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GUIDEBOOK

A STEP-BY-STEP GUIDE FOR LANDSCAPE RESTORATION PLANNERS AND PRACTITIONERS

Restoration Launchpad

WRI.ORG



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LAYOUT

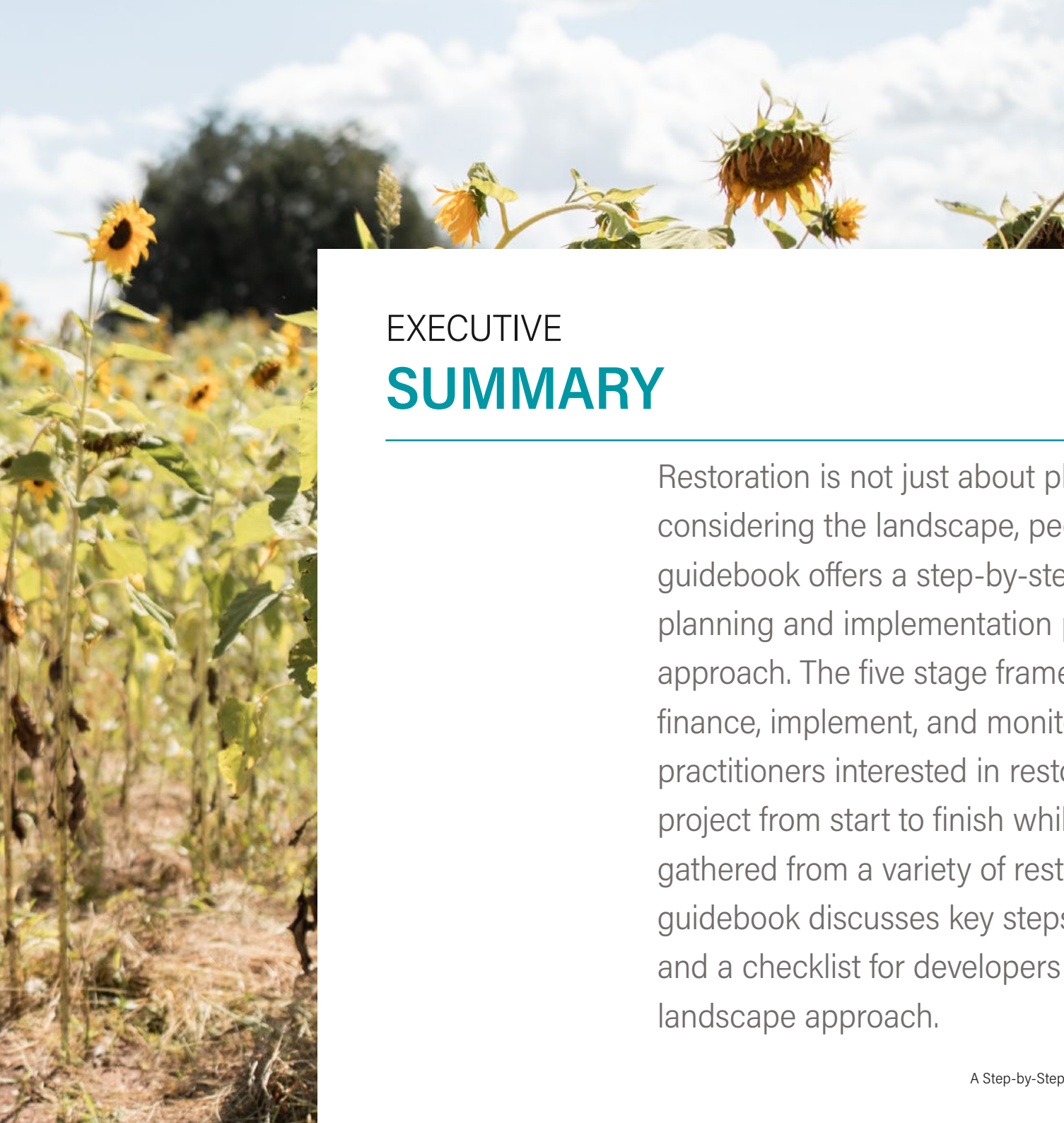
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VERSION I | MAY 2024

Suggested Citation: Kakani, M., R. Singh, K. Buckingham, et al. 2024. "A step-by-step guide for landscape restoration planners and practitioners." Guidebook. Washington, DC: World Resources Institute. Available online at <https://doi.org/10.46830/wrigb.21.00045>.

Guidebooks are designed to help users apply a clearly defined standard, practice, or process.





EXECUTIVE SUMMARY

Restoration is not just about planting and growing trees but considering the landscape, people, and their priorities. This guidebook offers a step-by-step outline of the restoration planning and implementation process using a landscape approach. The five stage framework of scope, design, finance, implement, and monitor guides (new) planners and practitioners interested in restoration to conceptualize a project from start to finish while integrating good practices gathered from a variety of restoration practitioners. The guidebook discusses key steps to consider at each stage and a checklist for developers to track their progress using a landscape approach.

HIGHLIGHTS

- Landscape restoration has multiple benefits—social, economic, and environmental. Recognizing this, several global initiatives such as the Bonn Challenge and the New York Declaration on Forests, as well as regional initiatives such as AFR100 in Africa and Initiative 20x20 in Latin America, have committed millions of hectares of land to restoration by 2030.
- In order to transform large-scale restoration commitments into project-level implementation, restoration planners and practitioners need clear pathways and tools and guidance on principles to develop restoration projects that are ecologically sustainable, socially inclusive, and economically feasible.
- This guidebook walks restoration planners and practitioners—project developers, funders, and implementers—through the process of planning a restoration project using a five-stage framework: Scope, Design, Finance, Implement, and Monitor. This includes scoping restoration opportunities, designing value chains, financing and allocating resources, implementing a project on-site, and finally, monitoring the project's performance over time.
- Stakeholders in any region can use the framework to track the progress of their project across all five stages, supplemented by a checklist of considerations that are widely identified by practitioners at each stage.

INTRODUCTION

The Intergovernmental Panel on Climate Change's 2021 report on the physical basis of climate change emphasized the need to accelerate mitigation and adaptation measures (IPCC 2021). Forest and landscape restoration is increasingly seen as a climate strategy that can enhance community resilience, biodiversity conservation, food and water security, and energy access, while improving livelihoods and providing green jobs.

More than 70 national and sub-national governments, regional initiatives, and private sector institutions have already pledged to meet targets established in international commitments. Commitments include the New York Declaration on Forests, the Bonn Challenge's goal of restoring 350 million hectares of degraded lands and forests by 2030 (Bonn Challenge 2020a), the United Nations Decade on Ecosystem Restoration, and the United Nations Sustainable Development Goals (SDGs). Implementation of these pledges has the potential to sequester more than 15.7 gigatons of carbon (Gichuki et al. 2019). Private corporations are also pledging to reach net zero commitment through nature-based solutions. For instance, the Trillion Tree Pledge offers companies the opportunity to commit to conserving, restoring, and growing trees and forests over the coming decade (1t.org n.d.).

Regional coalitions such as AFR100 in Africa and Initiative 20x20 in Latin America have also committed to bring 150 million hectares of land under restoration (AFR100 n.d.; Initiative 20x20 n.d.). More than 90 percent of commitments to restoration have come from developing countries, where sustainable land use is foundational to achieving a range of SDGs, including SDG 1 (No Poverty), SDG 2 (Zero Hunger), SDG 5 (Gender Equality), SDG 6 (Clean Water and Sanitation), SDG 15 (Life on Land), and SDG 17 (Partnerships for the Goals) (Bonn Challenge 2020b). In these countries, restoration is expected to fulfil both environmental and development outcomes. When done the right way, restoration accomplished by growing trees, natural regeneration, or forest protection can reduce poverty and improve access to food, clean water, energy, and local health, while also empowering women and marginalized communities (Berrahmouni et al. 2015).

Moving landscape restoration from political commitments to large-scale implementation requires significant and sustained investment. In addition, restoration requires significant capacity development such that stakeholders across different regions and backgrounds understand essential guiding principles, processes, and resources. To move forward, we need to identify clear pathways that a variety of collaborators can use to develop this understanding, unlock finance, and ultimately mobilize, sustain, or strengthen diverse restoration initiatives on the ground.

About This Guidebook

This guidebook offers a step-by-step outline of the restoration planning and implementation process using a landscape approach. There are multiple definitions of the landscape approach, and it has evolved with time. The landscape approach enables achieving an area's economic, social, and environmental objectives while planning for resource management and considering tradeoffs like productive land uses competing with environmental and biodiversity goals. It provides a framework for reconciling conservation and development objectives in a landscape—centering the focus on people and bringing key stakeholders together to solve problems like land degradation, conserve natural resources, and enhance local incomes and livelihoods. When undertaken systematically in planning and implementation, a landscape approach to restoration could enable adaptive management with a dual focus on conservation and poverty alleviation goals. This requires considering fundamental principles, clarification of rights and responsibilities, multifunctionality of landscapes, participatory monitoring, resilience, and stakeholder engagement (Sayer et al. 2013).

The guidebook proposes a framework for (new) planners and practitioners interested in restoration to conceptualize a project from start to finish while integrating good practices gathered from a variety of restoration practitioners. The guidebook can also be used in ongoing restoration projects to fill in any gaps and reassess considerations.

