A guide to investing in landscape restoration to sustain agrifood supply chains

Reducing risks, raising resilience, reaping returns

Leander Raes, Pauline Buffle, Zoe Williamson, Scarlett Benson, Helen Ding and James McBreen

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https://www.foodandlandusecoalition.org/

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Credits

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Executive summary

This guide provides information and reasoning as to why it is important for agribusinesses to engage in nature-positive business practices, and why landscape restoration is an effective solution to issues related to degradation of landscapes and natural capital on which agribusinesses depend. The aim of this guide is not to provide a comprehensive methodological overview, but to outline key steps to consider for developing a business case for restoration in supply chains, and why this matters.

Section 1 provides background information and reasoning as to why it is important for agribusinesses to engage in nature-positive business practices. After discussing problems related to land degradation, its impact on agricultural production, and the risks linked to the costs of inaction, the guide outlines why landscape restoration is one of the most effective solutions to tackle these issues. Investing in landscape restoration is a win-win strategy. Once mainstreamed, it will contribute to sustainable supply, whilst reviving rural economies and producing tangible benefits for nature and climate, as well as enhancing companies' triple bottom line[1]. Landscape restoration can increase local production and diversification, resilience to climatic and economic shocks, carbon sequestration, and the improvement of a host of other ecosystem services, such as water quality and erosion control, the number of pollinators, and increased biodiversity. To understand the relationship between supply chains, degradation and nature, the guide uses a natural capital approach to frame the discussion.

Section 2 provides six steps for agribusinesses to take, in the form of six key components. This sets out a flexible framework with considerations that can be adapted depending on agreed goals, aims and action plans, according to local contexts and resource constraints. It also presents additional details on tools that can be useful throughout the process.

The six components presented in Section 2 are introduced below.

1. The entry point is understanding how supply chains relate to productive landscapes as well as agribusinesses' dependencies on natural capital.

2. For successful restoration, it is imperative to have local buy-in and ownership of the stakeholders that will be conducting the majority of the restoration interventions, especially producers.

3. Through an inclusive consultation process, the best restoration interventions can be identified and analysed to make sure they are designed to deliver the financial, social and environmental goals.

4. A business case on specific restoration interventions can then be developed.

5. This business case should include a financing strategy.

6. The final step includes a roll-out plan with indicators for tracking and monitoring progress.

By acting on these six components, businesses will ensure that risks and trade-offs associated with investing in restoration are not only minimized, but that economic, environmental and social benefits are also maximized for the company, producers, the landscapes in which they live and all along the supply chain.

Finally, the guide includes summaries of three case studies of companies working with different commodities and with different objectives, as examples of business cases for landscape restoration.

[1] The triple bottom line is an accounting framework that goes beyond the conventional measures of profits, return on investment and shareholder value, by including environmental and social dimensions. It focuses on reporting business performance along the interrelated dimensions of profits, people and the planet (Slaper and Hall, 2011).

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Introducing the guide

This guide will help agribusinesses make better investments in landscape restoration[2] so they are better able to sustain agrifood supply chains, reduce risks, raise resilience and enhance returns. There is growing business momentum to take action on climate and nature. More than 2,200 businesses covering more than a third of global market capitalization are working with the Science Based Targets initiative (SBTi[3]) to set 1.5°C aligned targets at the end of 2021 (SBTi, 2022).

In addition, over 1,100 businesses with combined revenues of USD 5 trillion are calling on governments to adopt policies to reverse nature loss[4] in the 2020s as part of the 'Nature is Everyone's Business' pledge (Business for Nature, n.d.). In parallel, there are increasing calls from civil society for companies to go beyond net-zero climate targets and to also set nature-positive targets. In response, the Science Based Target Network is responding by developing target setting methods that will allow businesses to make nature-positive claims (SBTi, 2020).

There is a compelling business case for companies to align with net-zero[5] and nature-positive targets[6]. For agribusinesses, guaranteeing sustainable production throughout the supply chain should be a high priority. As weather events become more frequent and extreme, and land degradation[7] increases globally, agribusinesses are at risk of experiencing decreased yields and reduced revenues as these shocks cause issues throughout supply chains. The sixth Intergovernmental Panel on Climate Change's assessment report (IPCC, 2022) predicted that agriculture and crop production will continue to be increasingly adversely impacted by climate change.

The climate crisis, along with the interconnected crisis of nature loss, threaten future agricultural production. Achieving nature positive supply chains will become critical for agribusinesses. This will also help to achieve corporate social responsibility (CSR[8]) targets by improving farmer livelihoods and contributing to economic development. This guide describes how agribusinesses can secure natural capital throughout their supply chains, minimize risks, and restore natural capital.

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[2] Landscape restoration is a form of ecosystem restoration that focuses on a defined landscape. Ecosystem restoration is defined as "the process of halting and reversing degradation, resulting in improved ecosystem services and recovered biodiversity. Ecosystem restoration encompasses a wide continuum of practices, depending on local conditions and societal choice" (Valderrábano et al., 2021). Ecosystem restoration is different from ecological restoration in that it refers to a broader range of management interventions aimed at repairing ecosystem, their functions and the ecosystems they provide. Examples include (but are not limited to) assisted natural regeneration, such as through grazing and fire management, artificial regeneration, such as terracing, and management of invasive species. (IUCN, 2022a).

3 See more: https://sciencebasedtargets.org/

[4] This consists of the loss of biodiversity loss and the collapse of ecosystem. Humanity has already caused the loss of 83% of all wild mammals and half of all plants (WEF, 2020). According to the 2019 report by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), five direct drivers of change in nature have accounted for more than 90% of nature loss in the past 50 years: (i) Land- and sea-use change, (ii) Climate change, (iii) Natural resource use and exploitation, (iv) Pollution, (v) Invasive alien species.

[5] According to UN (2022), "net zero means cutting greenhouse gas emissions to as close to zero as possible, with any remaining emissions re-absorbed from the atmosphere, by oceans and forests for instance".

[6] Although there is not yet an agreed upon definition of 'nature-positive', IUCN (2022b) uses the following working definition: "A nature-positive future means that we, as a global society, halt and reverse the loss of nature measured from its current status, reducing future negative impacts alongside restoring and renewing nature, to put both living and non-living nature measurably on the path to recovery".

[7] Land degradation can be understood as "the reduction and loss of the biological and economic productive capacity of land" (UNCCD, 2016).

[8] According to UNIDO (2023) "CSR is a management concept whereby companies integrate social and environmental concerns in their business operations and interactions with their stakeholders. CSR is generally understood as being the way through which a company achieves a balance of economic, environmental and social imperatives (Triple-Bottom-Line- Approach), while at the same time addressing the expectations of shareholders and stakeholders".

The rationale for investment in landscape restoration

There is a problem...

The land on which agribusinesses depend is degrading

More than half of global GDP is ‘highly or moderately dependent on nature and its services’ (WEF, 2020), with at least 1.2 billion jobs relying directly on a stable and healthy environment (ILO, 2018).

The global economy is therefore at risk from nature loss. Unfortunately, all scientific evidence points to significant changes in the environmental context within which businesses operate. At a business level, supply chains are at risk due to land degradation and climate change, with natural capital being eroded at an unprecedented rate.

This is a fundamental risk to the ecological underpinnings of our society – and is now widely acknowledged as a ’nature emergency’ (WEF, 2020). Agriculture is among the three largest industries dependent on nature, along with food and beverages, and construction (WEF, 2020). It is also the main driver of habitat loss. Population growth and increased per capita food consumption will increase the demand for agricultural products in the coming decades (Ahmed et al., 2020). Given the projected growth in demand, not only should agribusinesses ensure risks from nature loss are correctly addressed, but they have a particular opportunity to act.

The transformation of food and land use systems will unlock significant business opportunities – from tackling food loss to creating new value chains needed for productive and regenerative agriculture[9] and the shift to healthy diets – worth an estimated USD 4.5 trillion a year by 2030 (FOLU, 2019).

Land degradation threatens agricultural supply chains and the global economy

Land degradation, which sits at the nexus of the nature and climate crises, refers to the reduction or loss of biological or economic productivity of land, declining carbon storage and biodiversity, and accelerating climate change (in a continued vicious cycle). Today, more than 75% of the world’s land is degraded by human activities with a direct negative impact on the wellbeing of two-fifths of the global population (IPBES, 2018).

Land degradation has a direct impact on agricultural supply chains, as land becomes less productive due to issues such as loss of nutrients in the soil and more irregular water flows. It is estimated that by 2050, land degradation and climate change together will reduce crop yields by an average of 10% globally and up to 50% in certain regions (IPBES, 2018). With a global agricultural production valued at 4% of global GDP (FAO, 2021), this constitutes a significant risk to the global economy.

The costs of inaction are significant

This risk is of concern to all regions of the world. Land and soil degradation costs the European Union an estimated EUR 50 billion annually (European Commission, 2020). Costs are even higher in Asia and Africa at USD 84 billion and USD 65 billion annually respectively. These costs are projected to increase over time – with economic damage to reach USD 23 trillion by 2050 if no action is taken (UNCCD, 2018). These costs are significantly higher than the investment requirements, estimated at just USD 4.6 trillion, meaning that the economic return is more than five times the cost. Disregarding the warning signs of degrading landscapes will therefore increase costs within a company’s supply chain in the long term.

Increasing investments now in order to protect and restore natural capital will be significantly less costly than doing so later. Indeed, degradation could lead to a staggering economic loss of as much as USD 11.2 trillion in agricultural assets (Caldecott, 2018). If companies do not consider environmental protection and restoration in their operations, the commodities at the core of their businesses will be put at enormous risk.

With regards to biodiversity protection and restoration, delaying action is also significantly costly; more than doubling the social cost to approximately USD 15 trillion over the next 10 years (equivalent to around 15% of global GDP in 2021) (Vivid Economics & the Natural History Museum, 2021). Given that in 2020 an estimated 36.5% of land area globally was used for agriculture (World Bank, 2022), the agricultural sector is a critical part of efforts needed to protect and restore nature and biodiversity.

[9] “Regenerative agriculture is broadly defined to include both conservation agriculture and agroforestry techniques. Conservation agriculture includes soil management practices such as reduced tillage, mulching and manuring, and crop management practices such as cover cropping, improved fallow, crop rotation and diversification. Agroforestry techniques are centred around trees, but can be crop based, such as alley cropping, livestock based, such as grazing rotation and integration, or also include farmer managed natural regeneration” (ARASG, 2021).

But there is a solution...

Landscape restoration

It is therefore imperative to increase investments in restoring degraded landscapes, that at the same time help to protect nature. Landscape restoration is essential for improving the quality and quantity of natural capital as we approach a biophysical tipping point, and it is also a proven solution to diminishing risks related to land degradation in agricultural supply chains. Nature-based solutions (NbS)[10] help to regain the many benefits provided by nature that are important for supply chains, such as pollination, recovery of soil health, improvement of water quality and availability, carbon sequestration, and assuring local climate regulation. Restoring landscapes also supports the socioeconomic development of smallholders and local communities by offering additional and more diversified revenues. “Every USD 1 (both private and public investment) spent on key net-zero and nature-positive actions, including ecosystem conservation and restoration, could generate USD 7-30 more in the broader economy” (Ding et al., 2017).

Landscape restoration has multiple co-benefits

Restoration interventions can be as diverse as planting new forests, allowing degraded ecosystems to regenerate (woodland, grasslands, wetlands, etc.), or transitioning to productive and regenerative agriculture, agroecology or agroforestry systems. Restoration can include many forms, such as planting and encouraging the natural regeneration of trees throughout a landscape (Figure 1). This may include greatly expanding the number of trees, but equally more modest actions contribute to positive impacts, such as the addition of native trees, flower strips or rewilded fallows within farmland. The aim is to regain a integrated landscape that balances the trade-offs between a productive versus protected functions and the provision of different ecosystem services.

A landscape focus often includes incorporating shifts to productive and regenerative agriculture and agroecology. Effective landscape restoration goes beyond merely planting trees or other types of species. It is a participatory process leading to resilient landscapes and value chains, bringing

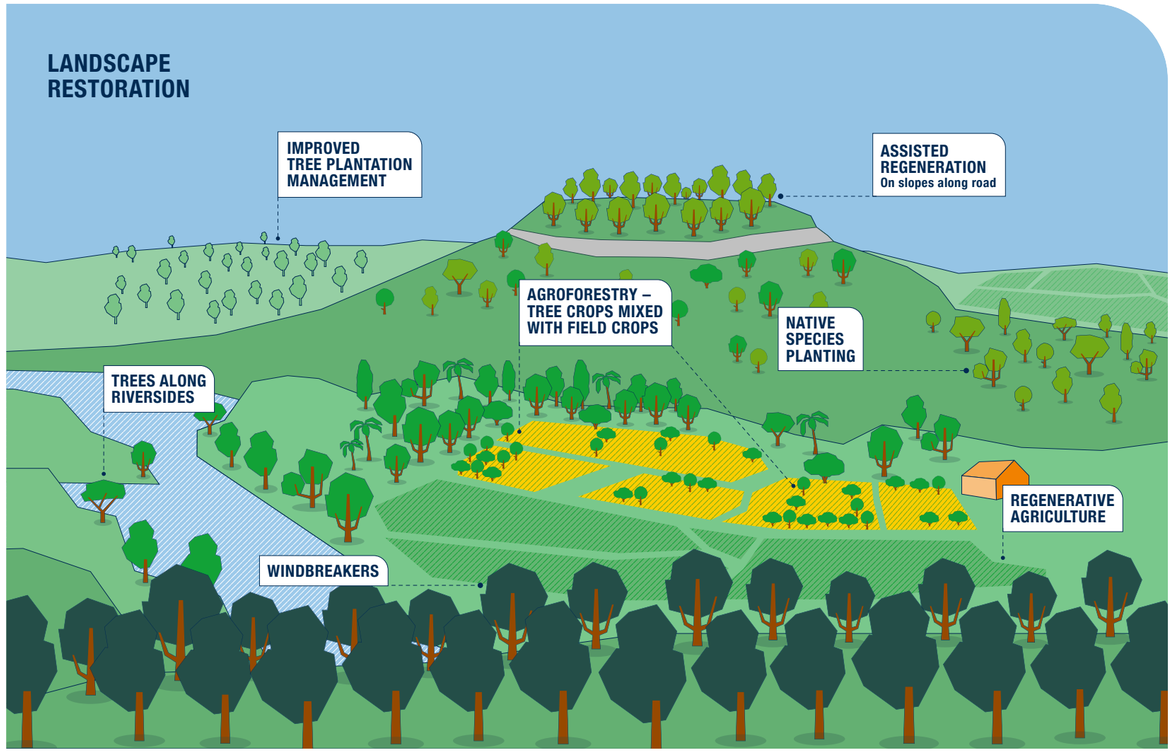

FIGURE 1: Examples of possible landscape restoration interventions (Source: Illustration prepared by the report authors)

smallholders[11], producers, local and international traders, processors, other agribusinesses, and local and national governments together to find a consensus on the best way to transition agricultural practices to restore a degraded area.

The effectiveness of restoration interventions are also highly dependent upon local needs, conditions, and enabling factors for restoration. The second part (Section 2) of this guide outlines how to navigate the implementation of restoration interventions, whilst leaving room to adapt to various contexts.

[10] Nature-based Solutions are “actions to protect, sustainably manage and restore natural and modified ecosystems in ways that address societal challenges effectively and adaptively, to provide both human well-being and biodiversity benefits” (IUCN, 2016a).

[11] Smallholders can be understood as “Small-scale farmers, pastoralists, forest keepers, fishers who manage areas ranging from less than one hectare to 10 hectares. Smallholders are characterized by family-focused motives such as favouring the stability of the farm household system, using mainly family labour for production and using part of the produce for family consumption. Smallholders are often organized in indigenous peoples and local community organizations; tree-grower and agroforestry associations; forest owner associations; produce cooperatives and companies; and their umbrella groups and federations” (FAO, 2022).

How landscape restoration addresses natural capital risks and opportunities

This section contains practical and technical insights into understanding the relationship between a landscape (see Box 1) and a supply chain, and how nature and the benefits it provides fits in. This is especially relevant for the agriculture and forestry sector, and the related food and beverage sector, as according to WEF (2020), the entire direct gross value added for these sectors and most of their supply chains are highly dependent on nature.

Linking landscapes and supply chains

In order for a business to identify the links between its supply chains, environmental degradation, and opportunities for restoration, the first step is to recognize that the landscapes from which goods are sourced are a vital part of the supply chain.

BOX 1: WHAT IS A LANDSCAPE?

A landscape is a broad concept with varying definitions, depending on the focus of different disciplines. Landscapes are often not only based on biophysical elements and processes but can also incorporate aesthetic or cultural aspects.

For example, a landscape can be defined as **"a socio-ecological system that consists of natural and/or human modified ecosystems, and which is influenced by distinct ecological, historical, economic and socio-cultural processes and activities".**

Importantly, the emphasis is often placed on how an understanding of landscapes can help define the scope of a project, an investment or a research opportunity.

For example, the GPFLR (2018) states that **"Focusing on landscapes is different from considering individual sites. Understanding entire landscapes implies looking at mosaics of different interacting land uses and management practices, which can be under various tenure and governance systems".**

Forest landscape restoration (FLR) encompasses this landscape approach. However, for practical reasons, landscapes are often defined within identifiable boundaries such as jurisdictions (district, municipality) or physical boundaries (watershed or a national park and its buffer zone).

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Landscapes in which producers live and/or work are central to the supply chain, and the condition of the landscape in which a business operates fundamentally affects a company's near and long-term profits. Land degradation, whether from soil erosion, deforestation or other causes, has a range of impacts that affect production systems and therefore the rest of the supply chain (Figure 2).

The approach of landscape restoration allows businesses to tackle this issue from the foundations of their supply chains. In this way, companies ensure resilient, future-proof supply chains, and become drivers for positive social and environmental change. The framework through which landscapes can be linked with businesses and their supply chains is natural capital (see Box 2).

The link between landscapes, their natural capital, and supply chains, provides the context for highlighting the essential role of landscape restoration in addressing risks and harnessing opportunities through enhancing or maintaining natural capital.

