards, regulations and disclosure requirements. For the Kilombero Sugar Company, for example, supporting restoration of riparian zones will help secure its supply of sugar by reducing crop losses from erosion, flooding and climate impacts, while also strengthening the company's social licence to operate by improving water quality and availability for local communities. For commercial banks and other private finance institutions, the investment case is less well developed. However, finance instruments such as the AGRI3 Fund offer opportunities to use public funds to leverage private investment.

Trade-offs and synergies

Ecosystem restoration can be viable even in complex production landscapes – like the Kilombero Valley and the Atlantic Forest, where large-scale commercial agriculture, small-scale farming and biodiversity conservation compete for land and water resources. Although approaches such as agroforestry can enhance both productivity and ecosystem services, restoring natural ecosystems at scale is likely to mean some land is taken out of production. To enable this without compromising livelihoods or food security requires investments in improving productivity – as in the Atlantic Forest, where cattle production has been intensified, and Kilombero, where improved sugarcane varieties have increased yields for smallholders. Similarly, investment in replanting and improving the productivity of smallholder oil palm plantations is needed to prevent future encroachment into forest areas.

Scalability, replicability and capacity gaps

While every restoration project needs to be adapted to its own unique circumstances, there are opportunities for upscaling and replication. The AGRI3 model, for example, could be widely applied in emerging markets where producers struggle to access finance for restoration and sustainable commodity production. Coupling finance with technical assistance and capacity-building can also help address capacity gaps.

A key ingredient for scalability is to approach restoration at the landscape level – or even the level of a whole biome, as in the Atlantic Forest. This can help direct efforts where they can be most effective for restoring ecosystem functions – for example, focusing on riparian areas has been crucial to restoring the health of Kilombero's wetlands. It can also support economies of scale and promote collaborative efforts, as with the Pact for the Restoration of the Atlantic Forest. Creating multistakeholder forums or similar platforms for collaboration at the landscape level is a critical part of this. Forums like these and the working groups set up under the Atlantic Forest Pact also offer opportunities to build capacity by sharing learning, experiences and examples of good practice.

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