To create the framework presented in this guidebook, we deployed a three-pronged approach:

1. Review the literature to identify existing restoration implementation guides and determine whether there are gaps in resources for restoration planners and practitioners. Review indicated that most of these guides were specific to a type of restoration intervention, biome, and geography, or did not include a focus on gender equity and social inclusion, financing, or monitoring considerations.
2. Harness knowledge of the requirements and needs of restoration practitioners at the country-level on the basis of the authors' years of interaction with 100+ collective project developers, funders, and implementers that are involved with restoration projects through World Resources Institute (WRI), WRI Brasil, WRI India, and WRI México. This scoping exercise led to creating a first draft of a universal five-stage framework.
3. Conduct interviews with restoration planners and practitioners whose experience spans research, investment, business, and implementation.

The guidebook integrates and builds on WRI's existing tools and knowledge products in one clear, concise place to give restoration planners and practitioners a synthesized roadmap in restoration planning. Most of the restoration examples feature trees as the primary form of restoration interven-

tion, whether through agroforestry or restoration or natural regeneration. The guide presents restoration as including value chains of commodities or restoration products from the landscapes. The approach, stages, and principles discussed in this guide have wider scope and applicability to other open natural ecosystem projects as well as marine landscapes, but these are not explicitly discussed in this guide.

Mobilizing Restoration

We identified five essential stages of restoration projects—**Scope, Design, Finance, Implement, and Monitor**—that were found to be common to every restoration project. Each stage explores the most essential steps to conduct restoration effectively, followed by a checklist to help developers track their progress and ensure that each topic has been taken into consideration before launching into a new project.

Stage 1. Scope

Scoping is the process of assessing the ecological, social, economic, financial, and regulatory context of any potential project site in order to determine where restoration is most feasible. The order of identification of the landscape and landscape goals may differ according to whether a new project developer or a local community, for instance, is leading the restoration initiative.

- **Define restoration goals:** Planners and practitioners should understand their motive for restoration, whether it be aligned with preserving biodiversity, preserving culture, building community resilience, creating food and products,

mitigating climate risks, maintaining soil, managing water, producing energy, or perhaps a mix of these motives.

- **Map restoration opportunities and prioritize landscapes and interventions:** Planners and practitioners should determine which landscapes are most suitable for restoration through a participatory, consultative process informed by the best available data and analysis. The process should be driven by stakeholders in the landscape, taking account of the scale of fragmentation and degradation and the potential of appropriate restoration interventions for ecosystem recovery.
- **Identify key enabling conditions and barriers:** Planners and practitioners should identify key success factors and barriers to restoration in the target landscape with a focus on any contributing incentives, land and tree tenure arrangements, ecological constraints and opportunities, stakeholder engagement, levels of capacity development needed, and buy-in from the local community.
- **Analyze trade-offs and develop a strategy to mitigate risks:** Every project comes with its own trade-offs, so planners and practitioners should compare project sites and interventions to determine how to consider trade-offs in the project and develop a strategy on how risks can be best minimized or managed.
- **Select project site:** Once this analysis of opportunities and threats has been conducted, planners and practitioners can identify the project site within the landscape by defining the current use, characteristics, governance,

ownership, ecological condition, and regulatory requirements of the land using a participatory consultative process.

- **Determine value proposition:** Identifying and communicating the project's unique value, supported by restoration goals, can ready the project for future funders and partners, as appropriate.

Stage 2. Design

Designing **an effective project requires the planners and practitioners to conceptualize, define, and organize all of the internal and external processes that will be involved in the project during implementation.**

- **Define restoration intervention:** Building off of the analysis conducted at the scoping stage, planners and practitioners can determine which restoration interventions are most appropriate for the project site based on its ecological and socioeconomic conditions, as well as the predefined restoration goals.
- **Manage key activities:** Once an intervention has been defined by local stakeholders, at the operational or implementation level, appropriate institutional engagement needs to be planned. Gender and social inclusion activities at all levels should be accounted for and built into the project's stages, timeline, and resource allocation.
- **Secure resources:** Planning for the key activities ahead of time will minimize inefficiencies and allow planners and practitioners to secure the required resources to support the project.

Those resources may entail multiple forms of knowledge, access, or implementation tools.

- **Engage and establish partnerships:** Aligning with partners, from governments to research organizations, can contribute to key activities and resources and help scale the project's funding and impact.
- **Protocols, standards, and certifications:** Depending on the audience or type of project, it can be helpful to consider if any sustainability protocols, standards, or certifications may enhance the project's goals and whether they involve project monitoring or job creation, for example, to meet the certification criteria.

Stage 3. Finance

Financing **is a critical step that moves any project from design to actual implementation by way of efficient budgeting, resource allocation, and funding options.**

- **Revenue sources:** Not all projects will include a commercial component, but it can be helpful to determine if the project's goals may support providing a product or service, such as timber, coffee, or tourism, for revenue. It is important for planners and practitioners to carefully consider the drawbacks of introducing for-profit models into the restoration plan should they not mutually support ecological and social restoration goals; for example, monoculture farming can render soil less fertile over time and may not meet either ecological priorities or local gendered priorities of restoration.

- **Costs:** Revenue sources may offset universal costs for all projects, such as land, labor, or planting materials, all of which should be built into a budget.
- **Financing options:** Depending on the extent of the budget, as well as the type of project, geography, and local policies, planners and practitioners will have to consider what kind of financing is most appropriate—whether it is debt, equity, grants, incentives, or a combination of them.
- **Funders:** Based on the appropriate financing option and eligibility, developers can take their outlined budget to a variety of suitable funders, such as institutional investors, banks, governments, or philanthropic organizations.

Stage 4. Implement

Implementing a project is the process of carrying out the restoration interventions on the ground by working with the landowners and communities to correct and prepare the site, undertake interventions such as planting, regenerating, growing trees, eliminating or mitigating any disturbances, and, finally, to monitor the progress of implementation in the critical early stages when species viability is tested.

- **Prepare site and resources:** Before planting or regeneration or growing can occur, correction of the soil should be made based on the results of the soil testing. Then the soil should be prepared, the area may need to be demarcated and

protected, workers must be trained, and locally and ecologically appropriate species and seed networks must be established.

- **Planting, regenerating, and growing:** Once the resources and area are prepared, work can begin according to the planting and regenerating timeline and design, followed by site management activities such as fertilization, irrigation, or mowing.
- **Site maintenance and resources:** Developers and implementers should ensure that there is a maintenance plan in place following planting and regenerating in order to maintain the project site's health and keep away invasive species and pests.

Stage 5. Monitor

Monitoring builds on implementation in a holistic way by assessing the project's performance across ecological, social, and economic parameters, creating opportunities for adaptive management and informing developers of what is needed to take the project forward.

- **Performance:** A monitoring system that has been designed with appropriate indicators and data collection procedures can help keep track of activities and any disturbances that may occur during implementation. Based on data collected, planners and practitioners should monitor and evaluate periodically how the project has performed relative to the original restoration goals and value proposition, whether restoration is ecologically effective and has social buy-in

(among local communities), and if there is acceptance from all stakeholders involved. They should also periodically assess additional financial and policy-related factors.

- **Adaptive learning and management:** Once the challenges faced are isolated, planners and practitioners can create a plan for how to improve their operational, social, and institutional governance processes, acquire the necessary resources, then implement the changes to sustainably manage the project in the long term and develop options to further adapt restoration activities, based on field conditions.
- **Scaling and exit:** Once planners and practitioners understand the final state of the project, they can decide whether to expand or exit the project. If exiting, they must ensure that there is sufficient knowledge sharing and to transition with local stakeholders leading the process, using adaptive management and governance mechanisms along the way. If practitioners want to expand their project, they may revisit the beginning of the **Scope, Design, Finance, Implement, and Monitor** framework for guidance.





CHAPTER 1.

INTRODUCTION TO THE GUIDEBOOK

Nearly 25 percent of the world's total land area—upwards of 2 billion hectares—is degraded (WRI 2014). Land degradation is the long-term loss of land productivity, often caused by unsustainable land-use management, such as overgrazing, overcultivation, urbanization, and deforestation, as well as extreme weather events that will only worsen with climate change (GEF 2021).

Degradation can have numerous biophysical impacts, including declines in soil fertility, soil water retention capacity, crop yields, biodiversity, and water quality, in addition to deleterious socio-economic impacts (IPCC 2019).

Failing to address land degradation will not only further exacerbate the loss of key ecosystem functions—it will also threaten the livelihoods of 1.5 billion people in the developing world and 3.2 billion people worldwide (UNCCD 2015). Degradation causes and exacerbates food and nutritional insecurity, limited water access, loss of jobs and incomes, and strain from disease. Women, children, and marginalized groups are left especially vulnerable, with fewer resources for adaptation (IPCC 2019).

Governments across the world have pledged a total of 350 million hectares (Mha) of land for restoration by 2030. Policymakers, financiers, businesses, and communities are galvanizing the restoration process for 100 Mha of land in Africa and 50 Mha of land in Latin America, among other regional initiatives (AFR100 n.d.; Initiative 20x20 n.d.). Despite the progress made thus far, many countries are not on track to meet their restoration commitments due to insufficient capacity to plan or develop robust business models and lack of finance (Gibbs et al. 2020). An overview of all restoration initiatives and interventions is also lacking, which prevents robust monitoring.