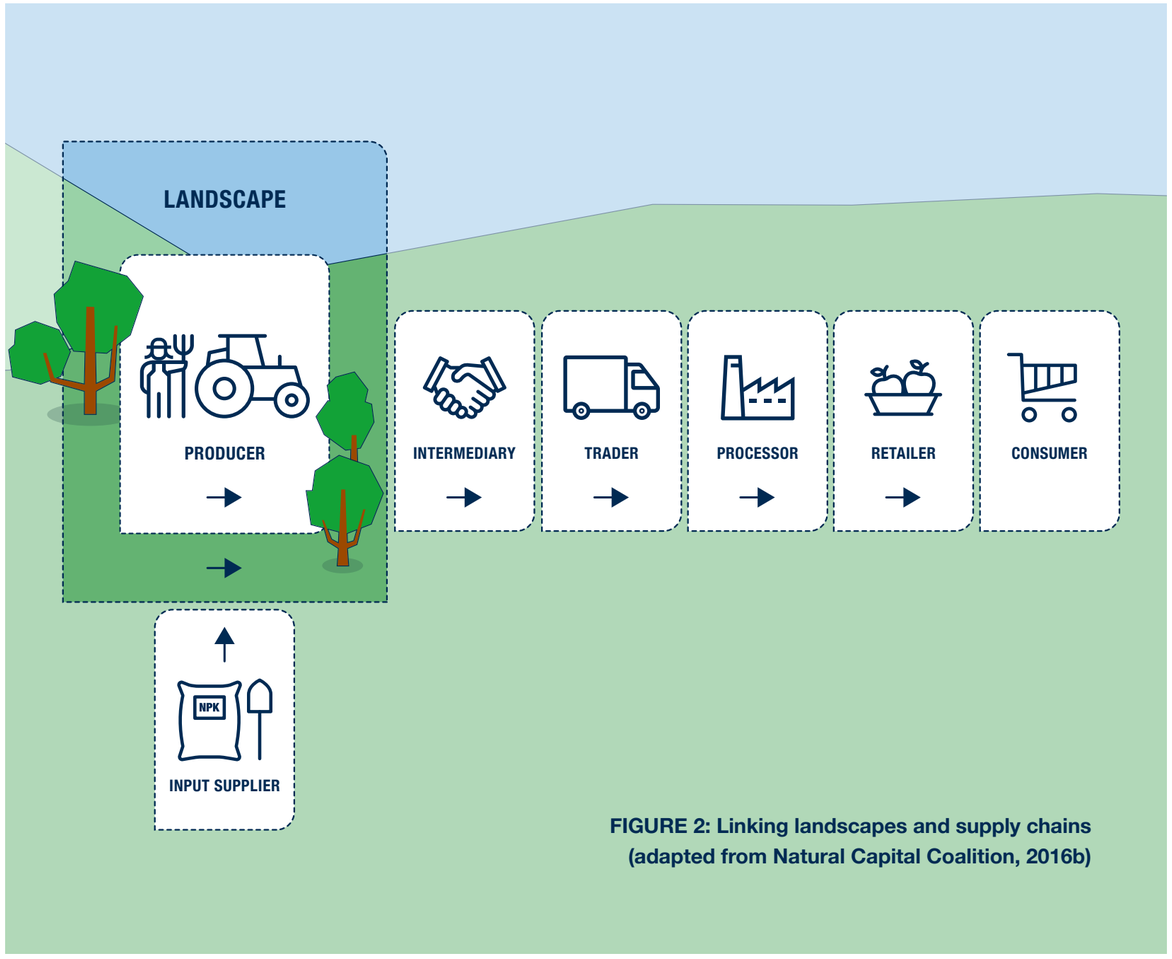

FIGURE 2: Linking landscapes and supply chains (adapted from Natural Capital Coalition, 2016b)

BOX 2: ZOOM IN ON NATURAL CAPITAL

Natural capital is commonly understood as the stock of ecosystems on earth including air, water, biodiversity and geodiversity. This stock underpins our economy and society by producing value for people, both directly and indirectly. Goods and services provided to humans by sustainably managed natural capital include a range of social and environmental benefits including clean air and water, climate change mitigation and adaptation, food, energy, places to live, materials for products, recreation and protection from hazards (IUCN, 2021). **Biodiversity at all levels** (ecosystem, species, genetic), and in terms of both quantity and variability, is considered **a key characteristic of natural capital**. Biodiversity plays an integral role in natural capital, underpinning the goods and services that natural capital stocks generate. It can be considered as the living component of natural capital stocks and plays a key role in the provision of ecosystem services (Capitals Coalition & Cambridge Conservation Initiative, 2020).

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Framing landscape restoration in supply chains

Natural capital is a concept that describes the relationship between society and nature. Natural capital stocks of various forms and the interaction between them generate a flow of goods and services that allow the creation of value through the benefits they provide to businesses, as well as to society as a whole (Natural Capital Coalition, 2016a) (Figure 3).

To identify the potential benefits of landscape restoration for a business, it is necessary to understand how a business depends[12] on, and has an impact[13] on natural capital.

These impacts and dependencies generate costs and benefits for businesses, creating risks, but also producing opportunities (Lammerant, 2019).

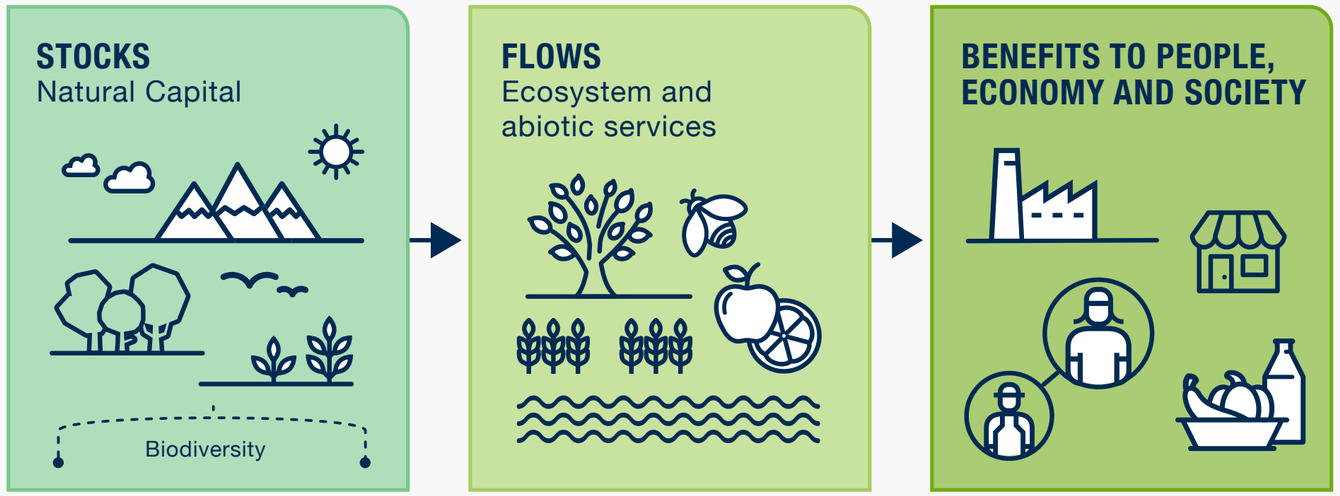


FIGURE 3: Natural capital flow (Source: Adapted from Natural Capital Coalition, 2016a; Pigneur 2009)

[12] Natural capital dependencies can be defined as "aspects of ecosystem services that an organization or other actor relies on to function. {…] Dependencies describe the value of the environment to businesses" (Business for Nature, Capitals Coalition, CDP, 2022).

[13] Natural capital impact can be defined as "Changes in the state of nature, which may result in changes to the capacity of nature to provide social and economic functions. Impacts can be positive or negative. They can be the result of an organization's or another party's actions and can be direct, indirect or cumulative" (Business for Nature, Capitals Coalition, CDP, 2022).

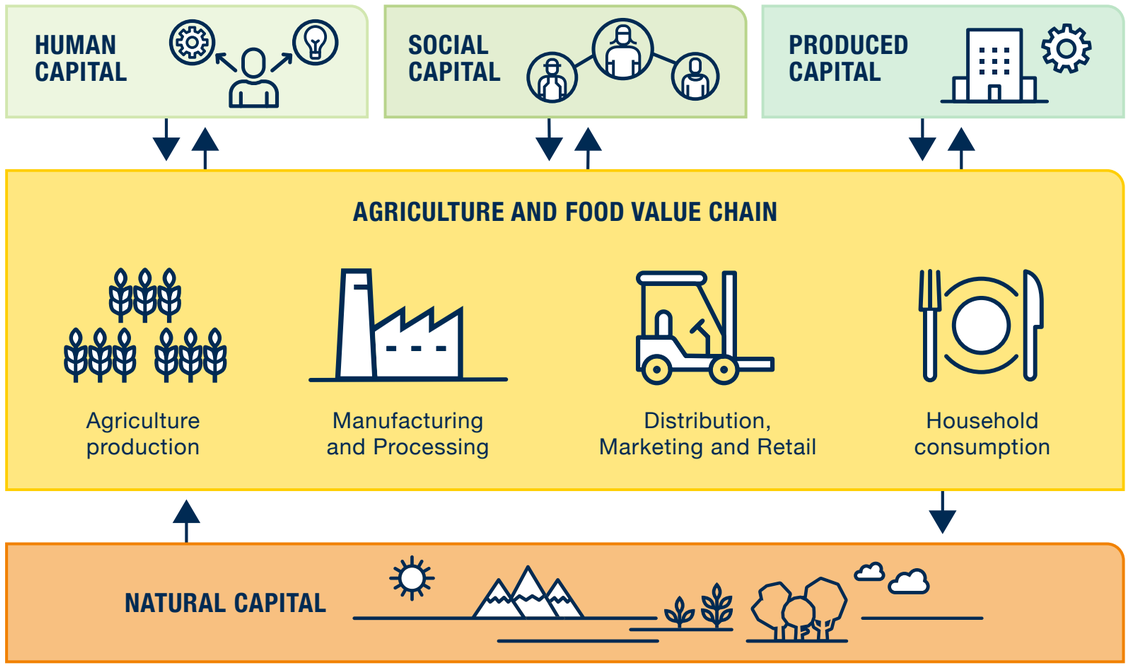


FIGURE 4: Natural capital, food and agriculture value chains, and the other capitals (Source: Adapted from Capitals Coalition (2020))

iStock credit: AllesSuper21

The application of a natural capital approach builds on environmental, social, and governance (ESG)[14] and risk initiatives already in use, but in addition, it offers further advantages due to a better understanding of the interrelated issues and the trade-offs between them (Capitals Coalition & Cambridge Conservation Initiative, 2020). While this guide focuses on the direct links between supply chains and the natural capital of a given landscape, businesses have impacts on and depend upon all types of capital.

These include human, social and produced capital[15], in addition to natural and financial capital both inside and outside landscapes from which goods are sourced (Figure 4). These connections are often overlooked, misunderstood and undervalued. All impacts on, and dependencies upon the different types of capital have consequences, both to business and to society, which can be thought of as risks, but also as opportunities to be addressed. Figure 5 illustrates how the restoration of a riverbank can impact different types of capital, and Figure 6 provides an overview of the different risks and opportunities related to a landscape's natural capital.

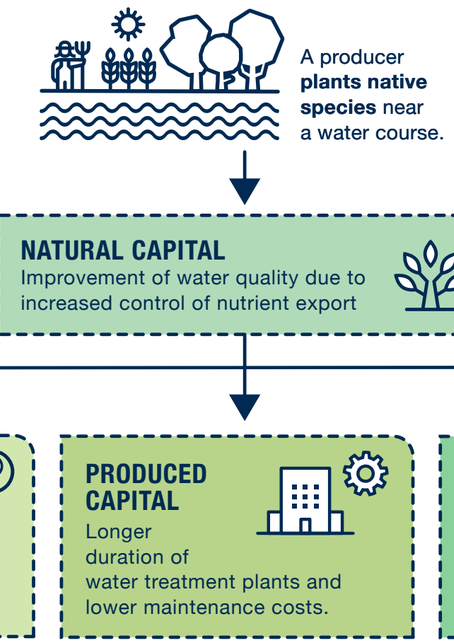


FIGURE 5: Example of restoration impact on natural capital and other types of capital (Source: Illustration prepared by the report authors, based on Capitals Coalition (2020))

[14] ESG has emerged globally to describe the environmental, social and corporate governance issues that investors are considering in the context of corporate behaviour (WBCSD & UNEP FI, 2010). According to Bergman et al. (2020), "ESG, at its core, is a means by which companies can be evaluated with respect to a broad range of socially desirable ends".

[15] Human capital: The knowledge, skills, competencies and attributes embodied in individuals that contribute to improved performance and well-being (e.g. workforce, knowledge, skills). Social capital: The networks together with shared norms, values and understanding that facilitate cooperation within and among groups (e.g. mutual respect and understanding). Produced capital: The man-made goods as well as all financial assets that are used to produce goods and services consumed by society (e.g. equipment and financial resources) (Capitals Coalition, 2020).

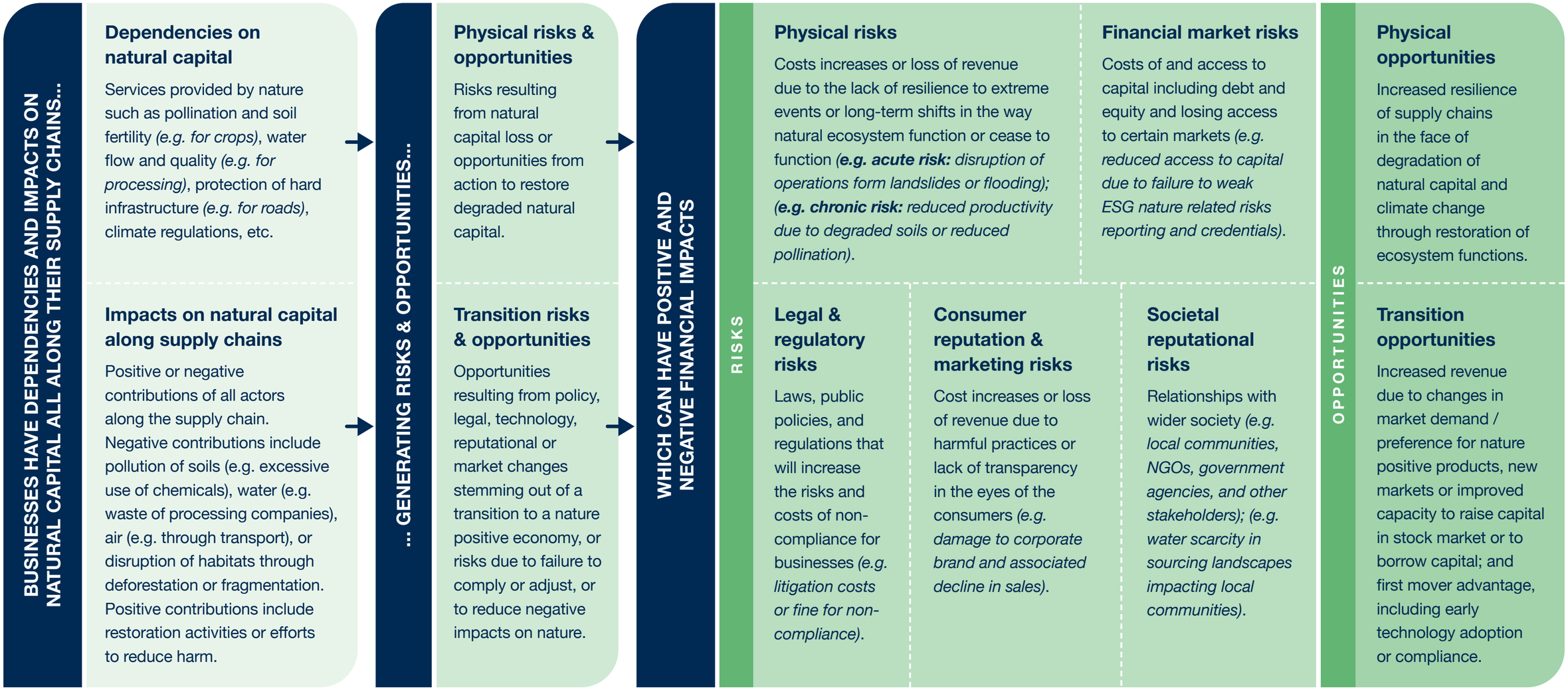


FIGURE 6: Natural capital risks and opportunities (Source: Illustration prepared by the report authors, based on Natural Capital Coalition (2016a) and TNFD framework)

The different physical and transition risks can lead to risk at a systemic level. For example, the risk that a critical natural system no longer functions, due to the aggregation of different physical risks.

The following section provides some examples on five types of risks and opportunities: physical, legal and policy, consumer reputation and marketing, financial markets, and societal reputation.

Physical

Many physical opportunities exist, such as those that address the risks related to pollinators. IPBES (2016) estimates that pollination services add between USD 235–577 billion every year to global agricultural productivity. Globally, there has recently been an increase in the reliance on pollinator-dependent crops (Aizen et al., 2009; IPBES. 2016), while pollinators, both wild and managed, have declined in many places (Biesmeijer et al., 2006; Potts et al., 2010). This constitutes a significant risk to global food production and crop yields (Garibaldi et al., 2011; Van der Sluijs & Vaage, 2020).

Landscape restoration can tackle pollinator loss through good agricultural practices, diversification and conserving and restoring pollinator habitats that are an integral part of healthy production systems. This provides opportunities for companies and stakeholders along supply chains that include pollination-dependent commodities to reduce losses and reduce costs by using alternatives to intensive fertilizer and pesticide use. Other examples of physical risks include soil erosion and degradation, poor water quality, and decreased seasonal water flows, among others.

Legal and policy

Companies are coming under more scrutiny as regulators intensify their focus on the degradation and destruction of ecosystems. Some countries and blocks such as the USA and the EU have introduced regulations and legislation that restricts the import of commodities associated with deforestation.

Businesses that fail to adjust their supply chains accordingly and comply with such legislation risk losing access to key markets. For example, the revised regulations in the EU on evaluating deforestation risk of certain crops can have an impact on sectors, such as soy, as the EU imports most of its soy, with a large share coming from countries with high levels of deforestation (Kuepper & Stravens 2022).

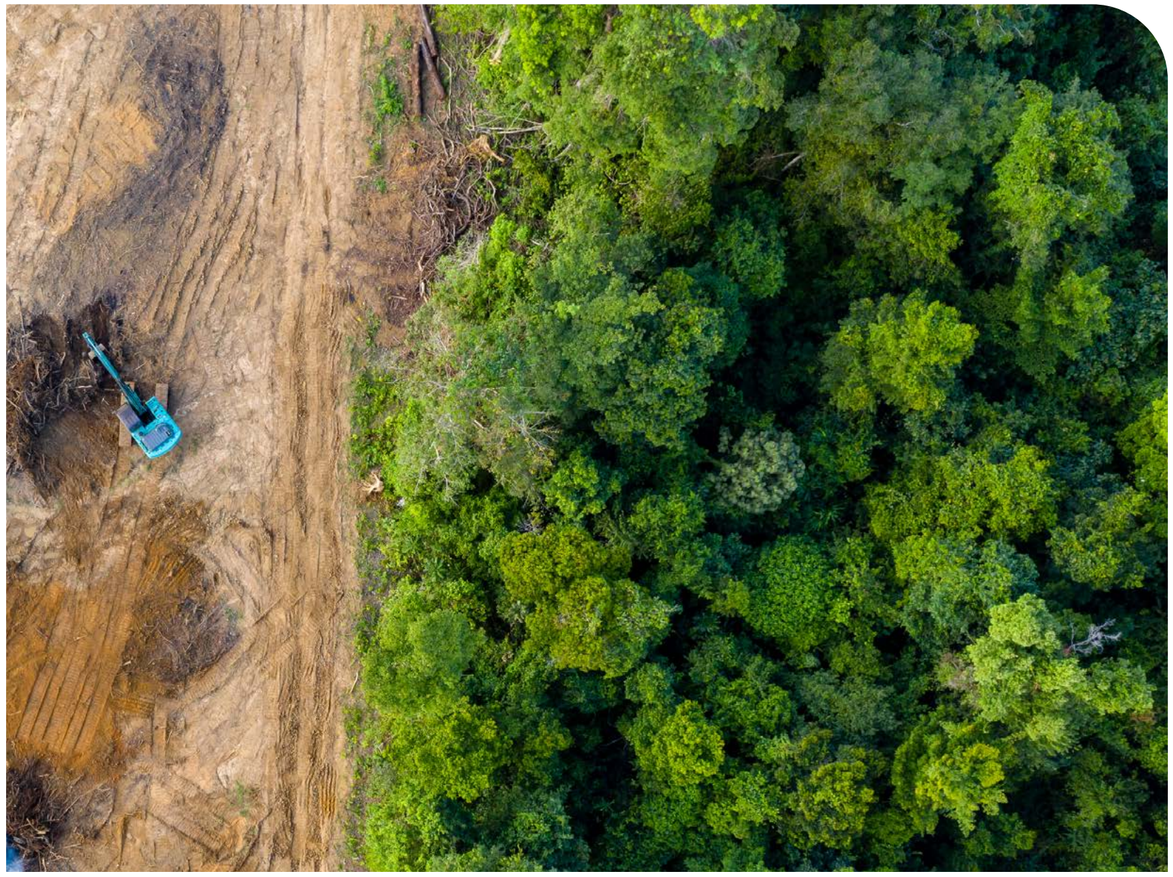
Landscape restoration gives businesses the opportunity to avoid deforestation and degradation while also having a positive impact on degraded land and biodiversity, with increased tree and vegetation cover.

Companies have an opportunity to act as leaders and leverage strategic advantages, not only through accessing deforestation-free markets[16] but also by driving investments beyond deforestation-free supply chains.

Consumer reputation and marketing

Consumers around the world are showing increasing concern regarding the environmental sustainability of food production. For example, 79% of consumers surveyed in the USA, Europe, and India indicated that they would change their consumer habits based on environmental, social and inclusivity concerns (Deloitte, 2021).

Investing in landscape restoration, with carbon sequestration and increased biodiversity, will put companies ahead of the crowd, increase consumer trust and loyalty, and add value to overall assets. According to Unilever (2018), their most sustainable brands grew 46% faster than those that were less sustainable, and these drove 70% of growth.



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[16] An example of this can be illustrated by the new EU Regulation on deforestation-free supply chains, which states that, for 7 products and their derivatives ‘’operators and traders will have to prove that the products are both deforestation-free (produced on land that was not subject to deforestation after 31 December 2020) and legal (compliant with all relevant applicable laws in force in the country of production)” (European Commission, 2022).

Financial markets

A growing number of investors are acting on climate and nature risks[17], in some cases divesting from companies with strong links to illegal deforestation.

Many food and agribusinesses are increasingly requested to disclose climate and nature risks through initiatives such as the Taskforces on Climate and on Nature-related Financial Disclosures (TCFD[18] & TNFD[19]). Initiatives such as the FAIRR Investor Network[20], with USD 67 trillion of assets under management, educate investors on climate and nature risks posed by livestock production, and produce risk ratings for different companies.

Landscape restoration along supply chains represents an opportunity to create nature-positive business models (see Box 9 for some examples) that have great potential to reduce these risks, while also unlocking significant business opportunities.

Agribusiness companies that successfully integrate an effective and well-designed nature response such as landscape restoration into their core business strategy, can generate more value, reduce costs, attract new business and capture price premiums, as well as maintain or extend their social license to operate.

Societal reputation

Degradation of watersheds through agricultural chemical effluents or unsustainable use can impact local populations and their livelihoods. This not only constitutes a physical and reputational risk for businesses, but also a wider societal risk.

Agribusinesses, whether owning land or working through outgrowers, have a huge opportunity to increase the resilience of the landscapes from which they source. Restoration and improved agricultural practices can improve water quality, and companies can directly influence the uptake of restoration on farms.

In addition, the implementation and maintenance of restoration interventions can create jobs both on and off-farm, in planning and design, tree planting and maintenance, and monitoring and reporting, among others (Raes et al., 2021; ILO, UNEP & IUCN, 2022). The different risks and opportunities described above are often connected. For example, legislation to regulate against commodities linked to deforestation is not only a legal risk. It is also a reputational risk, as more consumers become aware of and act on nature loss. It is also a physical and financial risk, as direct inputs disappear and ecosystem services on which businesses depend stop functioning (WEF, 2020).

In addition, physical and transition risks can also lead to risks at a systemic level, such as the risk that a critical natural system no longer functions due to the aggregation of different physical risks. The previous section highlighted the risk of nature loss and landscape degradation for supply chains, and how a supply chain's dependencies on natural capital in a specific landscape creates risks, but also opportunities.

The first section outlined why landscape restoration is an effective solution. Investing in landscape restoration is a win-win-win strategy. Once mainstreamed, it will contribute to sustainable supply chains, whilst reviving rural economies and producing tangible benefits for nature and climate, as well as enhancing companies' triple bottom line. Landscape restoration can increase local production and diversification, resilience to climatic and economic shocks, carbon sequestration, and the improvement of a host of other ecosystem services, such as water quality and erosion control, the number of native pollinators, and biodiversity conservation. Landscape restoration provides many opportunities to agribusinesses. The following sections provide an overview of the key steps that can be taken to develop a business case for landscape restoration linked to supply chains.

[17] Nature risks can be defined as "Potential threats posed to an organization linked to its and other organizations' dependencies on nature and nature impacts. These can derive from physical, transition and systemic risks. Risks are typically linked to future or anticipated effects to business, due to their relationship with the environment (historically, now, or in the future)" (Business for Nature, Capitals Coalition, CDP, 2022).

[18] See more: **https://www.fsb-tcfd.org/**

[19] See more: **https://tnfd.global/**

[20] See more: **https://www.fairr.org/**

Tailoring solutions, an operational guide to investment in landscape restoration

This section provides an overview of the different steps that could be taken to design a landscape-based business case for restoration (Figure 7)

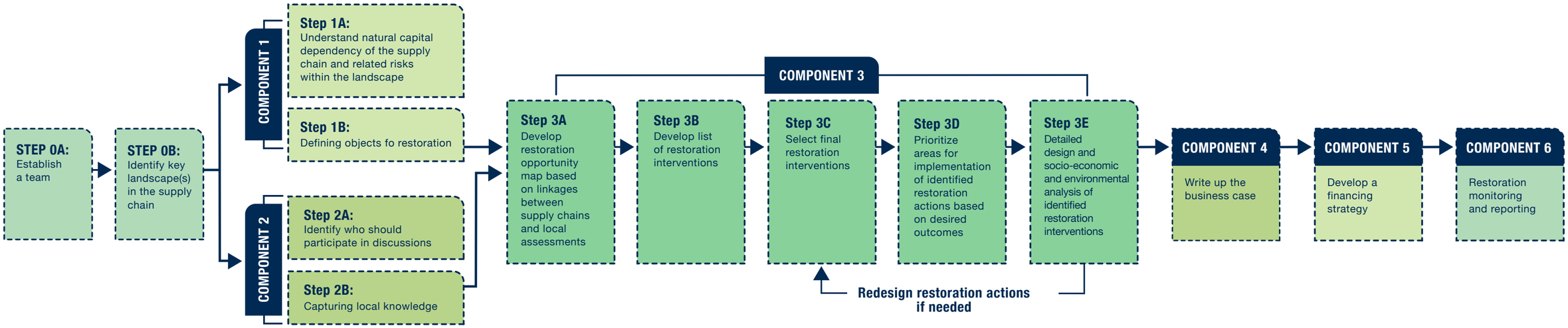


FIGURE 7: Components for the development of a business case for landscape restoration ks and opportunities (Source: Illustration prepared by the report authors)

Setting up

Step 0a: Establish a team

When creating a team within a company, and in collaboration with other organizations, it is important to consider that it should be able to focus on both the landscape level and the global supply chain. More diverse expertise will facilitate better outcomes.

Depending on the scope of the assessment, team members may include agronomists and forestry specialists to identify natural capital degradation risks and to define restoration actions, economists to assess costs and benefits (financial, environmental and social) of restoration and risks related to dependencies on degraded natural capital, spatial analysts, gender experts, community engagement specialists, and so on. Teams will be responsible for assuring that the data generated is practical and reliable (see also Box 3).

Step 0b: Identify key landscape(s) in the supply chain

Companies that operate in more than one landscape will have to select one or more of these landscapes to develop business cases on restoration interventions. Criteria for selecting priority landscapes for further assessment could be based on the natural capital relationships with the business, focusing on high landscape related risks based on impacts and dependencies.

The following are examples of criteria that could be used to identify priority landscapes:

- **Highly degraded landscapes**
- **Landscapes from which a high volume of goods are sourced**
- **Landscapes with a high level of biodiversity**
- **Landscapes with a high level of deforestation**
- **Landscapes where women are at the centre of the production system**
- **Landscapes where collaboration exists with indigenous producers**
- **Landscapes with ongoing initiatives that could be strengthened by restoration actions.**

Once the landscape/s is/are identified, the team will need to maintain flexibility regarding scale. For example, if a decrease in pollinators is considered a major risk to the supply chain, restoration actions most likely will take place within the identified landscape. However, if an identified risk is degradation of an upstream area in a watershed key for a stable water supply, then the scale will become broader.

BOX 3: DATA COLLECTION

If agribusinesses do not have solid baseline data, they cannot make the best decisions. Strong social-environmental and economic data are needed for the landscape assessment process and can support agribusinesses to make better science-based decisions – linked with local concerns – to secure the stability of their supply chains.

Depending on the data directly available, data collection often includes field surveys on and off farm, market and supply chain analysis, and desk-based research on the local legal and cultural environment and the search for spatial data. These data can be used to generate an overview of the current situation, possible restoration actions and potential impacts from restoration, among other uses.

iStock credit: Paralaxis

Component 1: Establish supply chain-landscape linkages

Step 1a: Understand natural capital dependency of supply chains and related risks

Once a landscape has been selected, the next step is to understand in detail how the supply chain, or the production system within the landscape, depends on and impacts natural capital. A natural capital assessment will help the company understand (i) what benefits or ecosystem services are provided within a landscape and how these may be at risk due to degradation, and (ii) the influence that the production system and demand for products have on the landscape.

Social impacts and potential benefits generated by specific agricultural practices are equally important considerations. It is critical to understand that while the entry point in the landscape relates to natural capital impacts and dependencies, local communities and producers are central to implementing any long-term and sustainable landscape intervention (Figure 8).

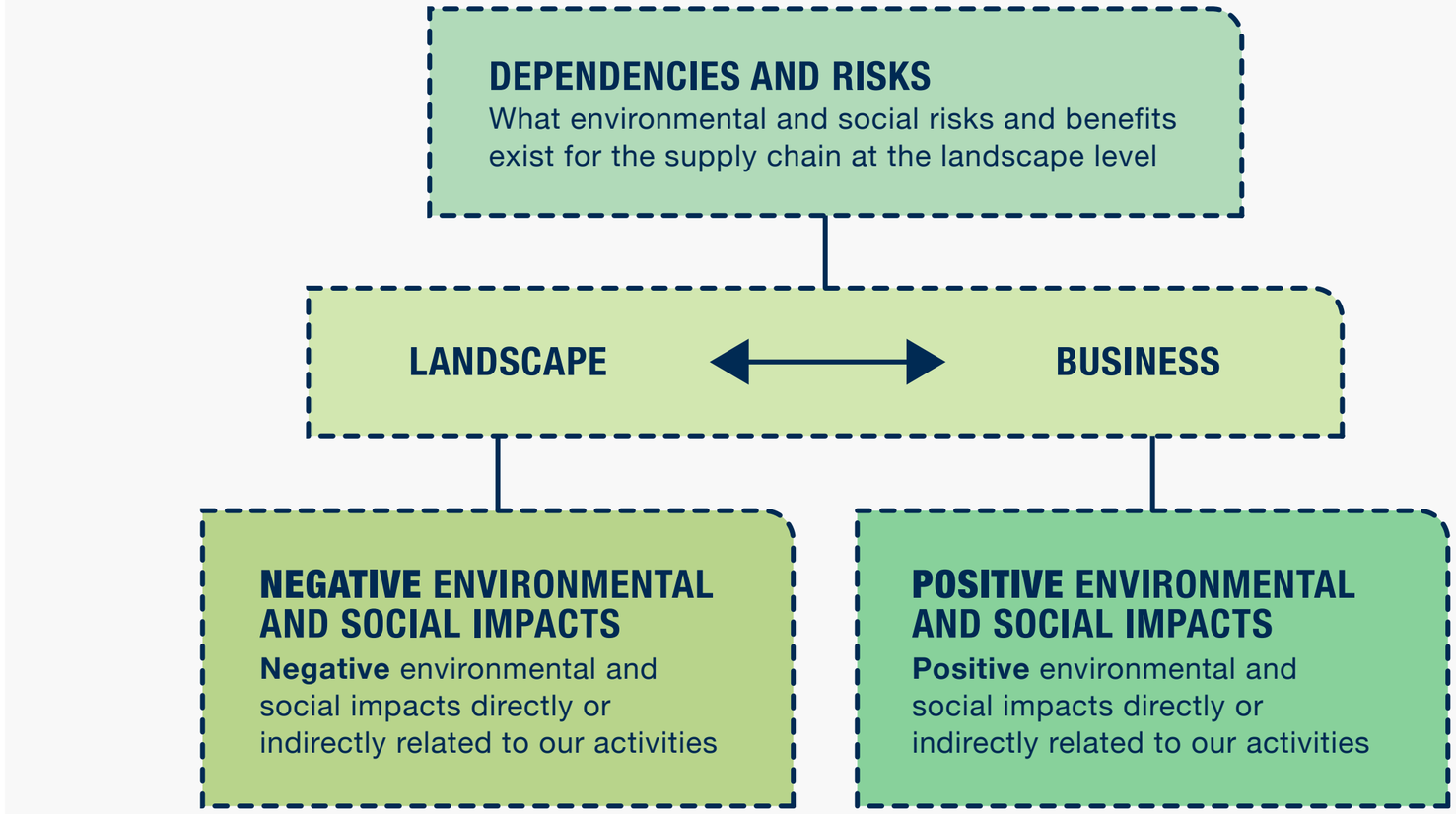


FIGURE 8: Natural capital dependencies and risks of a business in a landscape. (Source: own elaboration based on Natural Capital Coalition (2016a))

Defining natural capital dependency helps determine risks to supply chains

A natural capital assessment should focus on both the stock of natural capital and the flows or ecosystem services, which depend on the current and future state of the stock.

An assessment analyses the quantity and quality of stocks that underpin production systems in any given landscape, and clarifies the full range of impacts and dependencies these systems create (TEEB, 2018). It also demonstrates how changes in stocks will impact the provision of ecosystem services, the production system and supply chain. Once dependences are identified, risks can be determined.

The risk assessment has two parts. First it looks at which benefit-flows, or ecosystem services, are used by the production system (i.e. the dependencies). Second, it looks at the current state and ongoing changes in the natural capital stock to evaluate whether degradation of natural capital constitutes a risk to the supply chain now or in the future. Risks related to a supply chain in a specific landscape can be either on-farm (e.g. decreasing yields due to loss of pollinators), or off-farm (e.g. deforestation upstream leading to reduced water quality). A range of methodologies and standards have been developed that can support businesses in gaining a better understanding of natural capital dependencies and risks, and how landscape restoration can provide opportunities by enhancing natural capital.

These can be evaluated using natural capital assessment or accounting. The difference between accounting and assessments is that natural capital accounts are consistently and regularly compiled and do not function as one-off exercises (Edens et al., 2022). A natural capital assessment identifies, measures and values natural capital impacts and dependencies, and provides information to answer specific questions or inform decisions.

In contrast, natural capital accounting is a framework approach for compiling consistent and comparable data on a regularly basis, that approximates to financial accounting standards on natural capital and the flow of services generated in physical and monetary terms (Natural Capital Coalition, 2017; Lammerant, 2019; Edens et al., 2022).

There are a broad range of tools and methodologies for carrying out natural capital assessments. For natural capital accounting, the System of Environmental Economic Accounts (SEEA) is the international standard and official framework for organising and presenting statistics on the environment and its relationship with the economy (UNSD, 2019). It has a role that is equivalent to statistical standards used for measuring the economy, prices, populations and employment, but that also includes ecosystems, ecosystem services and other environmental stocks and flows (Capitals Coalition, 2021).

The SEEA consists of two parts. The SEEA Central Framework (SEEA CF) was adopted by the United Nations Statistical Commission in 2012 (UNSD, 2012), and the SEEA Ecosystem Accounting (SEAA EA) that was adopted in 2021 (Capitals Coalition, 2021). Developed for national and subnational assessments, the SEEA EA can also be valuable for corporate natural capital accounting and especially for collecting and structuring natural capital data (Edens et al., 2022).

iStock credit: ollo

The framework most used by businesses thus far has been the Natural Capital Protocol, launched in 2016. This standardized framework supports the identification, measurement and valuation of direct and indirect impacts (positive and negative) and other natural capital dependencies, and that enables businesses to integrate nature into their operations (Natural Capital Protocol, 2016).

Although linear, the Natural Capital Protocol is iterative and users can adjust and adapt approaches as they progress (Lammerant, 2019). It can be applied to all sectors and organizations of any sizes, and anywhere, and at product, project or organizational levels (Natural Capital Protocol, 2016).

Full consistency of the SEEA with corporate measurement systems may not be possible, or required, however, as the metrics developed might have different intentions (Hoekstra et al., 2022). The SEEA EA and Natural Capital Protocol can thus be understood as complementary. The SEEA EA provides a framework for systematic measurement of natural capital, while the Nature Capital Protocol can support the application of the accounts into decision-making processes of businesses (IDEEA Group, 2017).

In addition, the first official guidelines on the scale of businesses are available in the British Standard BS 8632: Natural Capital Accounting for Organisations – Specification.