The landscape approach is an important consideration for restoration planners and practitioners. Landscape is defined by the Food and Agriculture Organization (FAO) as “a social-ecological system that consists of a mosaic of natural and/or human-modified ecosystems, often with a characteristic configuration of topography, vegetation, land use, and settlements that is influenced by the ecological, historical, economic, and cultural processes and activities of the area” (FAO 2022). The landscape approach to restoration is a transformational strategy that can combat land degradation, reduce fragmentation, and improve land productivity, when conducted the right way (see Box 1).

Restoration planners and practitioners such as project developers, funders, and implementers are central to scaling up and implementing different types of restoration efforts that benefit both people and ecosystems. Practitioners like grassroots organizations and communities are constrained by the lack of clear pathways and funding for restoration. In order to meet the goals of the government pledges, more stakeholders will need support for restoration through building and bridging capacity gaps and sharing knowledge, expertise, and resources to promote the most effective and inclusive ways of restoring land (WRI 2014).

Landscape restoration interventions are diverse and depend on the ecosystem. Different types of restoration interventions include agroforestry, silvopasture, agri-horti-forestry, reforestation, mixed species plantations, linear plantations, plantings along roads and canals, riparian restoration, mangrove restoration, peatland restoration, assisted natural regeneration, and farmer-managed natural regeneration, among many others. Restoration interventions support both the natural and assisted recovery of ecosystems. For instance, the spectrum of interventions for lightly assisted, moderately assisted, or intensively assisted recovery may involve management techniques such as soil health management, water-related measures, planting seeds or saplings, or removing stressors such as grazing, fuelwood extraction, and other anthropogenic pressures. Unassisted or lightly assisted natural regeneration allows the landscape or ecosystem to recover or regenerate naturally. Choosing the appropriate restoration intervention will depend on a variety of factors, including land use, land ownership, bio-physical characteristics (such as slope, elevation, and soil type), socio-economic factors, and the goal or objective of restoration. Importantly, local knowledge and input from local communities during the planning of restoration is crucial for deciding on the type of restoration.

Box 1 | The Landscape Approach to Restoration

The landscape approach to restoration seeks to reestablish the ecological functionality of a landscape while engaging local stakeholders and adapting to local social, economic, and political conditions. It brings together actors who identify and implement practices to achieve an optimal balance of ecological, social, and economic benefits from forests and agricultural landscapes (GPFLR n.d.). The approach enables planning for resource management while considering trade-offs, such as productive land uses competing with environmental and biodiversity goals. It provides a framework for reconciling conservation and development objectives in a landscape-centered focus on people, and for bringing key stakeholders together to solve problems like land degradation, conserving natural resources, and enhancing local incomes and livelihoods (Sayer et al. 2013).

A landscape approach to restoration, when undertaken systematically at the planning and implementation stages, will consider fundamental principles, clarification of rights and responsibilities, and the multifunctionality of landscapes (Sayer et al. 2013). The approach uses tools like participatory monitoring, building resilience into project planning, and stakeholder engagement to enable adaptive management with a dual focus on conservation and poverty alleviation.

The approach discussed in this guidebook can be used to plan restoration in a variety of ecosystems, including grasslands, pasturelands, farmlands, coastal zones, wetlands, and peatlands. However, the primary focus of the guide is on a landscape approach to tree-based restoration.

Source: WRI authors.



About This Guidebook

This publication aims to provide an accessible framework to guide restoration planners and practitioners—new project developers, funders, and implementers—through the various stages of the restoration planning and decision-making process using a landscape approach. Focusing on five simple stages in project planning—Scope, Design, Finance, Implement, and Monitor—this framework guides users through identifying their restoration goals, scoping the available opportunities, designing their restoration interventions, securing sources of finance, preparing for implementation, and monitoring project performance to determine a long-term management strategy. The guidebook enables restoration planners and practitioners to conceptualize a project from start to finish while integrating good practices gathered from a variety of restoration practitioners. The guidebook can also be used in ongoing restoration projects to fill in any gaps and reassess considerations. It pays close attention to the ecological, social, and economic conditions necessary for a project to be effective in the long term, such as social inclusion, gender, extent of forest fragmentation, soil health, risk management, partnerships, financing, monitoring, and adaptive management and governance aspects.

Although every restoration project is different, this general framework was developed to be applicable to any restoration project and is designed to help

make restoration projects both impactful and scalable. Once restoration planners and practitioners have a clear understanding of the guiding principles (social, economic, and ecological), processes, and resources necessary to conduct restoration, they are more likely to move toward implementation and have enough information to move forward with their restoration goals. If widely adopted, this restoration launchpad can help scale restoration operations to support global restoration commitments. Although a simplification, this guide seeks to provide a starting point and useful checklist for those seeking to undertake restoration.

A methodological note in Appendix A discusses how this guidebook and the associated framework was developed. What sets this publication apart is its holistic and simple approach that can help many different practitioners and project developers conceptualize their projects. Existing manuals are specific to a practice, biome, or project, and can be either too general or too specific to be useful beyond a single case. The framework suggested here aims to solve that problem by serving as a succinct yet comprehensive map of how to plan a restoration project.

Audience

This guide is primarily intended for a wide range of actors across the public and private spheres who are seeking a roadmap for landscape restoration during the various stages of their project. Those stakeholders

may be new project developers, including individuals or organizations that have overall control and responsibility for developing a restoration project; funders like philanthropic organizations and development banks; and implementers, such as non-government organizations (NGOs) or local community groups recognized as rights-holders for owning and managing land. Experienced implementers and project developers, however, may still find the guide useful for more nuanced planning and adaptive governance and management.

Therefore, in this guidebook, a “restoration planner and practitioner” refers to any stakeholder or group of stakeholders who are intentionally conducting restoration with specific objectives in mind. Restoration planners and practitioners can span several capacities, from grassroots organizers to social entrepreneurs, to large-scale investors in restoration. This guidebook can be used to assist any project developer, including local communities, government agencies, businesses, and NGOs with a set of guiding considerations.

Scope of the Guide

This guide is based upon the collective knowledge and experience of the authors. It did not set out to include every restoration initiative globally and certain large-scale projects, such as the Great Green Wall, were omitted from our analysis. While the analysis was supported by desk research, the

framework was predominantly created from on-the-ground experience and drawn from case studies known to the authors.

“Restoration” in this guide includes a wide range of goals, from food security to biodiversity conservation, as outlined in *The Road to Restoration* and the goal wheel depicted in Figure 1 (FAO and WRI 2019). In order to make the guide user-friendly, it was necessary to present a simplified framework. While this framework may not fit every type of restoration intervention, the aim is to provide an overview that will allow for adaptation. Since the United Nations (UN) Decade of Ecosystem Restoration (2021–2030) has led to a surge in publications, some recent key publications may be missing from this analysis.

Most of the restoration examples feature trees as the primary form of restoration intervention, whether this is through agroforestry or natural regeneration. Natural regeneration is considered an important key restoration practice and can be identified during the planning stage for site-specific interventions. For instance, restoration at times is about removing the invasive species, removing fences, or reintroducing fire so that natural regeneration can occur. The authors also recognize that tree-based interventions are not always a viable option or recommended, depending on the landscape; for example, open natural ecosystems need to be valued as such for the multiple ecosystem benefits they provide. The guide presents restoration as including value chains of

commodities or restoration products from the landscapes. The approach, stages, and principles discussed in this guide have wider scope and applicability and can be used in other open natural ecosystem projects, including marine landscapes (such as seaforestation) and other landscapes where trees are not the primary restoration intervention, as in other terrestrial open natural ecosystems like grasslands and savanna. Note that these other ecosystems are not explicitly discussed in this guide.

How to Use This Guide

We identified five essential stages of restoration projects—Scope, Design, Finance, Implement, and Monitor—that were found to be common to every restoration project. Each stage explores the most essential steps to conduct restoration effectively, followed by a series of checklists outlining the most important factors to consider before proceeding to the next stage of the planning and implementation process. After reviewing each section, users may refer to the checklists to mark off which topics have been considered in their own planning process thus far. Not every consideration will be applicable to every restoration initiative on the ground, but users can ensure that all necessary steps have been reviewed while keeping track of their progress.







STAGE 1.

SCOPE:

WHAT KIND OF RESTORATION INITIATIVE OR PROJECT SHOULD YOU PURSUE?

Restoration planners and practitioners should assess whether the current enabling environment is sufficiently supportive before undertaking any further action on a restoration initiative.

Every restoration initiative differs in its goals, climate conditions, or vegetation species, and also in the prevailing enabling conditions determined by laws and policies, markets, and the modalities of implementation and governance. The “Scope” checklist and explanation that follow were created to help planners and practitioners anywhere make an informed assessment of their situation before continuing.

This stage involves selecting relevant restoration goals; prioritizing projects with the greatest potential for environmental, social, and economic impact; identifying potential risks and their mitigators; and selecting a project site that offers unique value to multiple stakeholders and is steered and led by local communities’ priorities.