This provides organizations with ways to improve decision making through a strengthened understanding of how their operations impact and depend on natural capital assets.

There are two main accounting outputs: a natural capital balance sheet that details the dependency on natural capital assets, and a natural capital income statement that outlines an organization's positive and negative impacts (BSI, 2021).

A key issue with natural capital assessments is the inclusion of biodiversity as part of ongoing work involving academics with the public and the private sectors (Lammerant, 2019).

One result was the Biological Diversity Protocol that provides a standardized approach to account for and consolidate biodiversity information on the impacts and dependencies of an organization on different species and ecosystems.

It also offers guidance on developing and managing a biodiversity impact inventory, and how to identify and determine biodiversity impacts (Endangered Wildlife Trust, 2020).

Credit: Pauline Buffle, IUCN

Step 1b: Define restoration objectives

In addition to reducing the identified risks and impacts, other aspects can help companies to define restoration objectives and propose specific restoration actions. The company's business model can help with this (Figure 9). A company may have a specific value proposition that aligns with restoration, or is related to environmental or social value propositions such as environmental certifications or labels, or ESG-related company policies. A company may also want to target specific customer segments or consumer demands, align with new legislation, or intend to access specific national subsidies. A particularly relevant example is where companies have committed to delivering science-based climate mitigation targets as part of the Science Based Targets initiative (SBTi).

Companies can the implement restoration activities within their supply chains, and the emissions reductions or carbon removals count towards meeting their targets. Where restoration activities are outside of a company's value chain, these emissions reductions or carbon removals could count towards 'beyond value chain mitigation' targets under the SBTi's Net Zero Standard. Corporate social responsibility activities in a landscape will also factor into decision-making. For example, if a company is supporting recycling or is building schools, it may want to see how these actions can be used to strengthen restoration objectives (e.g. use of non-plastic materials, or inclusion of environmental education).

FIGURE 9: Business defining the objectives for restoration (Source: Illustration prepared by the report authors based on Osterwalder and Pigneur (2009))

All these aspects, from risk management to corporate social responsibility, will set the objectives for a company to engage in restoration. Specific objectives can be diverse, and when connected to natural capital risk and opportunities, could include the following.

- **Operational: such as reduction of soil loss in areas with high levels of erosion**
- **Legal: such as restoration of recently deforested areas**
- **Reputational: such as improvement of habitat for key bird species**
- **Financial: such as access to carbon financing[21]**
- **Social: such as the diversification of household income.**

Understanding the connections between business models and restoration helps to identify restoration objectives, and also helps to understand how a business model can change through the implementation of restoration actions. This may be, for example, by being able to source to new customers, or by adding new value propositions (Figure 10 provides an example).

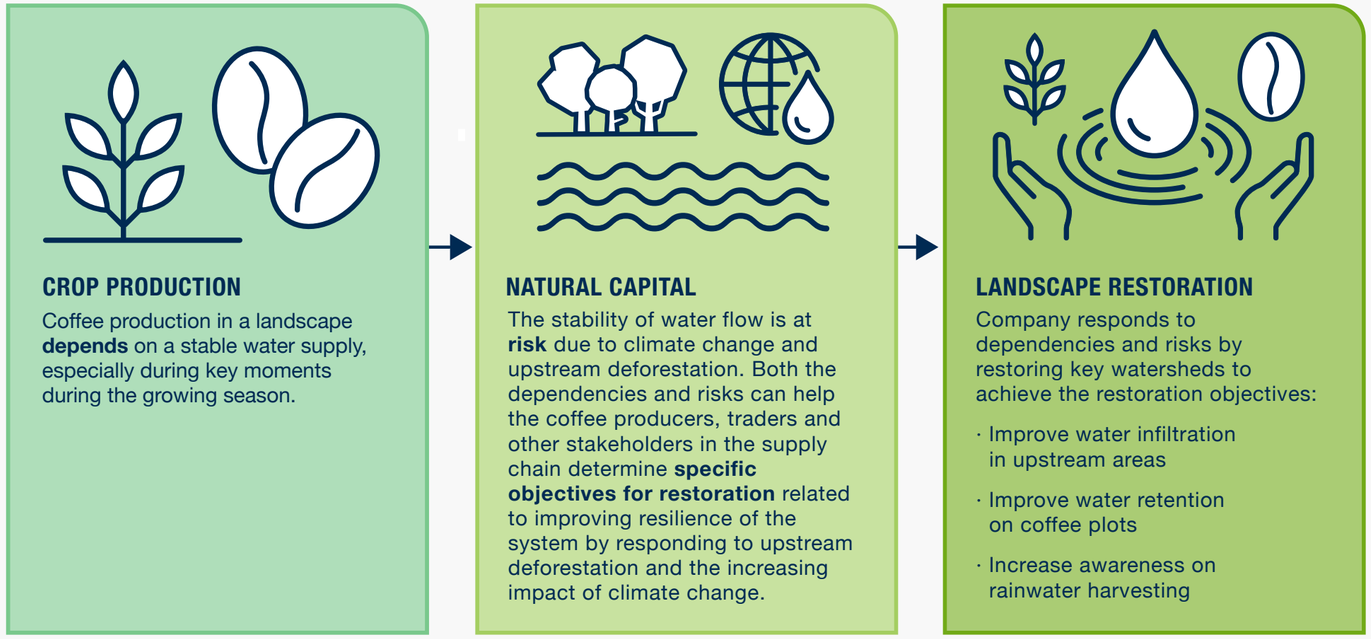


FIGURE 10: Defining risks and dependencies on natural capital in a coffee production system (Source: Illustration prepared by the report authors

[21] Carbon financing could occur through the sale of carbon credits. But it is important to note that if a carbon credit is sold onto another entity then the seller cannot claim the emission reduction or removal.

Component 2: Ensuring strong grassroots ownership and local relevance

Step 2a: Identify who should participate in discussions

Once the landscape and link with the supply chain is identified, it is crucial to ensure the involvement of a diverse and representative set of key stakeholders in the assessment process (Figure 11).

Local inclusion greatly improves ownership and buy-in from key actors at the outset, it anchors the process in the local context, and promotes long-term sustainability of restoration actions defined in the assessment process.

This step helps to ensure that proposed restoration interventions draw from local inputs and traditional knowledge of the actual situation in the landscape.

In addition, by applying a gender and youth lens to consultations, youth and women are empowered to participate and express their opinions on the restoration assessment and the processes in which they will be involved.

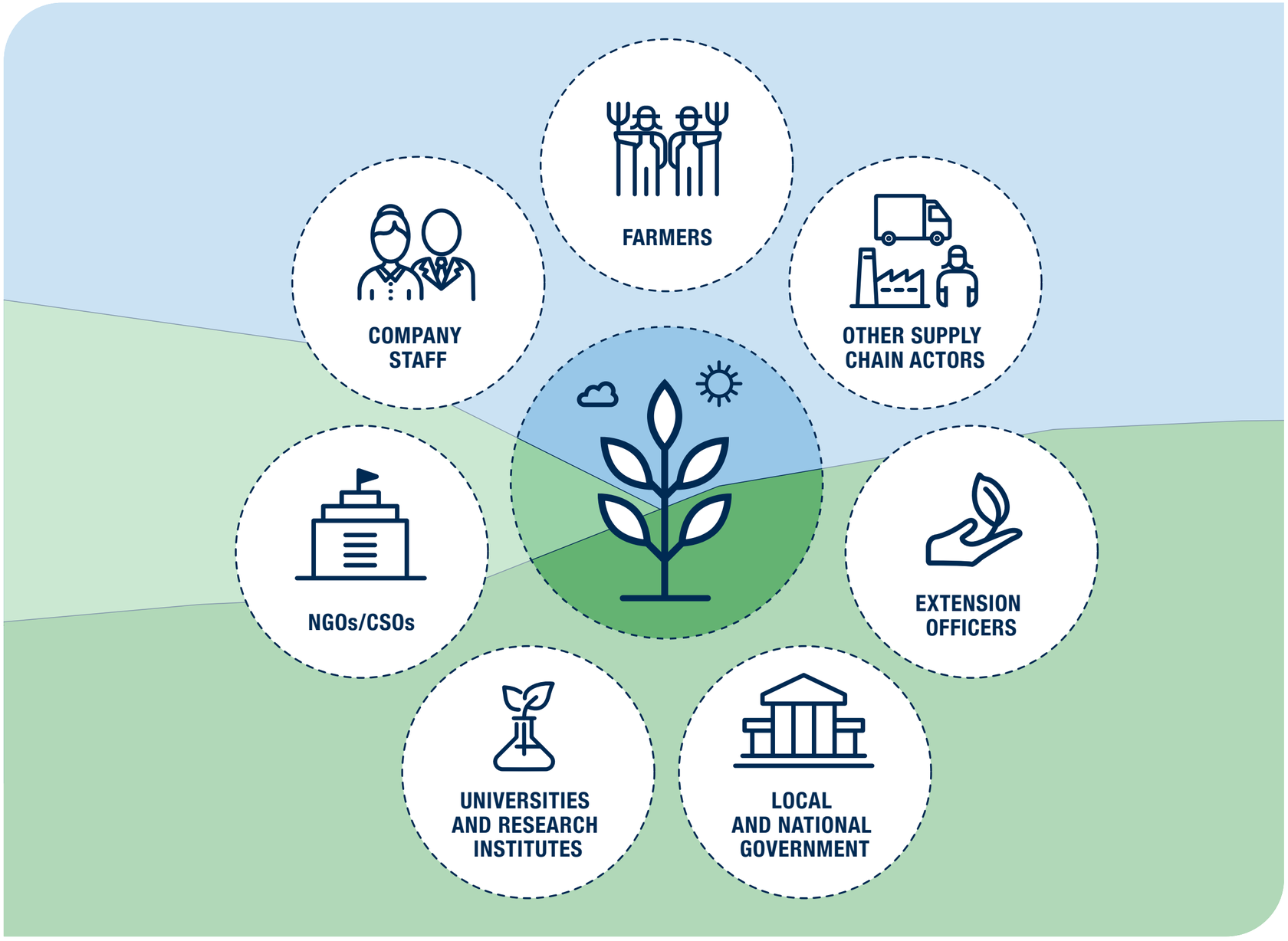


FIGURE 11: Grassroots ownership and multistakeholder dialogue (Source: Illustration prepared by the report authors)

The stakeholder groups must all be represented and play an active role:

Farmers and producers: those at the centre of farming systems that supply agribusinesses and know the local and cultural context. Ideally, they also represent forest and farm producer organizations (FFPOs, see Box 4). They work and/or live in the landscape, are likely to be key actors in restoration. Their issues and challenges should be at the forefront of discussions.

Traders, processors, retailers and other supply chain actors: those who supply goods or services to the company in some way, and may be in different groups or sometimes together with producers in producer organizations.

Extension/technical officers: from ministries and companies, including those who organize collection of raw materials field, supply inputs or are trainers in best practices. They have a good sense of producers' priorities, with a broader perspective as they interact with many farmers. They are likely to be involved in supporting restoration and monitoring, so they must be engaged them from the start to ensure intended interventions are well-understood and feasible.

Local and national governments: to identify, better understand and address the legislative bottlenecks or opportunities, through facilitated dialogue between government officials producers and companies.

Local universities or research institutes: for collaboration on data collection and analysis.

Non-governmental organisations: can play key roles providing technical guidance, facilitating peer-to-peer learning on landscape restoration, and supporting the empowering of landscape stakeholders. They can also facilitate forums or platforms for restoration discussions between the public and private sectors.

Credit: Pauline Buffle, IUCN

Company representatives: including those in direct contact with producers. It is also important to involve more senior corporate staff especially at the beginning of the process, to demonstrate a high-level company commitment to inclusive engagement with all stakeholders.

BOX 4: IMPORTANCE OF FOREST AND FARM PRODUCERS' ORGANIZATIONS

For businesses working in a large landscape, connecting with all of the individual smallholder producers is not realistic. However, for restoration interventions to be successful, most or all of these smallholders need to part of the solution.

Producer organizations bridge this gap by creating a conduit between businesses and smallholders in a landscape. Businesses can greatly increase their reach while supporting the producer organizations through partnerships, financial instruments and skills transfers.

Credit: Pauline Buffle, IUCN

Step 2b: Capture local knowledge on degradation and restoration objectives

The stakeholders above, with particular emphasis on a strong representation of farmers and producers, must be invited and encouraged to attend an initial dialogue, to identify and discuss the main issues they face and set restoration objectives. Such a workshop or similar meeting could last 1-2 days or longer, with the following aims:

- **Understand landscape restoration**
- **Develop a common understanding of degradation on their farms and in their landscapes, and the drivers behind this degradation (e.g. climate change, land use change)**
- **Identify and agree on the main restoration objectives (e.g. additional revenues or food security)**
- **Understand who the stakeholders are, who benefits and who influences decision-making processes in identifying opportunities, as well as social-cultural considerations to ensure inclusive participation of all relevant groups**
- **Better understand the economic considerations, such as costs of implementing landscape restoration or short-and long term benefits, when identifying appropriate restoration interventions, and practice this by doing an initial simplified cost-benefit analysis.**

The main objective of the inception workshop is to harness inputs into the development of a roadmap of activities and timeline for landscape restoration, clarify stakeholder roles, and identify policy entry points at both landscape and national level.

It is important to keep in mind that different groups may have quite different perceptions of what restoration is, and its benefits and this throughout the process outlined in this guide.

The recurring consultations should ensure that the restoration business case is not only aligned with what is considered key for the company, but also addresses local objectives and priorities – and especially, that it does not conflict with local interests.

This not only assures equity in decision-making but also strengthens uptake of the proposed restoration intervention by the same grassroots actors very likely to be at the core of the interventions, and the best placed to provide long-term sustainability. Box 5 provides an example.

BOX 5: MULTI STAKEHOLDER ENGAGEMENT PROCESS IN GHANA

The methodology in the guide was tested using a consultative process in Ghana, that started with a meeting reserved for farmers, farmer representatives, community-based organizations representatives and purchasing clerks. They were clearly the stakeholders often not included in decision making despite being central to the supply chain and landscape restoration potential.

The first meeting introduced key concepts and discussion topics that would be outlined in further discussions to level the playing field as much as possible with stakeholders from the cocoa company, government and research community. This meeting must include women, young people and other marginalized groups to ensure their voices are heard and that they feel more confident to be active in multistakeholder processes. Forty farmers and producer organizations representatives took part in the first meeting, later joined by 12 participants representing the Ministry of Agriculture and other government agencies, the Ghana Cocoa Board, district and municipality assemblies, traditional authorities, and company staff.

The exact composition of multistakeholder groups will vary from one landscape to another but should reflect who will be implement restoration interventions (farmers), who will provide investment (government and the company), who will provide technical support (purchasing clerks), and ensure an enabling political, economic, legal environment (government, traditional authorities and the company).

This group together decided to appoint ‘restoration champions’ among participants, to become spokespersons for restoration efforts in their communities and in local governments. Champions are then engaged regularly throughout the different steps of the process as outlined in the methodology. Their buy-in and feedback is crucial for empowerment and ownership of future restoration interventions.

Component 3: Decide on an analytical framework

Step 3a: Develop a restoration opportunity map

The objectives of companies and local stakeholders will define the opportunities for landscape restoration. The aim is to look for overlapping objectives. For example, if erosion reduction is an objective, then areas with high erosion rates are targeted for restoration, or reducing distances between pollinator habitat and crop fields if improving pollination is an objective. Objectives can be represented in landscape maps that can be developed using tools such as STAR (Box 6), InVEST (Box 7) among the many tools that can support analysis. With a map that allows objectives to be visualised, they can be combined in a spatial multi-criteria analysis including three components (see below), that highlight restoration opportunities in the supply chain landscape.

- **Spatial data:** Satellite imagery, community mapping can give complementary insights into a landscape. But farmers and field officers may not always have access to quality spatial data, it may be too expensive or not exist. Field and desk surveys are still needed to validate spatial analysis estimate for sites and sizes for restoration opportunity in a supply chain landscape. Spatial data can also be used to evaluate current or future ecosystem service provision (WBCSD, 2021).
- **Multi-criteria analysis:** Combines the full range of restoration objectives (MCA) and identifies and compares options by assessing their effects, performance, impacts, and trade-offs (Geneletti, 2014). It can be used to classify and prioritize multiple options by combing economic, social and ecological data (Noleppa, 2013, Favretto et al., 2016)
- **Spatial multi-criteria analysis:** Used when indicators of restoration objectives have explicit spatial dimensions (Chakhar and Mousseau, 2008), that combines and transforms geographical data (the objective maps) into a decision (output) (Malczewski, 1999). The result is an aggregation of multi-dimensional information into a single output called a restoration opportunity map. In addition to combining and analysing geographical data, this process also allows the inclusion of decision maker preferences (Alkema et al., 2017).

BOX 6: STAR

The Species Threat Abatement and Restoration (STAR) metric measures the contribution that investments can make to reducing species extinction risk. It does this by assessing impacts in specific places by businesses, governments, civil society. It can support the identification of actions that have the potential to bring more benefits for threatened species and global sustainability targets, and supports the establishment of science-based targets for species biodiversity.

Read more

BOX 7: INVEST

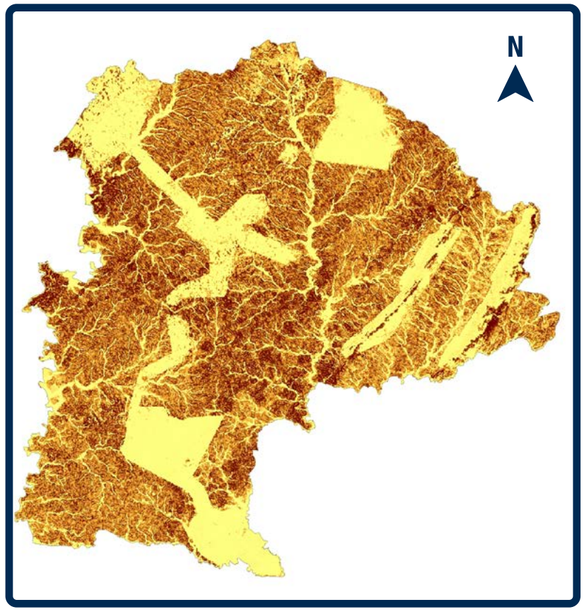
The Integrated Valuation of Ecosystem Services and Tradeoffs (InVEST) is a suite of spatially-explicit open source models that are used to map and value the goods and services from nature. It helps explore how changes in ecosystems can lead to changes in the flows of many different benefits to people. InVEST enables decision makers to assess quantified tradeoffs associated with alternative management choices and to identify areas where investment in natural capital can enhance human development and conservation. The toolset includes distinct ecosystem service models designed for terrestrial, freshwater, marine, and coastal ecosystems, as well as a number of “helper tools” to assist with locating and processing input data and with understanding and visualizing outputs.