A. DEFINE RESTORATION GOALS

Restoration practitioners and entrepreneurs are restoring landscapes in response to several economic, social, and environmental drivers, such as climate change mitigation and adaptation, water or food security, government incentives, and emerging markets for restoration offerings. Moreover, restoration can directly improve livelihoods by creating green jobs, establishing new and sustainable industries in rural areas, improving yields, or addressing drivers of degradation in the target landscape.

The first step for any restoration planner and practitioner is to identify why you want to restore land. This should be a community-driven and inclusive process guided by local priorities. That initial set of

decisions helps clarify the next steps that you will need to take to design, finance, implement, and monitor a successful project. Here, we have classified both the commercial and non-commercial objectives of restoration under eight larger goals or themes (“goal-themes”): biodiversity, culture, community, food and products, climate, soil, water, and energy (FAO and WRI 2019).

Extensive research on principles underlying restoration practices has led to a broad consensus that planners and practitioners should consider key principles that both underpin practice and guide specific criteria and indicators for forest protection. Adherence to such principles is necessary if landscape restoration interventions are to be successful. For instance, actively engage communities as agents of change, and unpack and strengthen resource tenure for marginalized groups. For more information see:

- “Ten people-centered rules for socially sustainable ecosystem restoration,” by Elias et al. (2021);
- “The political ecology playbook for ecosystem restoration: Principles for effective, equitable, and transformative landscapes,” by Osborne et al. (2021);
- “Principles for ecosystem restoration to guide the United Nations Decade 2021–2030” (FAO et al. 2021); and
- “International principles and standards for the practice of ecological restoration,” by Gann et al. (2019).

Defining restoration goals should be a community-driven and inclusive process. Restoration planners

and practitioners should consider which goal-themes their restoration priorities fall under, while recognizing that they cannot achieve goals related to every goal-theme (See Table 1). The goal-themes presented here can be tailored to a project’s needs and serve as a point of reference. Building in local stakeholder priorities and planning for socially inclusive and community-driven restoration should be the priority of every restoration planner and practitioner. Figure 1 demonstrates how a restoration planner and practitioner might narrow the focus of intervention according to their priorities, moving from all of the potential goal-themes to focus on elements of biodiversity, culture, community, climate, and water. It may be a helpful practice for planners and practitioners to list the specific goal-themes and intended foci of their projects before scoping potential project sites; in some cases, the determination of goal-themes and foci may depend on the site chosen.

Consider:

- ☐ Why is landscape restoration needed?
- ☐ What are the land use or ecological challenges that landscape restoration can address?
- ☐ How will you make your goals actionable?
- ☐ What are the desired outcomes?
- ☐ What are the key principles that will guide the restoration initiative on the ground?
- ☐ Are the goals defined through a community-driven and inclusive process?
- ☐ How can you improve the livelihoods of forest-dependent people?

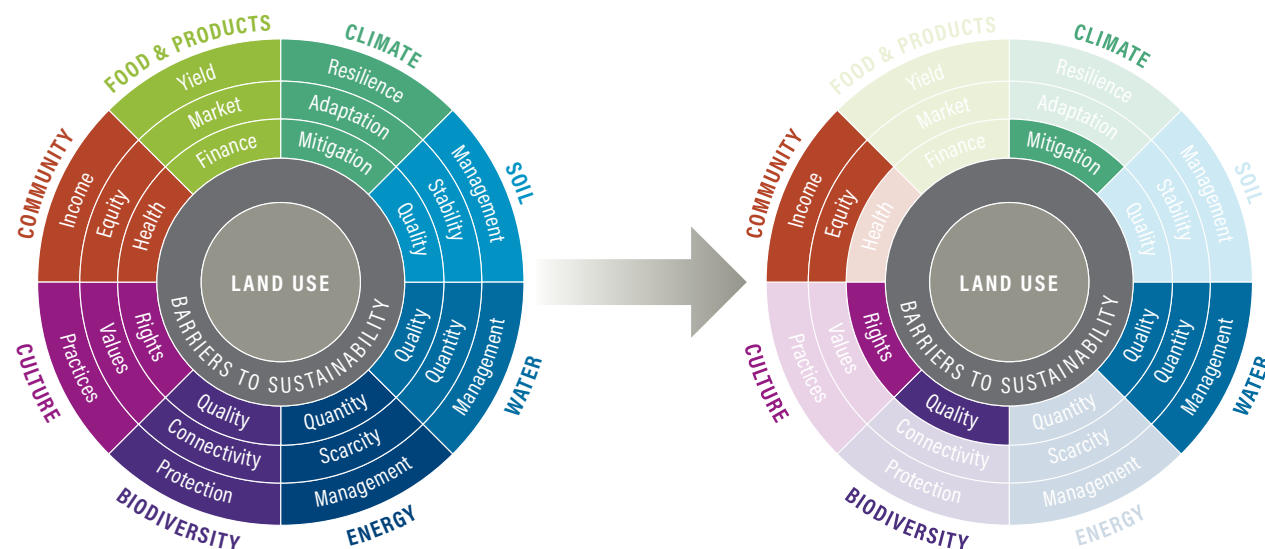
To learn more about key indicators to measure different restoration priorities and restoration goals with global examples, please see *The Road to Restoration* (FAO and WRI 2019).

Table 1 | **Goals and Priorities for Landscape Restoration**

GOAL-THEME	FOCUS	RATIONALE
Biodiversity	▪ Natural habitat protection ▪ Habitat connectivity ▪ Biodiversity quality through abundance of flora and fauna	Restoration creates and enlarges habitats and connects fragmented landscapes, improving the ecological conditions for plant and animal species. Direct introduction of diverse species can also constitute restoration, as well as natural regeneration.
Culture	▪ Local cultural practices and multiple forms of knowledge, including traditional knowledge ▪ Stakeholder values ▪ Land ownership and rights	The knowledge, value, and tenure systems (including tree tenure) of many communities are linked to how they interact with physical landscapes. It is important to consider how revitalizing a landscape will affect the local culture and traditional knowledge.
Community	▪ Income ▪ Equity ▪ Health	Restoration expands the livelihood options available to communities, especially women and marginalized sections (like indigenous groups, small and marginal land holders, landless, and those belonging to a disadvantaged caste or race), creating economic opportunity and improving well-being.
Food and Products	▪ Restoration product yield ▪ Market value ▪ Available financing	Healthy landscapes are more productive. Local people—especially youth, women, and marginalized sections—benefit from higher yields of forestry products, non-timber forest products, crops, and healthier and nutritionally-diverse diets.
Climate	▪ Resilience ▪ Adaptation ▪ Mitigation	Forests and trees sequester carbon in biomass and soils, helping to mitigate climate change. Landscapes need resilience and adaptation measures to protect against current and future pressures from climate change.
Soil	▪ Improved soil-related land-use management through sustainable and regenerative agriculture, watershed management ▪ Soil stability ▪ Soil health	The restoration of root systems, understory growth, and leaf litter help stabilize the soil, increase organic matter, and promote nutrient cycling. This can be paired with a package of sustainable and regenerative agricultural practices which will further improve soil health.
Water	▪ Improved water-related land-use management ▪ Water quantity ▪ Water quality	Vegetation reduces surface runoff and erosion, thereby controlling the amount of sediment and pollutants that flows through the watershed. Restoration can improve water quality and help manage water quantity. Restoration can also include rejuvenating the land to retain more water.
Energy	▪ Fuel wood management ▪ Energy scarcity ▪ Energy quantity	Restoration interventions can help provide sustainable sources of energy such as fuelwood. The need for fuelwood is an important driver of deforestation in some regions. Alternative and sustainable sources of energy are also needed.
Timber	▪ Sustainable harvesting ▪ Market value	Restoration interventions can provide sustainably managed areas for timber to meet the demands of industry and a region's developmental priorities.

Source: Adapted from FAO and WRI 2019.

Figure 1 | **Determining Goal- and Sub-Themes Using the Restoration Monitoring Wheel**



Source: FAO and WRI 2019.

B. MAP RESTORATION OPPORTUNITIES AND PRIORITIZE TARGET LANDSCAPE

It is critical to scope out where restoration opportunities exist, and then which opportunities align most with your selected goals. This section reviews the methodology for prioritizing landscapes: assessing the need for restoration, consulting the stakeholders involved, weighing the rewards against trade-offs, and understanding the characteristics of a given landscape (IUCN and WRI 2014).

In this section, we use an example from India to illustrate how to map restoration opportunities and identify interventions steered by local community priorities and interests using a landscape approach.

Restoration planners and practitioners must consider and plan systematically for restoration, taking into account the larger landscape and social, economic, and ecological factors. Figure 2 illustrates six components of a restoration opportunity assessment:

- Restoration potential mapping: Spatial analysis of restoration potential and the associated restoration interventions
- Ecosystems services analysis: An examination of the multiple ecosystem services that could flow from the identified restoration interventions
- Enabling conditions analysis: Policy, legal, and institutional conditions determined by the presence or absence of success factors for restoration
- Social landscape analysis: Which key stakeholders to engage
- Livelihood benefits analysis: Livelihood benefits associated with the identified restoration interventions
- Cost analysis: Identification of financing and resourcing options for implementing the priority restoration interventions



Figure 2 | **Components of an Adjusted Restoration Opportunity Assessment Methodology (ROAM) for Sidhi, India, That Enables Following a Landscape Approach**



Singh et al. (2020) used a combination of remote sensing imagery, stakeholder consultation, household surveys, focus group discussions at the village level, and a review of secondary data to determine restoration potential, and to analyze the enabling conditions, ecosystem services, social landscapes, livelihood benefits, and costs by region.

Consider:

- ☐ What is the total extent of restoration opportunities?
- ☐ What incentives exist?
- ☐ Who are the stakeholders that need to be engaged?
- ☐ What are the costs and benefits, and with whom are the benefits shared?
- ☐ Where is restoration socially, economically, and ecologically feasible?

For in-depth and step-by-step guidance on how to (spatially) map and identify potential restoration areas, engage stakeholders, and conduct data collection and analysis, please see the “Restoration Opportunities Assessment Methodology” (ROAM) (IUCN and WRI 2014). “Gender-Responsive Restoration Guidelines” further outlines step-by-step guidance on how to consider gender while assessing restoration opportunity assessment (IUCN 2017).

For a more nuanced look at incorporating inclusion, multiple ecosystem services, livelihoods, and governance considerations while planning on-the-ground initiatives, see the adjusted ROAM findings for Madhya Pradesh, India, in “Restoring Landscapes in India for Climate and Communities” (Singh et al. 2020).

Source: Singh et al. 2020.

Need for restoration

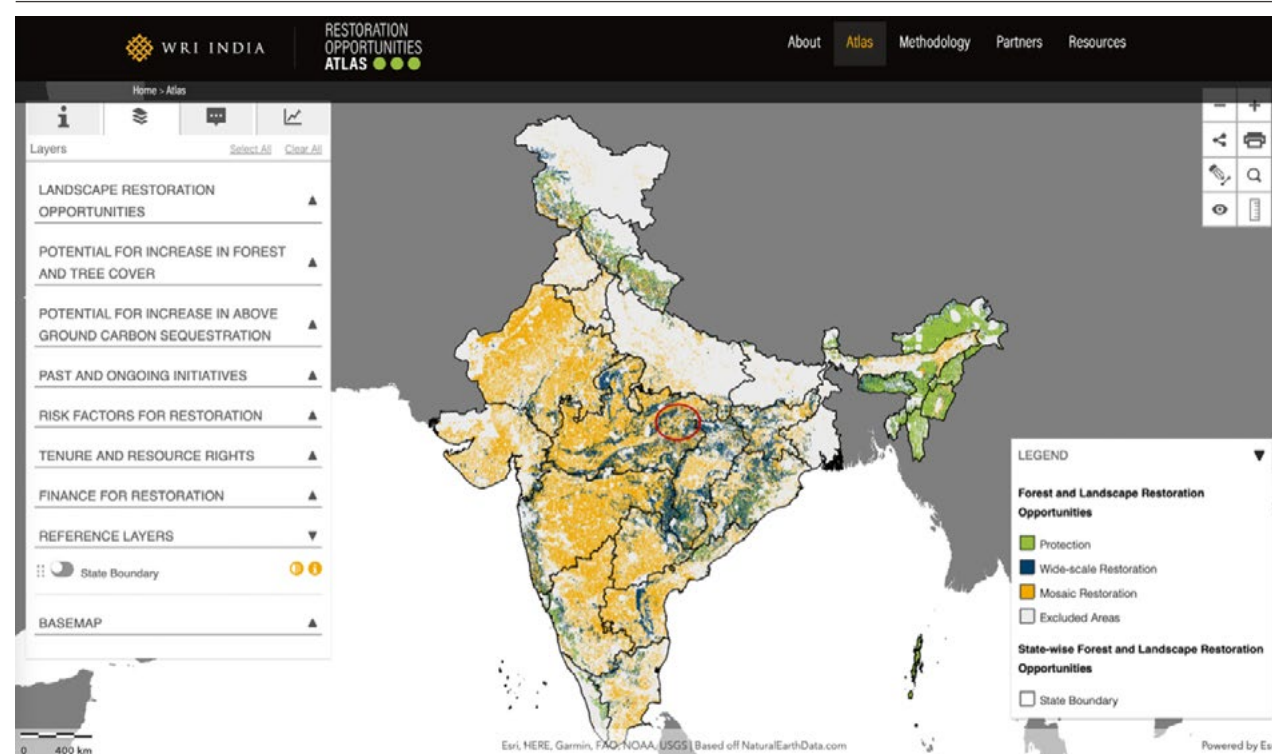
The restoration opportunity components (Figure 2) and underlying data and information help determine where there is the greatest need for restoration—taking into account local and socially inclusive priorities—that can lead to multiple livelihoods and ecosystem benefits. These data may be available through partners at a regional level or more broadly through global or national assessments. For example, Figures 3 and 4, respectively, show landscape restoration opportunities of more than 100 ha in India and

the potential for landscape restoration (more than 300,000 ha) by sub-district in India's Sidhi district. The maps are based on data from Indian national and sub-national assessments and social landscape mapping (Singh et al. 2020). They were created by adapting the ROAM methodology, which aggregates both scientific data and local expertise to determine where restoration is feasible at the national and sub-national levels (IUCN and WRI 2014).

Figure 3 illustrates the information from the Restoration Opportunities Atlas (<https://india.restorationatlas.org>) for India, developed by WRI India.

The Atlas combines publicly available national data-sets shared by partners under several data-sharing agreements, together showing that nearly 140 Mha in India present opportunities for forest protection and landscape restoration. The Atlas enables restoration planners and practitioners to identify where there is potential for increase in forest and tree cover and carbon sequestration, where there are past and ongoing initiatives, where risk factors may exist, where tenure and resource rights are of interest, and where restoration finance is available. Similar information is available using the atlases specific for other countries, as mentioned later in this section, as well as through respective national and sub-national assessments. Figure 4 then categorizes opportunities by restoration, conservation, and protection based on the ecological and social factors of each sub-district in Sidhi.

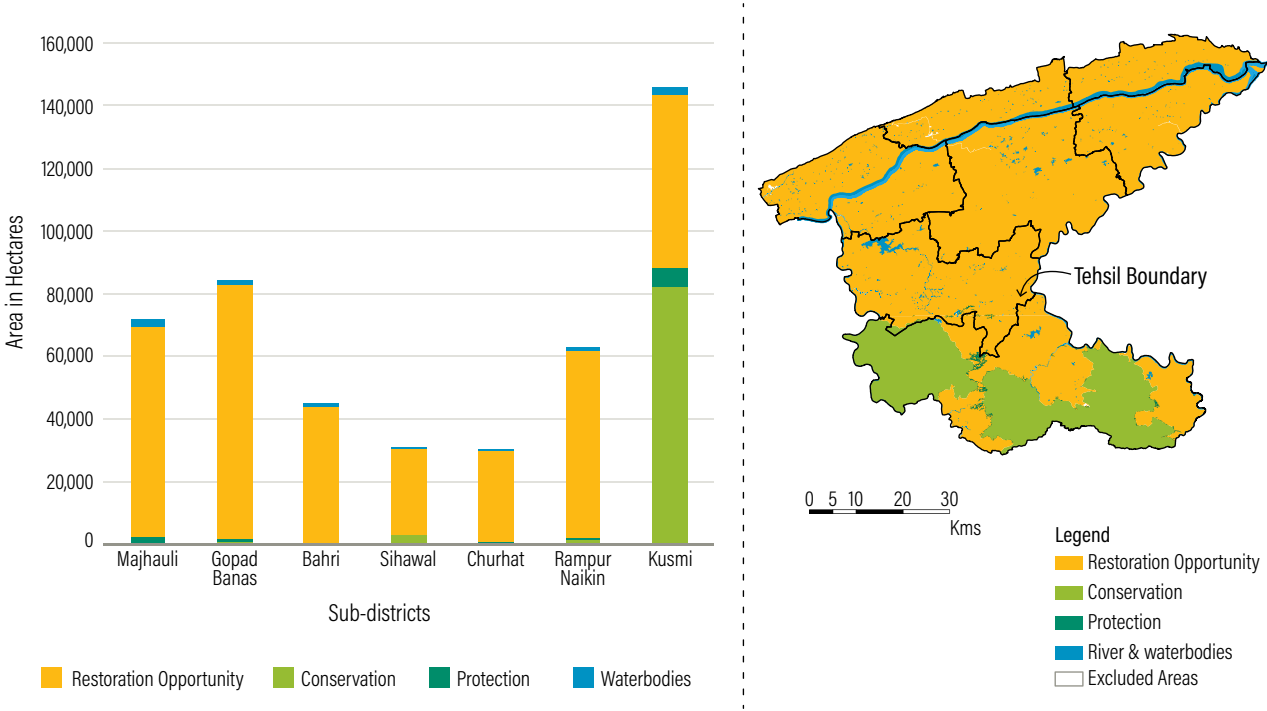
Figure 3 | **Landscape Restoration Opportunities in India**



Note: The circle in red highlights the region where Sidhi district is located; map not to scale.

Source: WRI India 2018.