Read more

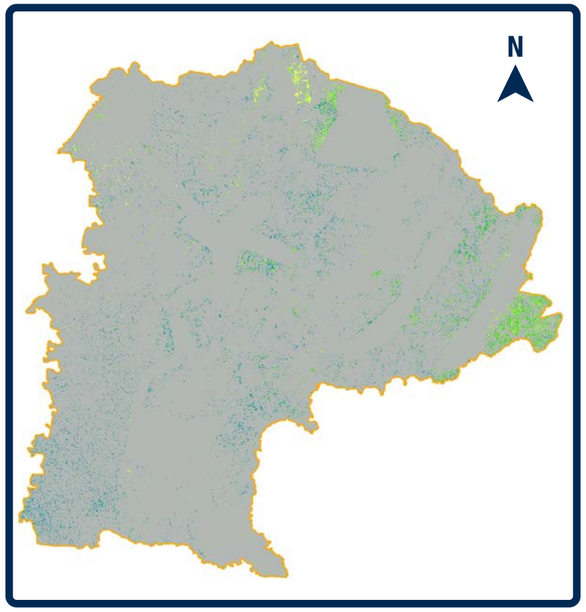
[22] Further methodological guidance can be accessed here: **https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/7612/1132618.pdf**

The maps below (Maps 1- 4) present examples of restoration objective maps developed for Wassa Amenfi, Ghana

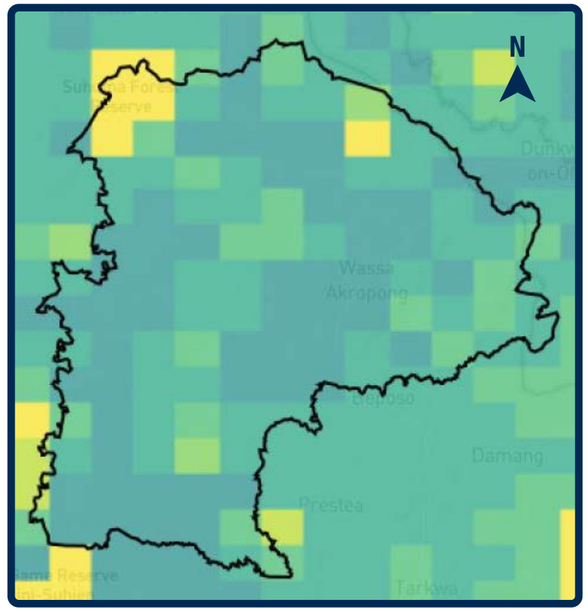
Once an opportunity map has been developed, it can be overlaid with a land cover or land use map. The overlay between opportunity and land use maps help to define priority restoration actions by analysing what land is currently being used for, and how, if needed, it can be restored.



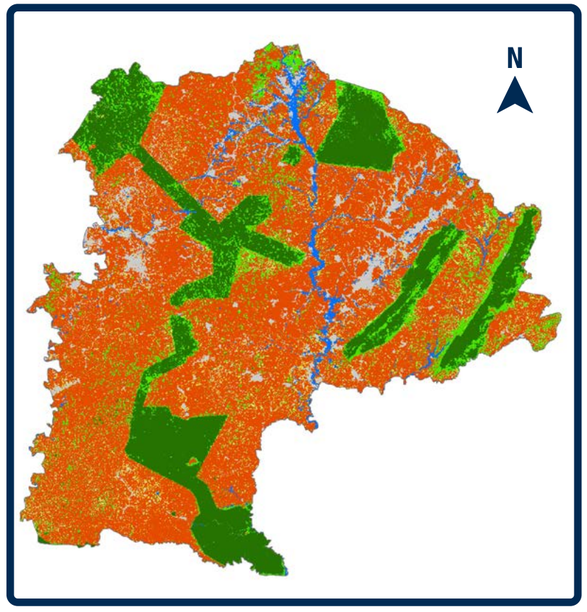
MAP 1: Potential erosion rate
(Source: prepared by Muneeswaran Mariappan (IUCN), George Ashiagbor, Guillermo Putzeys (IUCN), with InVEST)



MAP 2: Land cover change
(Source: prepared by Muneeswaran Mariappan (IUCN), George Ashiagbor, Guillermo Putzeys (IUCN))



MAP 3: STAR restoration score
(Source: prepared by Muneeswaran Mariappan (IUCN), George Ashiagbor, Guillermo Putzeys (IUCN), using STAR)



MAP 4: Land cover
(Source: prepared by Muneeswaran Mariappan, (IUCN), George Ashiagbor, Guillermo Putzeys (IUCN))

Step 3b: Develop a list of restoration interventions

Once different objectives are combined and results are joined with a land use map, a preliminary list of restoration interventions or actions can be defined (see Figure 12 for some examples).

IUCN RESTORATION INTERVENTION TYPOLOGY FOR TERRESTRIAL ECOSYSTEMS

Deserts and semi-deserts | **Forests and woodlands** | **Grasslands, shrublands and savannahs** | **Rivers, streams and lakes (wetlands)** | **Peatlands** | **Coasts and mangroves** | **Urban areas** | **Farmlands and mixed-use areas**

SOME EXAMPLES

Forests and woodlands

Assisted natural regeneration restoring degraded forests, reclaiming severely degraded sites:

- Farmer-assisted natural regeneration
- Native recolononisation
- Restoring natural flooding regimes (remove dams or barriers, create wetlands)
- Site stabilisation
- Soil improvement (fertilizer, liming, biostimulants)
- Phytoremediation
- Re-establish hydrologic connectivity or physical processes for watersheds

Agroforestry / Silvopastoral systems establishing trees outside forests:

- Streamside buffers (riparian zones)
- Home gardens
- Combining trees with crops and/or animals
- Combining trees with grazing on pastures, rangelands, or on-farms
- Planting native trees on private pastoral farmlands

Peatlands

Natural regeneration

- Passive natural regeneration:
  - Reducing or eliminating the sources of degradation and allowing recovery time
- Assisted natural regeneration:
  - Fire prevention change to management to account for wetlands where fire regimes may be beneficial e.g. prescribed burns for bogs
  - Reintroduction of native species

Farmlands and mixed-use areas

Farm fields / within farm boundaries:

- Improving land management:
  - Agroforestry
  - Permaculture
  - Organic farming

Farm landscapes - improve biodiversity

- Establish / manage Woodlots
- Restore riparian zones
- Invasive/problematic species control
- Manage invasive native species (incl. diseases)
- Restore acequias and irrigation rafts
- Land / water protection
  - Create corridors

FIGURE 12: Examples of restoration interventions. (Source: IUCN, nd.)

Full list available at: **https://restorationbarometer.org/wp-content/uploads/2022/02/iucn_restoration_intervention_typology.pdf**

Key considerations when identifying restoration actions

- Which actions best meet all objectives (e.g. for pollinators, water quality, soil quality)
- Current land uses (e.g. agroforestry may be more appropriate that plantations)
- Markets for new products (such as fruit and other tree products from agroforestry systems)
- Volumes of supply needed.

Figure 13 provides some examples of how objectives and opportunities can be combined to propose specific restoration interventions.

Step 3c: Select the final restoration interventions

A preliminary list of restoration actions is then evaluated and shortlisted based on a list of determined factors, such as: amount of time needed to implement; time delay before benefits are provided; types of benefits generated; feasibility; legal requirements around land use; availability of planting material; and suitability of the actions to achieve the desired objectives. Once one or more restoration actions have been identified as priority, they can be designed in more detail when identifying the area of the intervention.

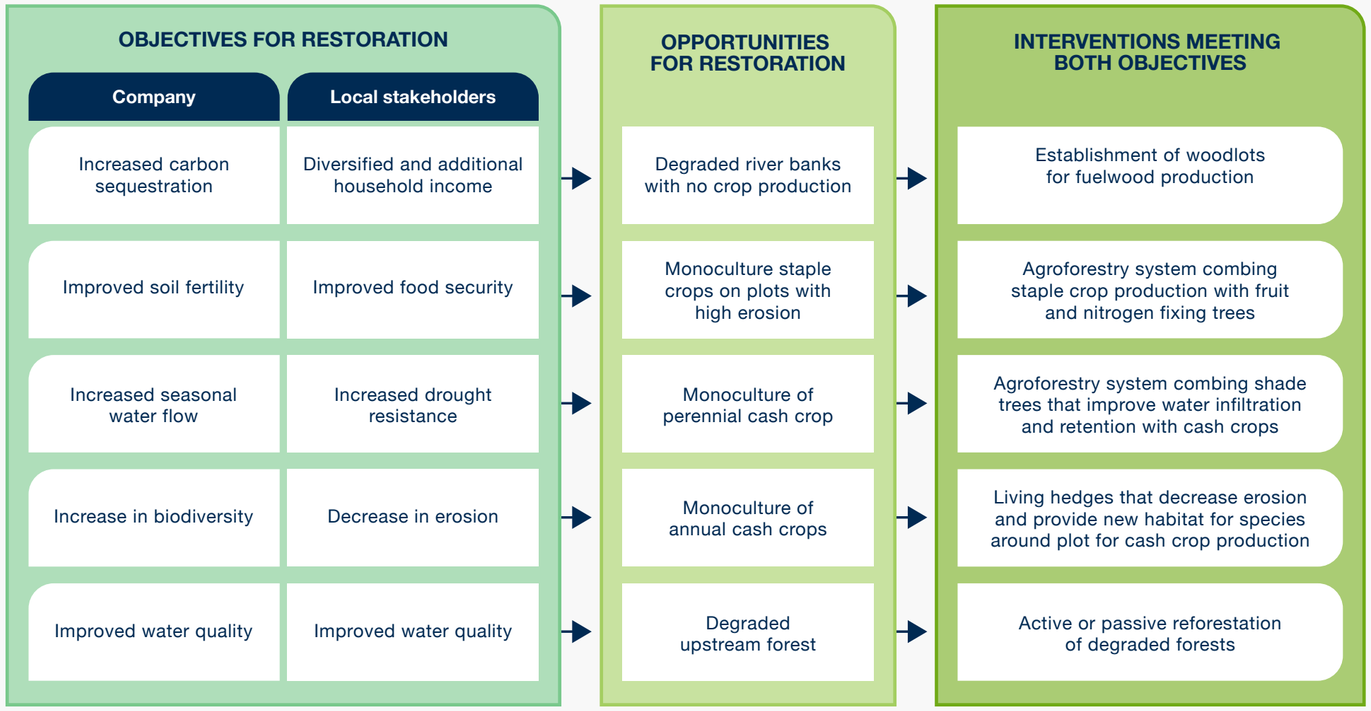


FIGURE 13: Examples on defining restoration interventions based on objectives and opportunities (Source: Illustration prepared by the report authors)

The identification and validation of restoration actions is a participatory process, with meaningful and equitable involvement of all producers and landscape actors. The discussion can be iterative, based on the input from different stakeholders. For example, in Costa Rica, a national analysis of restoration opportunities selected riparian restoration in banana, pineapple and palm plantations (Map 5). This intervention connected active programmes on good agricultural practices, legal requirements related to riparian buffers, and Costa Rica's carbon neutrality pledge.

The choice to focus on passive natural regeneration[23] was based on land suitability and location and the cost of interventions (Raes et al., 2022).

Step 3d: Prioritize areas for implementing identified restoration actions

There are various ways to choose implementation areas for the identified restoration actions. They can be directly identified from the opportunity maps, which show areas with opportunity for restoration (See Map 5). It can be an area of land managed by the company or producer organizations, or a defined degraded ecosystem or part of a protected area. However, sometimes a new analytical step is needed. Similarly to the development of the opportunity map, prioritization of the area for implementation can be done through a spatial multi-criteria analysis, as illustrated in Figure 14. This illustrates how different maps of Costa Rica can be combined to define areas where restoration will have most impact on identified objectives.

In this case the focus is on improved water quality and increased connectivity by reducing erosion, sediment export, and nitrogen and phosphorus flows. A spatial multi-criteria analysis combines maps of expected impacts of fertilizer management and agroforestry systems on coffee plantations with those of impact potential for hydro-electrical plants, communities and wetlands.

The final map is a restoration prioritization map of priority areas for restoration. Once priority restoration areas are identified, it must be validated by the local stakeholders and especially farmers, local communities, and their representative organizations.

iStock credit: Kevin Valverde

MAP 5: Areas for riparian forest restoration on banana, pineapple, and palm plantations in Costa Rica (Source: Raes et al., 2022)

[23] Passive natural regeneration refers to a restoration action where areas are protected from degradation to let regeneration to progress by the ecological process of secondary succession (Zahawi et al., 2014).

Spatial prioritization, multiple criteria: ROOT prioritization Costa Rica example prioritizing restoration of pasture systems with silvopastoral systems

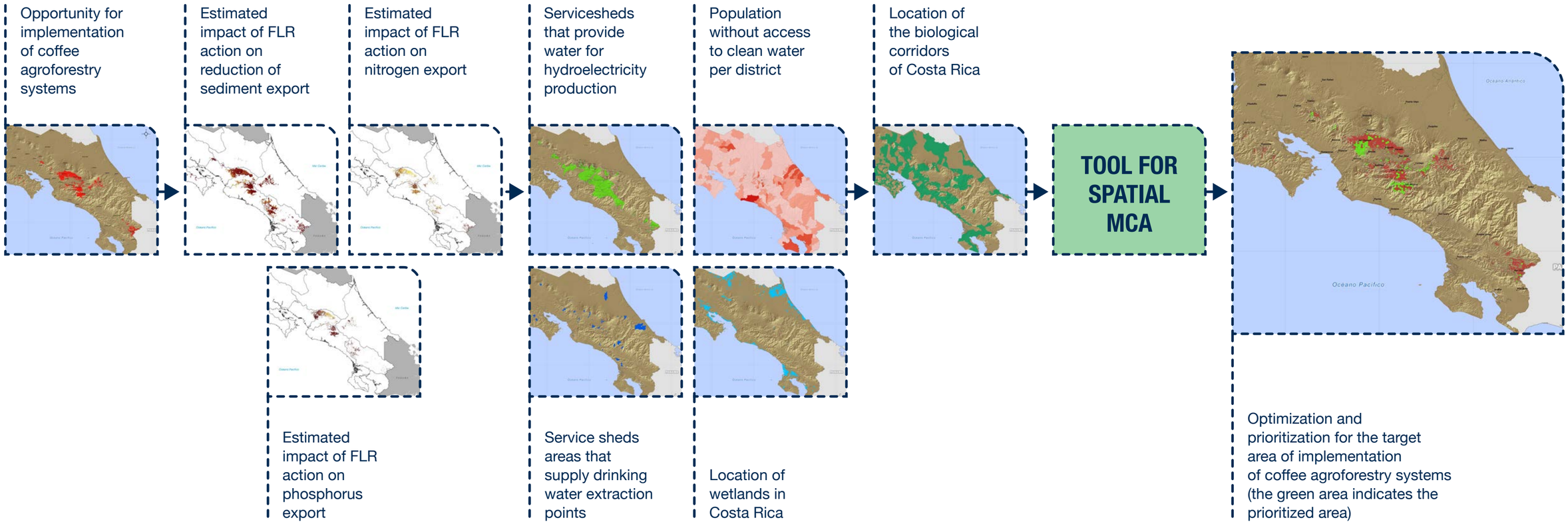


FIGURE 14: Inputs and results of ROOT in Costa Rica to prioritize areas suitable for silvopastoral systems (Source: Raes et al., 2022)

Step 3e: Design, socio-economic and environmental analysis of restoration interventions

Design restoration interventions

Restoration interventions must have their potential performance evaluated before implementation.

Before being able to evaluate proposed actions ex-ante, it is key to design the interventions in detail, answering the following question: What inputs are used? What species will be planted? What are the labour needs? How will the land be prepared? What timeline is needed for trees to grow or for the system to become mature?

Sound design of restoration actions includes what is needed to implement the actions, and also what will be needed for maintaining production for a defined period. Figure 15 shows an example of a restoration design, including longer term considerations related to tree growth.

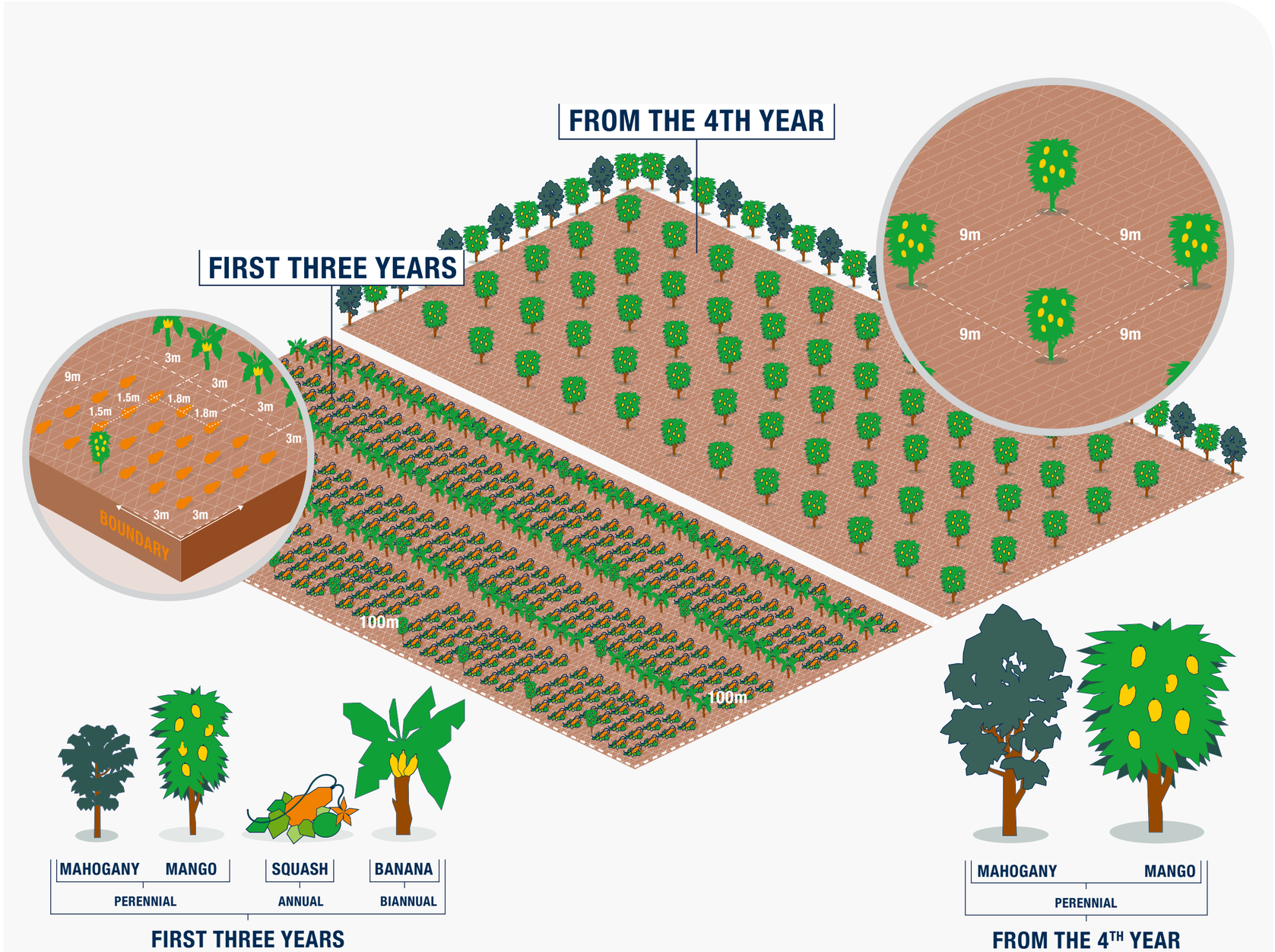


FIGURE 15: Design of an agroforestry system in Mexico (Source: IUCN ORMACC)

Define costs and benefits

Implementing restoration actions is an investment decision. However, this does not imply that landscape restoration should only be evaluated from a monetary perspective, as returns on investment can take multiple forms.