Figure 4 | Potential for Landscape Restoration, Conservation, and Protection by Sub-Districts (Tehsils) of Sidhi, India



Note: Protected areas were delineated as areas for conservation. Those in Sidhi district, for instance, include the Sanjay Dubri tiger reserve and the Son Gharial Sanctuary. Additionally, areas where there are existing forests outside of protected areas with dense canopy cover (approx. 70%) are prioritized for protection. The areas with no potential for tree-based restoration or that were unsuitable for tree-based restoration were excluded from the restoration opportunity assessment. These primarily included waterbodies and built-up areas. The remaining area, after excluding the area of protection, conservation, and exclusion, was categorized as area available for restoration.

Source: Singh et al. 2020.

In other countries or regions, restoration planners and practitioners may similarly consult and gather data from forest, land, rural development, or agricultural agencies; local government officials or leaders; companies; farmers and landowners; forest users; NGOs; or researchers, depending on the scale of the restoration initiative.

Consider:

- Where is landscape degradation or fragmentation most severe?
- Which restoration interventions are needed where, and what is the estimated impact?
- In which regions could you best pursue your restoration goals?

Mapping the scale of affected areas and identifying the drivers of degradation and land use challenges will help determine which interventions align most with your restoration goals. Beyond the need for restoration, you should also understand which interventions are available to you based on type and potential in each landscape, the scope and availability of the land itself, and where restoration can be socially inclusive of marginalized communities (IUCN and WRI 2014). “Type” refers to the nature of human interventions in the continuum, from planting to natural regeneration, while “potential” refers to the projected ecological, social, and economic impact of the intervention. Beyond that, “scope” refers to how much and what kind of land is appropriate

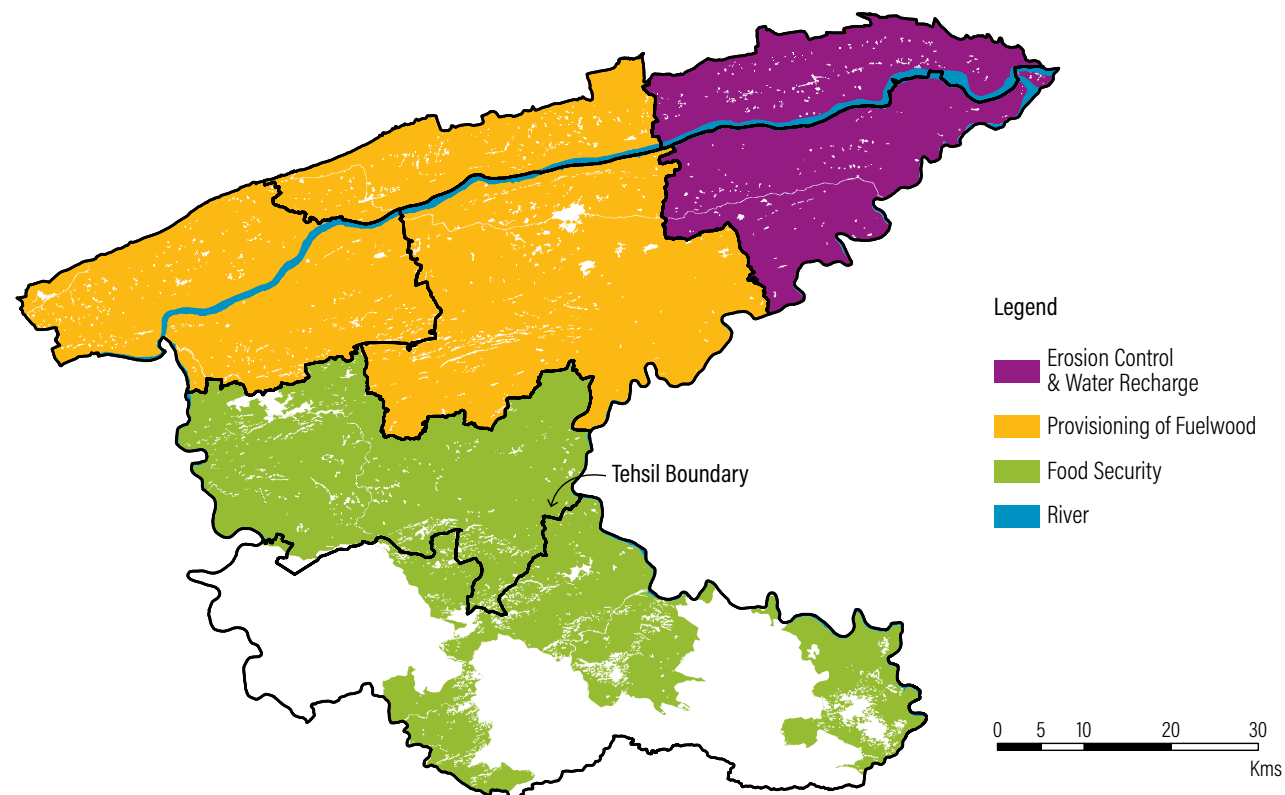
for restoration, and “availability” refers to whether land tenure and rights have been fairly secured by the project developer. Note that the drivers of degradation must be addressed prior to any designed intervention taking place.

Figures 5 and 6 illustrate where in India’s Sidhi district there are opportunities for flow of ecosystem service benefits and where each type of restoration intervention could feasibly work. Figure 5 illustrates opportunities where land is both degraded and recommended for restoration, as well as where restoration could also provide other ecosystem services, such as erosion control and food security.

For a visual summary of the opportunity assessment methodology that was applied at the sub-national level, please see “Restoring Landscapes in India For Climate and Communities” (Singh et al. 2020).



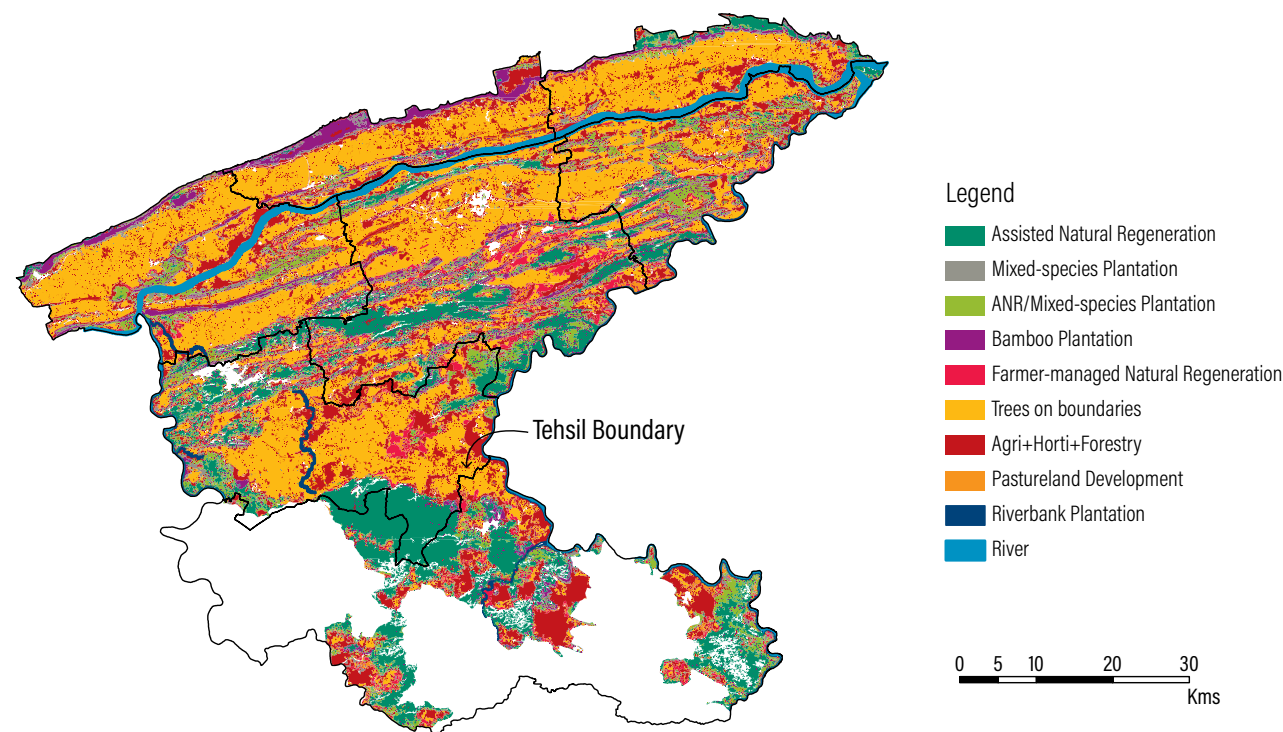
Figure 5 | **Ecosystem Services Benefits from Landscape Restoration Interventions in Sidhi, India**



Note: White areas in the maps do not need restoration, so are excluded areas to be prioritized for conservation and protection.

Source : Singh et al. 2020.

Figure 6 | **Recommended Landscape Restoration Interventions in Sidhi, India**



Note: These recommendations were identified through a participatory consultative process. White areas in the maps are excluded areas to be prioritized for conservation and protection.

Source: Singh et al. 2020.

To view similar priority regions for forest and landscape restoration across the world, see the Atlas of Forest and Landscape Restoration Opportunities (WRI 2014), the Restoration Opportunities Atlas (India) (WRI India 2018), and forest and landscape restoration activities by country, like the national forest landscape restoration strategy of Malawi. We

recommend that those implementing tree-based restorations identify priority areas for restoration by excluding wooded and non-wooded savannas and grasslands, using best available data. For instance, the Indian Atlas for Restoration Opportunities excluded grasslands based on the most advanced publicly available and shareable data in 2018.