Understanding overall costs, budget requirement, benefits and potential revenue streams are key inputs when developing the business case for restoration interventions. Thus, once the restoration actions are designed, this can be used to estimate costs and benefits, financial and otherwise.

To do so, it is important to determine the timeline for analysis, as costs and benefits will change over time. The timeline for analysis does not have to be the same as the investment timeline, as some benefits (for example the sale of timber) may only be accrued after longer periods (Figure 16).

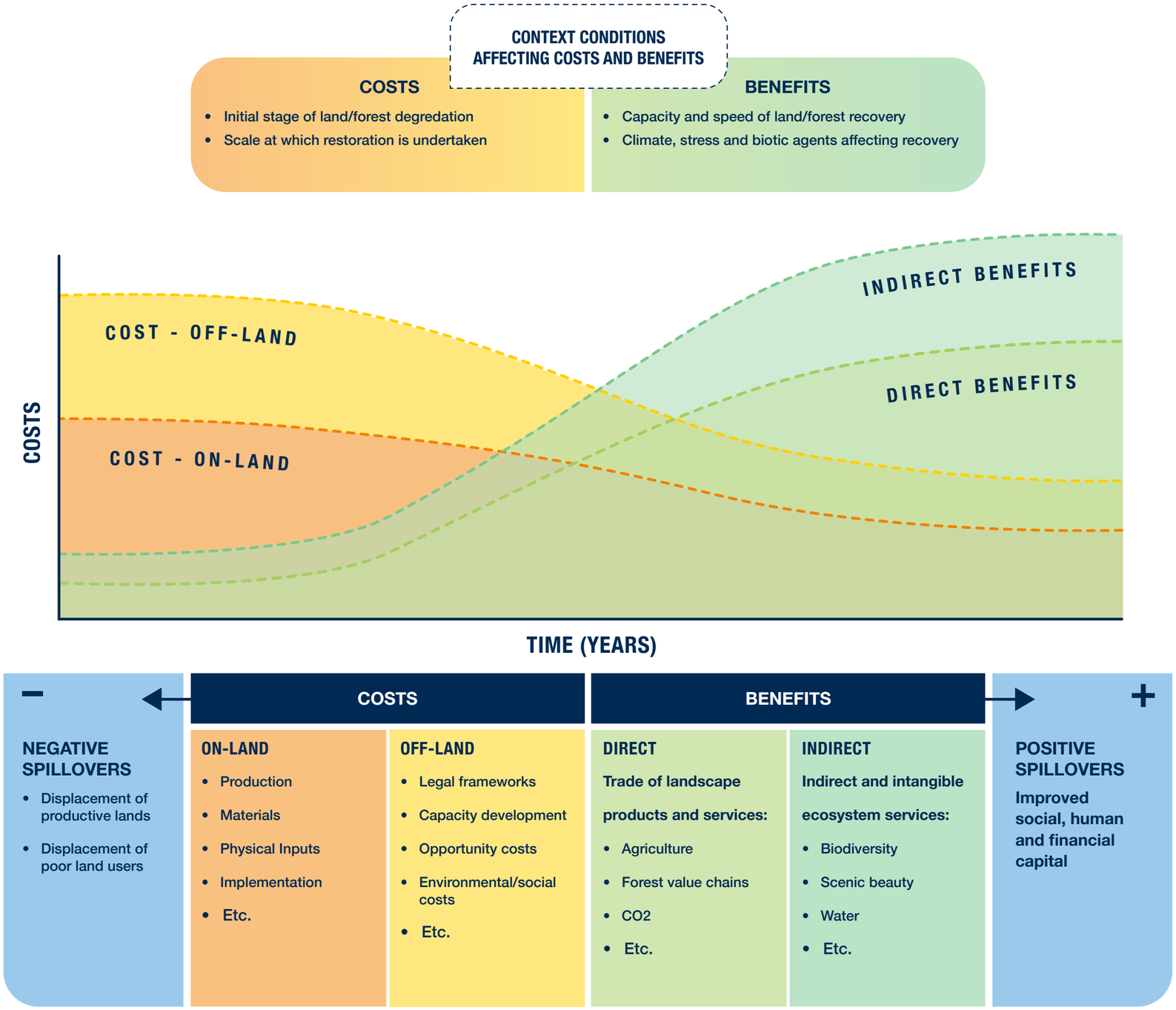


FIGURE 16: Defining costs and benefits of landscape restoration (Source: Adapted from FAO and Global Mechanism of the UNCCD (2015) and Gromko et al. (2019), with input from P. Pacheco Balanza/WWF)

Financial costs and benefits

Financial costs, such as implementation costs, maintenance, production, and opportunity costs can be related to purchasing inputs and labour. They may also include the costs of training farmers in new production methods, costs related to certifying, monitoring impacts of a production system, or obtaining carbon credits, among others.

Opportunity costs relate to foregone income from using land for alternative purposes. Once all costs are identified, it is important consider who will bear them. Local communities, for example, should not be burdened with too many costs (e.g. through additional but unpaid labour).

Direct or indirect financial benefits: Financial benefits for the company include enhanced revenue streams from sustainable production premiums, from sales of timber or non-timber forest products (NTFPs), increased yields from more productive soils, attracting new customers, increasing sales and improved brand reputation.

Broader benefits

Improved natural capital stock and ecosystem service flow: Typical examples include lower fertilizer costs due to improved soil fertility or improved natural pollination versus more expensive manual pollination. Less immediate but equally important benefits are improved soil health and water availability for crops, people and livestock in rain-fed areas that can also be translated into financial benefits, from[24] improved soil fertility reducing fertilizer costs, or improved pollination leading to higher crop quality and price.

Positive biodiversity impact: Restoration of deforested and degraded landscapes can halt and reverse species extinction in various ways (IUCN 2019). Implementing landscape restoration supports company commitments to conserving and restoring biodiversity in their supply chains, with a focus on agriculture.

Climate adaptation and resilience: Regenerative farming and increased tree cover reduces soil erosion, floods, and pests, improves agrobiodiversity in more resilient agricultural systems, alongside wider societal climate adaptations with higher resilience to shocks.

Climate change mitigation: Increased carbon sequestration and reduced greenhouse gas emissions benefit in the form of carbon credits, needed to comply with regulations and achieve a carbon neutral supply chain.

Enhanced food security: Restoring degraded agricultural land through agroforestry improves crop yields and reduces risks of crop failure (Vergara et al., 2016).

Improvement in social capital and local livelihoods: Restoration can reduce rural outmigration by creating new business opportunities, with opportunities for women and youth.

Improvement in human capital: Landscape restoration can have positive impacts on poverty and food security through training communities in new production techniques or capacity strengthening around value chains for new products.

Credit: Zoe Williamson, IUCN

Credit: Leander Raes, IUCN

[24] Adding a monetary value to the provision of ecosystem services is not always needed. For example, in the case of natural capital accounting, according to UNSD (2019), “monetary valuation is by no means a necessary feature of ecosystem accounting, and there are numerous examples of ecosystem accounting efforts that use only physical measures”

Methods for evaluation of restoration actions

There is a broad range of quantitative and qualitative methods available to evaluate and compare the expected performance of the proposed restoration actions with current land use. Four types of analysis are most important:

- **Cost-benefit analysis (CBA): A** CBA compares costs and benefits flows in different actions and determines which is more profitable (Brent, 2006; Ding et al., 2017). In this case, restoration actions are compared to business as usual (BAU), and impacts of restoring versus not restoring natural capital. A financial CBA focuses on the company to understand the expected return on investment for the company. An economic CBA evaluates broader benefits to society that are important when developing a financing strategy that includes multiple types of investors. When a CBA is not feasible - for instance, if it is not possible or considered necessary to assign monetary values to some or all natural capital impacts, three other methodologies can be applied.
- **Cost-effectiveness analysis**[25]**:** This examines costs and outcomes of interventions by comparing non-monetary unit of outcomes with the status quo (e.g. in terms of tonnes of soil not lost to erosion or cubic metre improvements in water flow).
- **Multi-criteria analysis:** This combines different financial, environmental and social impact results, and can also be used to capture the importance that different stakeholders have related to different criteria.
- **Spatial data analysis:** This is especially relevant when considering the use of software to model how restoration can impact ecosystem service provision, and it adds a spatial dimension to the understanding of past and future trends. Different tools exist to model ecosystem services, such as InVEST (**see Box 7**). Spatial results can also be used to value ecosystem service provision for a CBA or a cost-effectiveness analysis.

When evaluating the impact of restoration on different ecosystem services, there is often a trade-off between optimizing short-term crop production and long-term sustainability of the landscape. For example, deforestation clears land for increased production in the short-term, but is followed by an increase in erosion. Loss of soil nutrients needs to be offset by (usually synthetic) fertilizers. Excessive fertilizer application impacts water quality or degrades soil (Mulvaney et al., 2009). A restoration action where the main objective is timber and fuelwood production will have a lower positive impact on biodiversity than the restoration of a natural forest. Clearly defining the objectives of the proposed restoration is key to understanding the trade-offs and choices taken.

iStock credit: Media Lens King

[25] While cost-benefit analysis asks whether economic benefits outweigh economic costs of a given restoration intervention, cost-effectiveness analysis is focused on the question of how much it costs to get a certain amount of output from a restoration intervention.

Trade-offs: When evaluating the impacts of restoration on the provision of different ecosystem services, there is often a trade-off between optimizing short-term crop production and long-term sustainability of the landscape.

For example, deforestation clears land for increased production in the short-term, but is very often followed by an increase in erosion. Loss of soil nutrients needs to be offset by (usually synthetic) fertilizers. Excessive fertilizer application can impact water quality or degrade soil (Mulvaney et al., 2009).

In addition, although the aim of landscape restoration is to achieve a more resilient supply chain by enhancing natural and other capitals at the landscape levels, trade-offs normally have to be made related to different goals. For example, some restoration actions may have a higher impact on biodiversity, whereas others may have a larger capacity for carbon sequestration.

A restoration action where the main objective is timber and fuelwood production will have a lower positive impact on biodiversity than the restoration of a natural forest. Income diversification may be key for livelihoods, but could potentially decrease the production of a specific crop. Clearly defining the objectives of the proposed restoration is key to understanding the trade-offs and choices taken.

The decision on which trade-offs to be made should be based on the overall goals and agreed upon through stakeholder consultation. Cost-benefit analysis or other evaluations will support this decision-making process by providing key information.

Dealing with uncertainty and risk: When evaluating restoration interventions, it is important to consider uncertainty related to the future, as many impacts will only occur over a longer period. Uncertainty related to future outcomes and risks is related to the probability of an event happening.

This is relevant from a financial perspective (for example fluctuations in yields or prices of crops), but is also important for social and environmental impacts (for example, climate change impacts the performance of the current land use, and also of the proposed restoration action).

The results of the evaluation of the restoration actions may also provide information on undesired outcomes such as lower than expected carbon sequestration, or an excessive labour burden on women. In such cases it is necessary to redesign the proposed restoration actions and re-evaluate.

A preliminary assessment of different restoration interventions decreases the probability of having to redesign interventions and re-analyse. The IUCN Global Standard for Nature-based Solutions can be used to support the design of restoration actions, and help in the identification of key issues that may need to be addressed (Box 8).

BOX 8: THE IUCN GLOBAL STANDARD FOR NATURE-BASED SOLUTIONS

The IUCN Global Standard for Nature-based Solutions™ provides clear parameters for defining Nature-based Solutions (NbS) and a common framework to help design, implement, and monitor NbS actions.

Such a framework is essential to ensure high-integrity at scale, prevent unanticipated negative outcomes, and help project designers, funding agencies, policymakers and other stakeholders assess the effectiveness of interventions.

The Global Standard consists of 8 criteria and 28 indicators, which address the pillars of sustainable development (economy, environment and society) in a holistic manner and require adaptive project management. The application of the Standard results in identifying the project's strengths, weaknesses, opportunities, and threats and is also accompanied by a self-assessment tool and a user guide. Once the assessment is complete, it may be necessary to redefine or redesign the proposed actions (such as landscape restoration interventions), to ensure the sustainability and impact of the intervention.

The assessment should be an iterative process through the project life cycle, from design to implementation and monitoring and evaluation phases.

Read more

Component 4: Write up the business case

The business case will summarize the main findings of the assessment and highlight why the investment makes sense for the company, demonstrating clear positive social and environmental impacts.

The business case will be used for internal discussions and with external investors, private or public (Component 5), who might be interested in financing landscape restoration efforts.

Templates will vary depending on the use of the business case and the type of investor. Table 1 suggests information for inclusion. A plan should then be detailed for the short-term (5 years), but include key milestones at 10-15-20 years.

Table 1: Content of a restoration business case

Problem statement	*For example:* • Reduced productivity over the long term • Lower resilience to climate change.	**Expected return on investment**	Financial, social and environmental returns for each monetary unit invested
Proposed solution	*Restoration intervention, such as:* • Tree planting in forest upstream *(x hectares)* • Fencing off savannah for natural regeneration • Planting x species along coffee.	**Implementation plan**	*For example:* • Training for extension officers, technical staff and outgrowers, e.g. planting or harvesting techniques, soil management • Communication plan to inform local actors of upcoming change • Activities at farm level or outside farm gate, e.g. tree nursery development, transition to organic farming • Influencing policy for an enabling environment • Set up a landscape investment coordinating body
Contribution to business goals	*For example:* • Resilience to water stress • Financial through improved yields • Corporate sustainability goals.	**Key staff**	*For example:* • Project coordinator • Agronomist • Sustainability officer • Supply chain manager • Landscape-based extension officer.
Expected benefits	Financial benefits, expected revenue streams	**Assumptions and constraints**	*For example:* • Available resources for restoration • Planned costs • Political situation • Willingness of stakeholders to participate.
Expected social and environmental benefits	*For example:* • Improved water quality • Increased income for producer households • Additional carbon sequestration	**Critical success factors**	Elements essential to the success of the project
Costs (others)	Budget *(expenditures)* needed to implement the transitions	**Risks related to implementing the restoration plan**	For example: Drought, fire, diseases ***(although restored landscapes can be more resilient, the implementation phase, when a transition happens from one land use to another has its risks)***.
Timescales for costs and benefits	Investment payback time, overall timeframe for benefits	**Financing opportunities**	List main institutions identified in the financing strategy ***(Component 5)***.

Source: Compiled by the report authors

Including a cost-benefit analysis of landscape restoration, risk reduction and other business impacts related to restoring natural capital, also affects the expected income statement of the business and the company's future balance sheet (Figure 17).

These impacts can be captured by linking landscape level natural capital accounts with the financial business accounts. In this case, the stocks refer to underlying assets that support production and income generation (Lammerant, 2019).

To ensure farmers are aware of the opportunities and recommended interventions, it is important to develop a public document explaining benefits, risks and risk mitigation of proposed intervention and communicate widely for local buy in by companies, local government and traditional authorities, farmers and FFPOs.

The focus of this guide is to identify and develop business cases that link the way a company does business with an improved understanding of the natural capital it depends on. This has impacts on the overall business model (e.g., through value created, changes in customer relations, etc.), and can even create completely new business models (see Box 9).

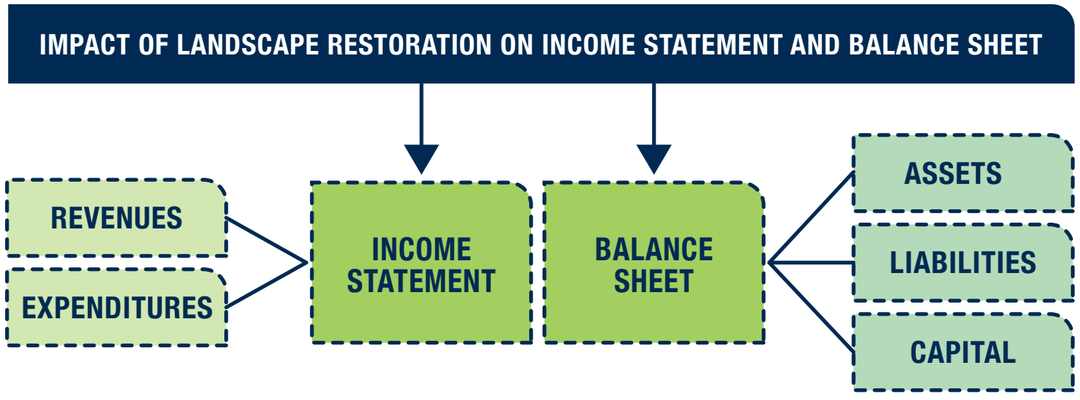


FIGURE 17: Income statement and balance sheet impact of landscape restoration (Source: Illustration prepared by the report authors)

BOX 9: REGENERATIVE BUSINESS MODELS FOR ECONOMIC RETURN AND ENVIRONMENTAL BENEFIT

Regenerative business models ensure that the natural sources of value on which society depends are renewed, rather than depleted, allowing the business model to be sustainable. There are three main categories of regenerative business models whereby positive economic returns can be generated through the protection, restoration and sustainable management of forests.

1) Creating value from standing forest. Models in this category depend on harnessing the variety, value and productivity of naturally occurring forest products and environmental services (this therefore excludes timber plantations or other forms of man-made plantation forests). Examples of business models within this category include payment for ecosystem services models (for example where finance for forest protection, restoration and management efforts is delivered in exchange for their role in climate regulation), wild forest production (honey, nuts, pharmaceutical products) and ecotourism.2) Sustainable agricultural production-protection. These models involve increasing the productivity and reducing the environmental impact of agriculture in forest landscapes. Improved practices are combined with land use planning, robust local governance and incentive and reward mechanisms for forest protection. Examples of business models within this category include the sustainable production of commodities such as palm oil and cocoa, and the production of crops such as coffee using "climate-smart", shadegrown techniques.