After viewing priority regions for landscape restoration, it may be necessary to contact government or research partners to determine whether a detailed country-level assessment, or the technical assistance to conduct one, is available.

Assessing existing initiatives and incentives

Many governments around the world have enacted policies that incentivize restoration, so restoration planners and practitioners should look closely at local laws to see if they qualify for any subsidies, incentives, or technical support. India has enacted several national and sub-national policies and schemes with incentives that motivate farmers to grow trees outside of recorded forest areas (Duraismi et al. 2022). The National Mission for Sustainable Agriculture in India, for example, promotes agroforestry through a dedicated Sub-Mission on Agroforestry by sharing relevant technologies, piloting agroforestry projects, engaging partners, and encouraging integrated farming systems (DoAFW n.d.).

Alongside commitments to initiatives like the global Bonn Challenge, Aichi Biodiversity targets, Initiative 20x20, and AFR100, several governments have incorporated landscape restoration into their nationally determined contributions (NDC) to the Paris Agreement, land degradation neutrality (LDN) targets, and under the UN Sustainable Development Goals (SDGs) (see Appendix B). Aligning your project with these commitments can help unlock partnerships and funding. If the landscapes you have identified fall into priority regions, you

should determine if you qualify for any support or incentives. Technical partners such as local forest, land, rural development, and agricultural agencies, as well as local NGOs and networks, will likely have more information on which initiatives and actors are well-aligned with national and regional priorities. There are also benefits of reaching net zero or being climate positive, from a brand perspective, for the private sector (WEF 2021).

Consider:

- ☐ Is there overlap between your identified landscapes and existing initiatives?
- ☐ Has the government in your geography set restoration objectives that you can contribute to?
- ☐ What benefits can you leverage on a global/continental/national/regional level?

Stakeholder mapping and engagement

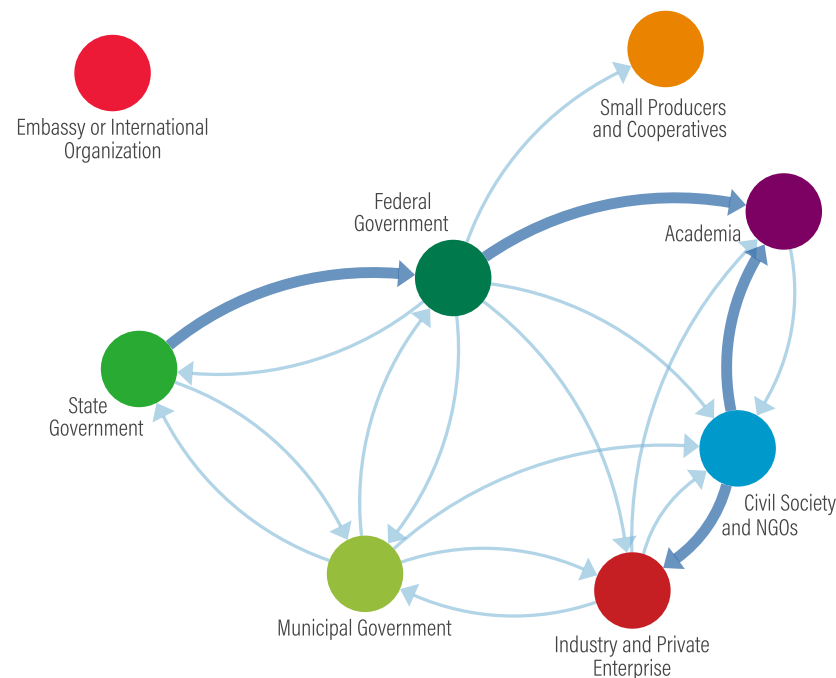
You need to assess the network of stakeholders, their priorities and values, and their relationships in your identified landscapes. Tapping into existing networks can help you address the technology, capacity, or business expertise that you may lack or need, as well as amplify the voices of women and marginalized communities who are otherwise left out. By mapping this social landscape—identifying all of the actors, how they interact, and how they exchange information, funding, and even seeds—on top of the more familiar biophysical landscape, you can understand which networks might make the most efficient use of restoration resources provided, improve your col-

laboration and outreach, and anticipate conflicts and bottlenecks (Buckingham et al. 2018). For example, Figure 7 shows how actors in a social landscape in Carmen, Mexico, may connect and interact with each other, and how strong the connection between them may be. It may be helpful to visualize the connections between specific institutions and stakeholders in your local landscape in the same way.

Moreover, the local communities living in the landscape and around the project are the primary agents of the improved economic, social, and ecological services—they are the people who should

be steering restoration initiatives on the ground, and you are likely relying on them to successfully restore land. However, local people can be the most vulnerable in the case of poorly planned initiatives. Restoration projects may be undermined if they do not ensure that the direct benefits of growing trees or forest protection flow to the local community, if the benefits are not communicated clearly enough, if people's short-term economic needs are not met, or if local tenurial and resource rights are not recognized. Each community is different; therefore, it is crucial to engage with people to ensure that local priorities steer the consultation process and obtain

Figure 7 | **Connections among Sectoral Actors in Carmen, Mexico**



Note: The thickness of lines denotes strength of connection between actors.

Source: Buckingham et al. 2018.

prior informed consent from the community before proceeding to the next planning stages. You should also establish mechanisms to directly share the benefits of restoration, compensate fairly, and resolve potential conflicts to help maintain the project’s success (Gann et al. 2019; ITTO 2020).

Restoration planners and practitioners should scope and design projects that are equitable, socially inclusive, and just, not only ecologically sound. Restoration planners and practitioners must consider structural inequities driven by, for instance, place, gender, race, class, caste, and culture—which determines how local communities interact with the environment and each other—and how power operates through the local social, political, and economic context (Singh et al. 2021). Key principles at local, national, and international levels like those outlined by Osborne et al. (2021), or the rules for planning socially sustainable ecosystem restoration by Elias et al. (2021), are crucial for restoration initiatives to create effective, equitable, and transformative landscapes.

Consider:

- ☐ What are the priorities and needs of key stakeholders in each identified landscape?
- ☐ What are the connections and relationships among them?
- ☐ Can you feasibly secure the support of diverse stakeholders for the project?
- ☐ Have you consulted the local community and established equitable benefit-sharing systems?

Learn more about how to apply the methodology to better understand landscape governance in

“Mapping Social Landscapes,” by Buckingham et al. (2018), which includes mapping actors’ resource flows and mapping their priorities and values, and understanding power dynamics in a study area with global examples from Brazil, India, Indonesia, and Rwanda.

C. ANALYZE COSTS AND BENEFITS AND ASSOCIATED TRADE-OFFS AND RISKS

Understanding the costs and benefits, trade-offs, and risks that exist within the prioritized landscapes can help define which projects are socially, economically, and ecologically feasible (IUCN and WRI 2014). You can analyze each landscape by comparing which initiative may have the greatest benefits or scope of impact, then identify which risks can and cannot be mitigated. To support any future funding activity, it can be helpful to conduct an economic analysis of restoration opportunities—just one of the dimensions you may consider alongside social and ecological benefits. For example, an assessment of landscape restoration opportunity in just one district in central India estimated that restoring land could generate US\$9.8 million in wages and 30,000 jobs, while also restoring ecological function to the degraded or unproductive area (Singh et al. 2020).

Every project comes with an element of risk, but early and active risk management will prevent disruptions to the project’s key activities and resources as you move to the next stages of the planning process (Table 2).

Table 2 | **Types of Risks to Consider in Restoration Initiatives**

TYPE OF RISK	EXAMPLES
Ecosystems	Flooding, pollution, fires, biodiversity loss, invasive plants and animals, or unsustainable resource extraction
Legal and policy	Non-compliance with contracts, permits, specifications, laws, and policies, or lack of land rights
Operational	Disruptions to seed network, supply chain, infrastructure, or business operations
Economic and financial	Economic uncertainty, recession, competition, price volatility, or loss of revenue
Human and cultural	Conflict around workers incentives, health and safety, pandemics, or equitable benefit sharing
Other	Political risk, reputational risk, strategic risk, or coordination risk

Sources: Adapted from Boitnott 2019; Singh et al. 2020; and FAO and WRI 2019.

There can be multiple kinds of trade-offs, so understanding and optimizing them while pursuing restoration goals is key. Figure 8 illustrates a set of examples that could exist in a particular landscape. The goals of restoration might be complementary or in conflict with each other; for example, energy and biodiversity needs may be challenging to reconcile. Another example is from Sidhi district in India. While discussing priority ecosystem services desired from restoration, upper caste farmers with large landholdings preferred farm forestry as an intervention. In contrast, small and marginal landholders from scheduled castes¹ and scheduled tribes (Adivasis or indigenous population)² preferred growing home gardens or trees on farm bunds and

boundaries to supplement their energy and other domestic requirements.

Consider:

- ☐ What kinds of trade-offs and risks exist and to what extent can they influence a project?
- ☐ What resources do you require to mitigate any potential risks?
- ☐ Do the potential benefits of the project outweigh the costs?
- ☐ Who do these risks impact? If impacting vulnerable groups, what plans can be put in place to shield them from these risks?