3) Creating value from forest regrowth. These models focus on restoring degraded land to a state as close as possible to natural forest using diverse regrowth mixes that increase above- and below-ground biodiversity and biomass. Examples of business models within this category include replanting native natural forest for compliance or voluntary purposes (such as compulsory or voluntary corporate social responsibility commitments). A modified version of the latter involves tailoring regrowth to maximise its productivity, using a broad mix of native seeds but focusing on species from which a commercial revenue can be derived, such as sugar palm or rubber.

Component 5: Develop a financing strategy

Once restoration interventions have been identified, actions have been designed, and the costs, benefits and co-benefits estimated, a final step before implementing restoration the actions is to develop a financing strategy. This is based on the budget needed, expected revenue streams and additional identified benefits related to the broader social and environmental impact of the proposed restoration action. A company may want and be able to cover the entire budget needed. However, given the multiple benefits of restoration, there are possibilities to attract different types of public and private investors at different scales (site level, landscape, national, international).

Private sector investment

Focusing specifically on the private sector, the main returns of interest can be divided into two categories:

- **Those related to ESG targets, with no direct immediate financial return expectation (communication and marketing departments, corporate foundations or ESG platforms)**
- **Those related to sustainable business and investment, with direct financial return expectations in the short and/or long-term (the companies themselves, impact investors or traditional investors).**

Overview of potential investors

From local to international level

As highlighted throughout the guide, landscape restoration provides multiple benefits, and each benefit can trigger different interests that can motivate investments.

Site level: Farmers could be interested to invest their time, finance and agricultural input to plant fruit trees for additional income or a more secure household food supply.

Landscape level: A municipality could invest the time of extension officers to train farmers on planting and maintaining fruit trees while helping with riparian restoration. The return on investment for the municipality would be reduce damage to road infrastructure from flooding. Similarly, a company losing important crop volumes because of floods could be interested in investing money to provide fruit tree seedlings to producers with farms along the river.

National level: Governments can be compelled to direct or enable investment into planting fruit trees different reasons. These could be the potential tax income from expanded fruit trade of a fruit, carbon sequestered by new trees to help meet Nationally Determined Contributions (NDCs) under the Paris Agreement, or the areas restored that help to meet restoration commitments. Government investments can also consist of subsidies to farmers involved in restoration (Ding et al., 2021).

International level: Donors and companies could be compelled to invest in developing new market opportunities to commercialize products from restored landscapes. Donors might be interested to do so under their foreign aid strategies, while companies or impact investors could invest in a new sustainable business.

Credit: Pauline Buffle, IUCN

Public and private

The type of investments mentioned above can be categorized as being either public or private finance. Private sources of finance can be found at all levels. At a local level, it is important to keep in mind that producers and farmers are private investors, and invest their time, land, labour, etc. into restoration interventions.

Other local private investors include forest and farm producer organisations, micro-credit institutions (banks, FFPOs), banks, etc. At the national and international level, common private investors are commercial banks (national, regional or international), insurance companies, small and medium-sized enterprises (SMEs,) and larger domestic of multinational companies.

Private finance can be mobilized through two channels. These are by financing projects that aim to contribute to the conservation, restoration and sustainable use of biodiversity and its services to people (financing green), and by directing financial flows away from projects with negative impacts on biodiversity and ecosystems and to projects that mitigate negative impacts or pursue positive environmental impacts as co-benefits (World Bank, 2021).

Public sources of investment include NGOs and inter-governmental organisations, local government, national government, bilateral aid, philanthropic organisations, etc. Public and private finance can often be combined to increase impact, for example through the use of blended finance (Box 10)[26].

BOX 10: BLENDED FINANCE AND PUBLIC-PRIVATE PARTNERSHIPS (PPPs)

The UN Convention to Combat Desertification (UNCCD) and fund manager Mirova Natural Capital created the Land Degradation Neutrality (LDN) Fund, the world's first investment fund dedicated to preventing soil degradation. This is a blended finance vehicle investing in projects that promote sustainable land management and rehabilitation of degraded land through investments in sustainable agriculture and forestry, among other land-use sectors.

The target size of the fund is USD 300 million, 70% from senior investors who aim for commercial returns, and 30% from junior investors who provide concessional capital. Of the USD 300 million 20–30% will be first-loss capital, most of it from public investors. At project level, the fund takes a mezzanine position, with the aim of attracting additional commercial funding to scale up promising projects (Global Mechanism of the UNCCD & Mirova. 2015).

Private investors include Fondaction, BNP Paribas Cardif, and Garance. Concessional finance has been provided by the European Investment Bank, Fondation de France, and the Government of Luxembourg. Grants for technical assistance were provided by Agence Française de Développement (AFD) and the Global Environment Facility (GEF).

The layered structure allows the LDN Fund to offer different risk-return profiles for different investors, with the junior tranche (funded using public and philanthropic funds) de-risking the more senior tranches and incentivising private investment (Global Mechanism of the UNCCD & Mirova. 2017).

The use of blended finance also facilitates the provision of technical assistance, longer repayment periods, and repayment grace periods, which are necessary due to the long time horizon over which many land rehabilitation and forestry projects take place, and the significant gap between initial investments and the first cashflows generated by projects (Quéru, 2017; WBCSD, 2018).

The fund aims to show private investors the potential of investing in natural capital, and thereby catalysing new investment (Climate Action Stories, 2020).

[26] Blended finance is the strategic use of development finance for the mobilisation of additional finance towards sustainable development in developing countries (OECD, 2018).

Relating type of investments, beneficiaries and returns

Different investors also have different willingness in terms of the level of risk that can be accepted (Figure 18). The more degraded a landscape, the higher the cost of restoration, and the higher the risk of investment.

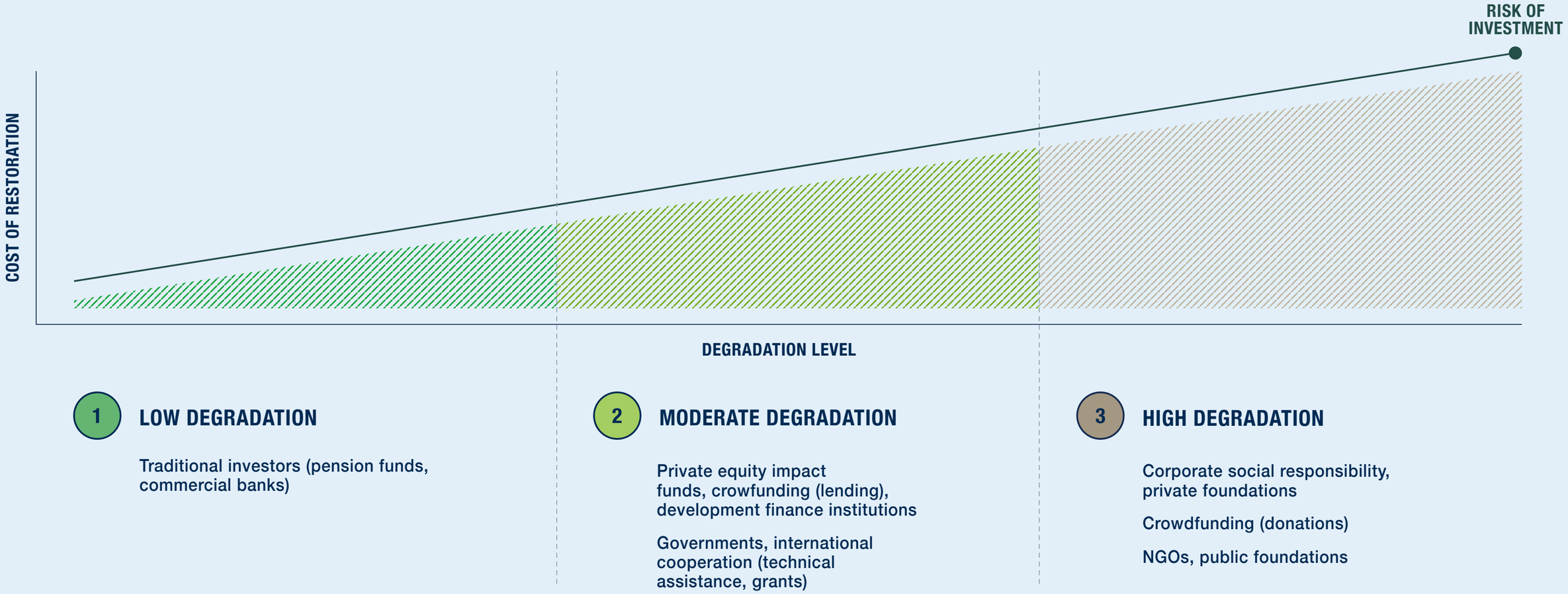


FIGURE 18: Risk and barriers to investment in restoration (Source: Besacier, 2016)

The aim here is not to provide a comprehensive overview of financing mechanisms for restoration, but to provide key points to consider when developing a financing strategy. An investor must identify the different financial, environmental and social returns that will be generated through the restoration intervention (Box 11), as different investors expect different returns, or a single investor can expect a series of different returns (Figure 19).

Furthermore, different types of investors, such as international public investors, national governments or private impact investors among others, can invest at different stages of the landscape restoration process and at different levels from global to landscape, using different types of investment (grants, equity, loans, etc). Each contributes with its own types of investment, and may expect a variety of returns.

For example, a private investor may be interested in social returns in line with ESG objectives, whereas a public investor may be interested in a financial return on investment to generate revenue for the government. Finally, the use of technology plays an increasingly important role in sustainable investment (Box 12).

iStock credit: boggy22

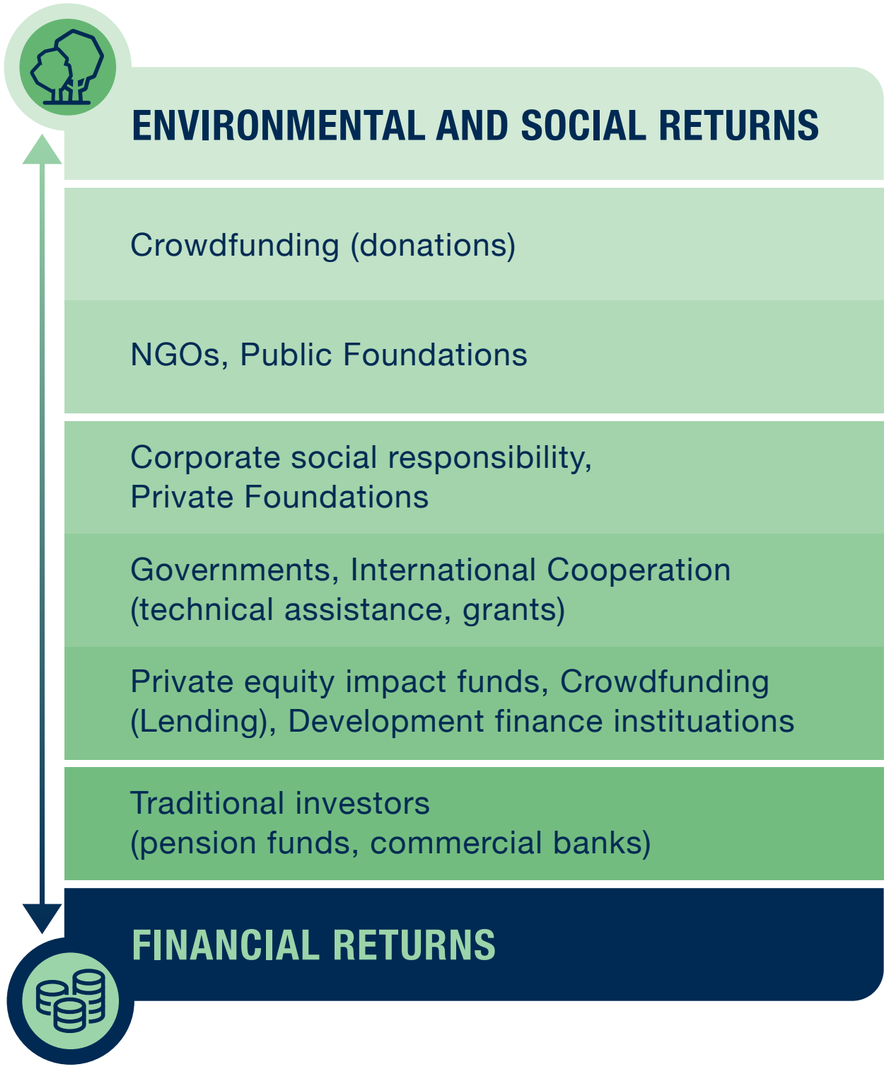


FIGURE 19: Illustration of the differing return expectations of different investor types (Source: FAO, 2015)

BOX 11: FOUR RETURNS FROM LANDSCAPE RESTORATION

The NGO Commonland has developed a comprehensive framework to calculate the value of the returns from landscape restoration, and that also includes a sense of hope in its fourth component.

The 4 Returns Framework for Landscape Restoration

- **Financial returns** (return of financial capital) such as increased capital form impact investors or improved financial performance related to ESG targets with longer return expectation.
- **Nature return** (return of natural capital) such as carbon sequestration, soil fertility, water quality or quantity.
- **Social return** (return of social capital) such as job creation, farmer engagement and cohesion, improved income.
- **Return of inspiration** thanks to the multistakeholder approach and the set up of a common and inclusive vision of the future of the landscape, giving a sense of purpose and opening possibilities for innovation and positive change (Commonland, 2020).

BOX 12: FINTECH

There is an increasing use of technology to improve activities in finance. Financial technology or Fintech is being used by both the established financial sector and new actors, including start-ups and NGOs.

Fintech solutions have the potential to support investment in landscape restoration, for example by using mobile phone based payments to pay farmers directly for restoration action, through the development of online crowdsourcing platforms or by using blockchain applications to potentially decrease transaction costs and increase transparency.

Innovative financial mechanisms can be aligned with other innovations, such as those related to monitoring and reporting.

Although Fintech provides multiple opportunities to support investment in landscape restoration, caution should be taken to assure marginalized communities do not become more marginalized due to less access to technology or lower digital literacy.

Sequence of investment

Another key aspect to consider is that investment can focus on different steps during development, implementation or maintenance of restoration actions (Figure 20).

Financing requirements for each restoration action can be categorized under four main components:

- **Technical assistance: covers expenses such as advice on the preparation of farm plans, site selection and support by community leaders during the necessary period (normally 3 years)**
- **Working capital: supplies, labour for maintaining the productive cycle of crops prior to harvest. Collective working capital to carry out collection, processing and sale activities can also be considered**
- **Investment capital at farm level: inputs, equipment, and materials for implementing restoration techniques**
- Investment capital for value chains: processing and storage equipment necessary to facilitate the economic integration of restored areas.

1 INITIAL UP-FRONT INVESTMENT	2 IMPLEMENTATION INVESTMENT	3 SUSTAINED FINANCING
Analytical work (identifying landscapes, ROAM, InVEST, STAR GIS)	Land-use zoning and planning	Landscape and forest products and services / timber and agricultural food products
Stakeholder participation and engagement (planning meetings, local consultations)	Restoration of degraded lands and forests (e.g. agroforestry. reforestation)	Payment for ecosystem services (PES) schemes (biodiversity offsets, certification schemes such as organic agriculture
Framing of intervention (around National Strategies, Regenerative Agriculture etc)	Strengthening stakeholder constituencies	
Monitoring and verification system design	Scaled-up capacity building	
Initial Capacity Building	Education, training and extension for smallholders, farmers, communities etc	
Program and Project Design	Strengthening company community / smallholder partnerships	
	Implementation of monitoring and verifaction systems	

FIGURE 20: Focus of investment based on state of landscape restoration implementation. (Source: Adapted from FAO and UNCCD (2015) and Simula (2008))

Building alliances and partnerships for investment in landscape restoration is key, such as through multistakeholder investment platforms. There are different entry points in the supply chain and the landscape to support restoration. Many actors are dependent on the same natural capital and would benefit from its restoration.

For example, farmers, producer organisations, traders, processors, retailers and exporters all depend on soil fertility and water flows. Industry partnerships can add to investments in restoration, and to which public money could be added such as from climate and biodiversity bilateral finance (FAO & Global Mechanism of UNCCD, 2015) (Box 13).

Final remarks on financing

Despite growing innovation, significant challenges remain to scaling up private finance (World Bank, 2021). In most cases, current economic and financial norms and institutions are unable to value and create positive financial returns for nature-positive investments (WEF, 2022).

Economic incentive structures, by and large, continue to support the unsustainable management of nature, resulting in distortions such as the under-pricing of biodiversity risk and value in private investment decisions (World Bank, 2021).

Barriers to investment and access to finance need to be overcome to significantly increase private investment in restoration, also at the policy level. There is also a need to increase the transparency around investment opportunities with greater publicly available information about the costs and revenue sources of restoration activities.

BOX 13: THE CERRADO WATERS CONSORTIUM

The Cerrado region in Brazil's central highland plains is a major source of the country's water. The Cerrado Waters Consortium (CWC) is a multi-sectoral collaborative platform involving coffee growers, businesses, NGOs, researchers and municipal governments that aims to regenerate productive and sustainable landscapes that generate positive socio-economic impacts.

It was launched in 2015, after IUCN, Nespresso and the NGO IPÊ, began working together to identify the environmental impacts of the company's coffee supply chain and its dependencies on ecosystem services. The Consortium supports producers in landscape restoration, implementation of climate-smart agricultural practices, and efficient management of water resources. The Consortium has since grown to include more companies that provide funds, as their supplies of raw materials depend on the region's sustainability.

Read more

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iStock credit: Leila Melhado

Component 6: Restoration monitoring and reporting

Monitoring is critical to assessing if the proposed restoration actions have been effectively implemented and have resulted in the anticipated impacts. Reflecting on implementation can also help identify roadblocks and areas where corrective action can be taken if needed. Finally, results can be used to report on progress and achievement of goals. Reporting can be done internally, at company level, with other stakeholders in the landscape, with investors, or with a broader audience, including consumers of goods produced in the landscape.

Develop indicators

Once objectives of landscape restoration are agreed, the type of interventions (practices, species, etc.) have been defined, then quantifiable indicators should be identified for use in tracking progress. As companies look to the triple bottom line, it is essential to also gather data on broader economic, environmental and social benefits to communities, in addition to the cost-benefit analysis for the company's own business case. All costs will be borne by the company, unless there is co-financing from a project or NGO, but benefits will also integrate positive externalities.

There is a wide range of indicators that cover the different financial, social and environmental outcomes. Some basic indicators relate to implementation of the restoration action, such as:

- **Number of trees planted**
- **Types of trees planted**
- **Number of surviving/maturing trees (after x years)**
- **Area restored.**

Indicators can be based on different ESG goals or based on specific requirements from investors or consumers. Moreover, frameworks and tools have been developed to support the monitoring and reporting of landscape restoration (Box 14).

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BOX 14: RESTORATION BAROMETER

The need for global ecosystem restoration to be urgently scaled up to meet the challenges of the climate crisis, biodiversity loss, and land degradation is evident to all. Existing restoration initiatives can be an excellent source of information to guide future, larger endeavours.

The Restoration Barometer, launched in 2016 as the Bonn Challenge Barometer, is the only tool already used globally to track the progress of restoration targets across all terrestrial ecosystems, and coastal and inland waters.

It records the size of areas being restored, the corresponding climate, biodiversity and socio-economic benefits, and enabling policies and funding structures.

It is a vital tool to highlight what actions are effective and why, to reveal obstacles to further success, and provide a foundation for scaling up and increasing investments in restoration.

The Restoration Barometer is being pilot tested for the private sector through collaboration with the One Trillian Trees campaign (1t.org).

A draft reporting format is being reviewed by more than 20 companies that have made restoration commitments, and the full platform is expected to go live in early 2023.

Read more

Finally, it is important to assure that indicators capture progress goals of local importance. The following is an example of indicators used by companies that want to report landscape restoration progress through the Restoration Barometer.

Action indicators

- Corporate policies and strategies (list and description of internal policies and strategies enabling restoration)
- Technical planning (list and description of restoration planning tools and methods, including social and ecological considerations)
- Funding (amount and description of financial support for restoration)
- Monitoring systems (list and description of restoration monitoring tools and systems).

Impact indicators

- Area of land (list and description of ongoing restoration interventions, including area under restoration – defined as the area of land where functionality (the ability to provide ecosystem goods and services) has been improved, and that may include areas outside direct intervention)
- Climate (estimated CO2e sequestrated, accounting methods and additional details)
- Biodiversity (list and description of biodiversity benefits)
- Economy (number and description of jobs generated or supported, and other social impacts).

In addition, the natural capital accounting frameworks can be used to monitor the impact of landscape restoration to understand natural capital changes over time and track progress. Stocks are measured at the beginning and end of each accounting period and aggregated into a balance sheet in physical units or monetary terms (Lammerant, 2019).

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Create a baseline and monitor

Once indicators are developed, the monitoring system can be developed. This can be done leveraging existing systems and extension services, mobile and remote sensing technologies. First, a baseline must be set, followed by regular progress monitoring and reporting.

For example, quarterly reports could be planned and specific resources allocated to document and share success stories. Monitoring can be done both internally, and through third party verification. There is a growing number of innovations to facilitate this process (Box 15).

BOX 15: MONITORING TECHNOLOGY

Implementation of landscape restoration is increasing, together with the development of a growing number of technologies and platforms that monitor progress. Satellite and drone images are used to verify restoration, increasingly supported with the application of deep learning. There are free and open source databases such as FAO's Open Foris (**Read more**), a set of software tools that enable data collection, analysis and reporting. In addition, online data platforms such as Restor (**Read more**) or the Global Restoration Monitor (**Read more**) where restoration actions can be uploaded. These innovations in monitoring can help to measure better, inform better and do better business.

Finally, it is key to consider how to communicate the results of monitoring along the way - especially to customers, producers, peers and potential investors - to show success, attract additional investment, and obtain high level buy in internally for replication in other supply chains or other landscapes.

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Credit: Pauline Buffle, IUCN

The second section outlined the steps for agribusinesses to take, in the form of six key components.

This section set out a flexible framework with considerations that can be adapted depending on agreed goals, aims and action plans, according to local contexts and resource constraints.

It also presented additional details on tools that can be useful throughout the process. The entry point is understanding how supply chains relate to productive landscapes as well as agribusinesses' dependencies on natural capital (Component 1).

For successful restoration, it is imperative to have local buy-in and ownership of the stakeholders that will be conducting the majority of the restoration interventions, especially producers (Component 2).

Through an inclusive consultation process, the best restoration interventions can be identified and analysed to make sure they are designed to deliver the financial, social and environmental goals (Component 3).

A business case on specific restoration interventions can then be developed (Component 4), including a financing strategy (Component 5), with the final step including a roll-out plan with indicators for tracking and monitoring progress (Component 6).

Only then can implementation begin. By acting on these six components, businesses will ensure that risks and trade-offs associated with investing in restoration are not only minimized, but that economic, environmental and social benefits are also maximized for the company, producers, the landscapes in which they live and all along the supply chain.

In conclusion: Towards a more sustainable future

Supply chains around the world and especially those for agricultural commodities, are increasingly impacted by land degradation through the interconnected crises of nature loss and climate change.

This guide outlines the risks and the means to overcome them by implementing nature-positive business practices through investing in landscape restoration.

This must also be done in parallel with reducing deforestation and preventing further degradation, with policies around deforestation-free supply chains gaining ever more traction in importing countries, especially in the EU and USA. Landscape restoration is also crucial in terms of reputational risks, and the need to meet CSR and ESG commitments.

A growing number of businesses are convinced that it is important to implement restoration in supply chains. But what comes next? First, an acknowledgement that this will require the investment of time and money, but that the benefits of restoration are undeniable and that they far outweigh the costs.

Restoration reduces risks by enhancing resilience at the landscape level. It makes good business sense, by improving degraded natural capital beyond what is included in broader company commitments.

The next step is to explore a company's dependence on natural capital and identify priorities related to the triple bottom line. Based on that, select an initial landscape or landscapes where the business runs the highest risk of stranded assets[27].

In parallel, make the necessary contacts with local institutions, going through the processes with all stakeholders and experimenting with the tools suggested in this guide. Together, jointly identify priority business cases, and the most appropriate interventions that will meet both company and community objectives.

With priorities agreed, develop and implement an inclusive action plan with farmers and other local actors including producer organizations, and with the support of local government, ensure the inclusion of women, youth and marginalized groups, and support smallholders in organizing themselves into formal associations or cooperatives. Invest in building smallholder and extension capacity on restorative practices. Engage with national and local governments to address key fiscal and tenure disincentives for restoration. Identify public and private actors to join forces and pool resources, as the multiple benefits of landscape restoration can attract other investors along the way.

Finally, it is imperative to have an agreed plan to jointly monitor, evaluate, reflect and learn, even for only a short-term training programme, though a longer-term tracking system is preferable. Communication is also crucial, as investors and customers alike benefit from seeing good practices, in practice. Once initial successes are achieved, models can be developed, and then adapted and upscaled elsewhere in the landscape, in the country, in other countries, and in different supply chains.

iStock Credit: Dennis Wegewijs

[27] Stranded assets are "Assets that have suffered from unanticipated or premature write-downs, devaluations, or conversion to liabilities. Environment-related risks that can cause asset stranding include: Environmental challenges, changing resource landscapes, new government regulations, falling clean technology costs, evolving social norms and consumer behaviour, litigation, and changing statutory interpretations…" (IDB, 2016).

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Annex: Case studies

A practical approach to identifying restoration opportunities in supply chains

In collaboration with three agribusinesses – ECOM, OFI, and the Kilombero Sugar Company – IUCN assessed opportunities for restoration actions in their supply chains: cocoa in Peru, cocoa in Ghana, and sugar in Tanzania. This work, in concert with local stakeholders, has led to the development of business cases for specific restoration interventions in each supply chain.

The three examples illustrate the diverse motivations of companies in each of the landscapes, but showcase multiple co-benefits to restoration – while demonstrating the effectiveness of interventions tailored to specific local, environmental and socioeconomic contexts.

The Restoration Opportunities Assessment Methodology (ROAM) tool was applied in each case (see box below), along with other selected analytical tools depending on the situation, including EX-ACT VC, InVEST, and STAR, among others, although hundreds of other are available (see e.g. the Tools & Mechanisms webpage hosted by the CBD for a comprehensive list[28])

Credit: Pauline Buffle, IUCN

[28] The Ex-Ante Carbon-balance Tool for Value Chains (EX-ACT VC) is a quantitative multi-appraisal tool that developed by FAO. The tool analyses greenhouse gas (GHG) emissions along an agrifood value chain, from farm-gate-to-shelf, as well as an additional set of environmental, social and economic indicators. More information here: **https://www.fao.org/in-action/epic/ex-act-tool/suite-of-tools/ex-act-vc/en/**

BOX 16: ROAMING – APPLYING THE RESTORATION OPPORTUNITIES ASSESSMENT METHODOLOGY[29]

The Restoration Opportunities Assessment Methodology (ROAM) provides a flexible and affordable framework to rapidly identify and analyse landscape restoration potential and locate specific areas of opportunity. Implementing ROAM is a multistakeholder participatory process that can help businesses recognize the value of a better management of natural resources whilst improving local livelihoods, identify landscape restoration opportunities, and develop strategies, with concrete implementation measures. ROAM was originally developed to assess forest landscape restoration (FLR)[30], but can be applied to a broader range of landscapes and restoration interventions.

ROAM allows businesses and landscape actors to jointly identify the drivers of natural capital degradation, and to develop a shared understanding of landscape restoration opportunities. It supports agribusinesses and other stakeholders in understanding where restoration is socially, economically, and ecologically feasible.

Through multi-criteria analysis, often GIS-based, the most appropriate restoration opportunities are identified and prioritized; whilst through economic analysis, costs and benefits (including carbon storage and other ecosystem services) associated with different restoration strategies are determined. The consultative, stakeholder-driven approach is of value to businesses as it ensures that critical landscape actors are identified, and ROAM brings them together to define the objectives and understand the multiple needs of different interest groups. ROAM identifies the possible types of restoration interventions, which financial and social policies and incentives are needed to support restoration, and what options exist to unlock finance.

Guidelines and tools for ROAM application

The ROAM road-test handbook (including introductions to each phase):
Read more

The clickable version to navigate phases online:
Read more

The restoration diagnostic:
Read more

Gender-responsive guidelines:
Read more

Biodiversity guidelines:
Read more

[29] See also: **IUCN and WRI (2014). https://portals.iucn.org/library/node/44852**

[30] Forest landscape restoration can be understood as “the ongoing process of regaining ecological functionality and enhancing human well-being across deforested or degraded forest landscapes.” (IUCN, 2018). ‘’FLR is more than just planting trees – it is restoring a whole landscape to meet present and future needs and to offer multiple benefits and land uses over time” (IUCN, 2023).

Case 1: Improved cocoa production practices and livelihood diversification in Ghana

Cocoa agroforestry, a typical landscape restoration intervention, can be a means to increase long-term productivity of agricultural systems and stabilize farmer incomes, while also increasing resilience to climate change and strengthening biodiversity conservation.

A business case for restoration interventions was developed by OFI in Ghana with a focus on reducing erosion, diversifying income, and training farmers to ensure long-term cocoa supply in a biodiversity rich landscape, without having to farm in forested or recently deforested areas.

OFI's objectives were to: increase resilience to climate change, ensure compliance with investor requirements, halt the decrease in pollinators, reduce the risk of pollution, and decrease soil erosion.

Links to the company's Corporate Social Responsibility (CSR) policies and compliance with its commitment to zero-deforestation are essential for its large buyers to continue to purchase from them. From the smallholder perspective, their aims are to increase production through more pollination, reduce erosion, and manage issues related to illegal mining. These separate aims were brought together in a jointly agreed action plan.

The main challenge during implementation of the restoration measures was that tree tenure and ownership rights are not clear in Ghana. Farmers held negative experiences regarding tree planting based on tenure issues and previous experiences, and there is a government focus on agroforestry systems that requires only a low density of non-cocoa trees.

MAP A1: Location Wasa Amenfi (Source: prepared by Muneeswaran Mariappan, IUCN)

Planned actions aiming to meet these multiple objectives include: (i) reducing erosion and increasing soil fertility through agroforestry practices; (ii) providing habitats for pollinators, mainly midges; and (iii) encouraging a stable and diversified source of income whilst strengthening landscape resilience.

Local producers identified cocoa agroforestry systems with fruit and timber trees as their preferred restoration intervention, and based on spatial criteria and the identification of the best suited areas for restoration, the southwest of Wasa Amenfi was prioritized for the implementation of selected actions on 1,140 farms covering a total of 3,215 hectares of cocoa.

Four actions were proposed that use different timber and fruit species at varying tree densities, allowing cocoa producers to select a production system most suited to their needs.

The business case focuses on the investment needed to implement the proposed systems, including training and extension work with farmers, the benefits for households, and expected benefits for the company in terms of a more stable supply chain – while increasing biodiversity and compliance with their CSR policies.

Case 2: Towards a carbon neutral cocoa supply chain in Peru

Carbon sequestration from agroforestry is one way to finance landscape restoration, which was the focus of ECOM in Peru. ECOM's business case focused on calculating the tonnes of carbon dioxide equivalent (tCO2e) of business as usual compared to restoration interventions. The cost-benefit analyses served as blueprints for other landscapes based on the principle that carbon credits only consider actions that are additional to what is already ongoing.

The aim of ECOM in implementing restoration actions was to improve supply chain stability through agroforestry by increasing tree cover, with positive landscape impacts such as erosion control, as well as moving towards a carbon neutral supply chain and meeting its sustainability core commitment, alongside its Rainforest Alliance certification.

For cocoa producers, the main objective was to improve income stability by decreasing the incidence of pests and diseases, and erosion control. San Martin Province in the northern Peruvian Amazon is an important cocoa producing area, and an important sourcing landscape for ECOM, which is supplied by 1,457 producers in four areas (San Martín, El Dorado, Mariscal Cáceres and Tocache). In 2019-2020, IUCN and the World Agroforestry Centre (ICRAF) developed a restoration business case for the cocoa supply chain in El Dorado district, where there are 465 producers who cultivate 1,762 hectares of cocoa and where another 623 hectares are being planted.

Producers and extensionists stated the main problems as soil erosion, pests and diseases. Cocoa agroforestry was proposed as a solution, which also contributes to ECOM-CAMSA's objective of achieving a carbon neutral supply chain.

MAP A2: Location map El Dorado (Source: prepared by Muneeswaran Mariappan, IUCN)

Three restoration approaches were agreed for different land uses. These were: (i) change from full-sun cocoa to cocoa with trees on boundaries; (ii) from cocoa with trees on boundaries to cocoa with trees within the plot and on boundaries; and (iii) from cocoa associated with mixed tree species, to include improved fertilizer management. The investment required the additional implementation of agroforestry alongside the opportunity costs of changing production systems, then allowed the company to evaluate the cost of carbon sequestration with each approach. Meetings and workshops allowed a joint understanding of common issues surrounding cocoa production, which led to the joint development of landscape restoration action plans.

Challenges during implementation included the scepticism from farmers on the benefits of agroforestry. Also, the current cocoa trading landscape focused on cocoa butter and power are in process of defining their climate action and carbon neutral strategies. Clients interested in carbon neutral cocoa may, however, might imply a change of variety as well as production system. However more needs to be done to assess the full range of benefits from more diversified and resilient supply chains.

Case 3: Investing in erosion control and flood protection on a sugarcane estate in Tanzania

Kilombero Sugar Company (KSC) considers that in order for restoration actions to be effective, they must be made at the landscape level, and not just a few individual farms. For example, planting and managing riverside buffer zones can make economic, environmental and social sense as these strips protect the landscape, increase biodiversity, and trees provide benefits for domestic uses such as increased supply of fuel, fruit and fodder. Benefits for the supply chain relate to a reduction in the loss of cropland due to riverbank erosion and flooding, while it is also a step towards the improvement of overall landscape health. A business case has been developed with a focus on restoring riparian forests for riverbank protection, flood control and improvement of river water quality.

Kilombero in south-western Tanzania includes a vast floodplain with mountainous areas. KSC owns and operates a large sugar cane estate in the Kilombero valley, with around 10,000 Ha of company land under sugar cane. Outside the main estate, more than 8000 smallholder farmers also grow cane, with around 19,000 Ha under cane, on thousands of small plots. All stakeholders in the valley–estate, smallholders, and community alike–share the same waterways, and are affected by the same landscape challenges; although the ways in which each stakeholder is able to mitigate and manage those challenges, is different.

The dominant land uses are the commercial production of sugar cane (both estate and smallholder production), the commercial production of rice (predominantly smallholders), and additionally, subsistence agriculture such as maize. The region suffers from degradation due to deforestation,

MAP A3: Location Kilombero river basin (Source: prepared by Muneeswaran Mariappan, IUCN)

erosion due to crop production on slopes, and population pressure. Land degradation impacts water supply, water quality and the ability of the landscape to resist climatic impacts such as sudden strong rainfall events. Water availability impacts different aspects of people's livelihoods, and a broad range of landscape interventions are needed to address them all. In this business case, riparian forest restoration will protect against flooding, decrease the loss of farm and plantation land due to riverbank erosion, and reduce the flow of sediments thereby improving the quality of river water and its biological diversity.

For KSC, finding a solution to mitigate the effects of flooding and erosion along riverbanks, as well as mitigating against risks of drought and climate-related impacts effecting crop yields along with improving biodiversity, was a key priority. For smallholders, their main concerns are to increase and stabilize farm incomes. Workshops allowed the company to improve their understanding of the drivers of land degradation. Discussions with communities showed their interests in specific landscape restoration LR actions, and specifically on the restoration of riparian forests. Estimates were made of the impact of restoration on sediment export, water flows, recharge, and nitrogen and phosphorus loss. Multi-criteria analysis was then used to prioritize riparian areas forrestoration. The next steps are to refine the proposed actions and estimate costs of implementation.

One challenge in the project development was that, whilst KSC had strong spatial and field level data integrity for its own estate, data within the external smallholder space did not provide the same level

of detail. Additionally, the multiple stakeholders involved in the smallholder spaces outside the main estate made an approach much more complex. Restoration of riparian forest alone will unlikely be enough to address all the landscape challenges that affect local livelihoods. Finally, regulations related to riparian areas are not clearly defined in the region, such as recommended widths of buffer strips.

After an active and positive engagement of KSC throughout the process, IUCN is now working to finalise recommendations to KSC for approaches the company might adopt on their own land, and plans to devise recommendations for how these challenges might be tackled in the more complex grower space. This could, for instance, include the development of Water User Groups that would ensure equitable riverine restoration where possible, but also development of businesses for women with development of nurseries focusing on species fit for restoration, in house gardens or along rivers, building on the existing infrastructure provided by the decentralized sugarcane cooperatives and nurseries. KSC has expressed clearly its willingness to take the next steps and move from analysis to on the ground action.

Credit: Maria Ana Borges, IUCN

Credit: Eleanore Moore

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