D. SELECT TARGET LANDSCAPE

Selecting a project site can be a complex question facing a new project developer; multiple laws and customary practices can overlap or contradict each other, while land use and land ownership patterns can vary greatly. Now that you have considered the restoration potential, prioritized the most appropriate landscapes, and considered trade-offs and risks, you can select a target landscape and assess its requirements.

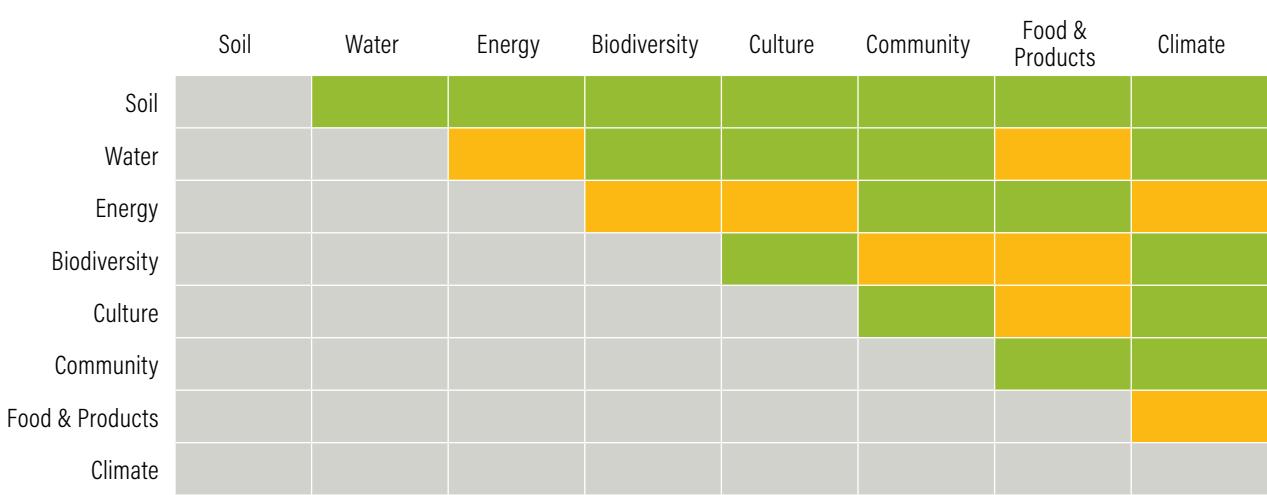
Consider:

- ☐ What kind of landscape is the project operating within and what are its key features?
- ☐ What scale of project can the landscape support?
- ☐ Do I have the rights to use and manage the land and its products?
- ☐ What policies do I need to comply with before I can start the project?

A global analysis of historical case studies indicates that successful restoration projects are likely to exhibit three common themes: a clear motivation, enabling conditions in place, and capacity and resources for sustainable implementation.

Building on these insights, Hanson et al. (2015) developed “The Restoration Diagnostic,” which outlines a three-step process for developing strategies to increase the likelihood of achieving successful forest landscape restoration. Consult that source to learn more about how restoration planners and

Figure 8 | **Understanding Trade-Offs among Goal-Themes of Restoration**



Note: Green indicates complementarity in goal-themes; orange indicates the risk of conflict.
Source: FAO and WRI 2019.

practitioners could plan strategies for restoration in a landscape by understanding key enabling, motivating, and implementing conditions.

Current land use

Land can be used in many ways—as natural environments like forests and wetlands, or human environments like croplands, pasturelands, and urban areas. The current use of the land that you are restoring can determine the areas of focus for your restoration goals, which laws and policies you must adhere to, which incentives you can tap into, and later, how you conduct the restoration interventions. Common land uses are described in Table 3. Based on the current land use and the extent of degradation or fragmentation for the selected landscape, you can further translate your restoration goals into specific targets and objectives in accordance with the landscape’s characteristics and capacity (Chazdon et al. 2016). For example, if the landscape is degraded peatland,

your restoration goals may be tailored toward restoring ecosystem services such as carbon capture and storage. If the land is being used for timber, the land may not provide/offer other ecosystem services, such as carbon storage, or permit recovery of biodiversity.

Consider:

- ☐ How much degraded land is available to be restored that does not conflict with other land use needs such as food, fiber, and energy production?
- ☐ What is the potential value for timber, non-timber, and/or ecosystem services, such as carbon storage and removal?
- ☐ Are forests natural or planted?
- ☐ Are forests pre-existing or newly established?
- ☐ Are forests composed of native or non-native species?

Land characteristics

You must determine if the land can or should ecologically support the landscape restoration intervention. For example, restoring shrublands through tree-based interventions may not be ecologically appropriate in many areas; shrublands may require removal of trees for ecosystem restoration. Furthermore, considering the soil characteristics is crucial because some soil types support trees better than others, and more heavily degraded land (such as mining areas) often takes longer to recover and may require more targeted restoration interventions. Assessing the properties described in Table 4 can help you select the most appropriate site.

Table 4 | Types of Land Characteristics

PROPERTY	DESCRIPTION
Biophysical	Soil class: Water-holding capacity, permeability, and workability of soil may determine what species can be planted.
	Topography: Physical features of land, such as hills, valleys, and rivers may influence access to natural resources.
	Slope: Gradient or incline of land may influence planting design and access to infrastructure.
Climactic	Rainfall: Rainfall patterns may influence planting season and irrigation systems.
	Temperature: Temperature patterns may determine what species can be planted and planting season.
	Sunlight: Access to sunlight may determine what species can be planted and planting design.

Source: Wang et al. 2016.

Table 3 | Example Classification of Common Types of Land Uses

CURRENT LAND USE	DESCRIPTION
Pastureland	Degraded pasture that can benefit from restoration interventions like silvo pasture
Cropland	Arable and tillage land where the primary use is the cultivation of crops
Forest	Land with very high levels of trees, either natural or managed
Industrial land	Land used primarily for an industrial use, such as former mines
Mangrove	Land where mangrove forests are the natural tree cover
Peatland	Ecosystems with a peat deposit (dead and partially decomposed plant remains that have accumulated over time) that may or may not currently support vegetation that is peat-forming or may lack vegetation entirely
Settlement	Areas where there are human settlements and other human infrastructure
Wetland	Land that is covered or saturated by water for all or part of the year

Source: Adapted from ILG 2010.

The available climatic information is based on past trends. Where available, climate projections and vulnerability or resilience assessment studies should be considered to incorporate changes in weather patterns and climate-induced exposure and risks for local communities and how planned restoration interventions could mitigate the risks. It also can help communities adapt to climate impacts by increasing the productivity of landscapes and enhancing the resilience of ecosystems to external shocks like natural disasters (Stanturf et al. 2015).

Location and size

The location and size of the landholding can limit how you restore and the type of funding that you can access. Define the boundaries of the project and understand whether the land you are operating on is contiguous—one large parcel or a scattering of small holdings.

Land tenure and resource rights

You should consider who has tenure, or who owns and has rights to the land and trees, because conflict over land, trees, and their products can jeopardize a project's success (see Table 5). Additionally, land tenure can have a significant impact on how you decide to restore the land, what kind of funding you raise, and who you partner with.

Table 5 | **Types of Land Tenure and Resource Rights**

LAND TENURE	DESCRIPTION
State	Property rights are assigned to some authority in the public sector. <i>For example, in some countries, forest lands may fall under the mandate of the state, whether at a central or decentralized level of government.</i>
Private	Rights are assigned to a private party, which may be an individual, a married couple, a group of people, or a corporate body such as a commercial entity or non-profit organization. Private land ownership allows different sets of rights, depending on country or local laws. <i>For example, within a community, individual families may have exclusive rights to residential parcels, agricultural parcels, and certain trees. Other members of the community can be excluded from using these resources without the consent of those who hold the rights.</i>
Communal	A right of commons may exist within a community, in which each member has a right to use independently the holdings of the community. <i>For example, members of a community may have the right to graze cattle on a common pasture.</i>
Open access	Specific rights are not assigned to anyone, and no one can be excluded. This typically includes tenure and resource rights access for rangelands, forests, etc. An important difference between open access and communal systems is that under a communal system, non-members of the community are excluded from using the common areas.

Source: FAO 2002.

If the land is owned by community or indigenous groups, you should carry out extensive community consultations and engagement before proceeding. Moreover, land and tree tenure is often gendered, so you should ensure that there is equal opportunity to access land and the benefits of restoration. For instance, in India, studies indicate that men manage and control high-valued fruit trees and timber, while women have limited access (Bose 2015).

In addition to ownership, land tenure includes use rights, control rights, and transfer rights, as defined below (FAO 2002).

- **Use rights:** Rights to use the land for grazing, growing subsistence crops, gathering minor forest products, and so on
- **Control rights:** Rights to make decisions regarding how the land should be used—for instance, what crops should be planted—and to benefit financially from the sale of crops, and so on
- **Transfer rights:** Rights to sell or mortgage the land, to convey the land to others through intra-community reallocations, to transmit the land to heirs through inheritance, and to reallocate use and control rights

You should also check to ensure that the tenure system and resource rights do not infringe on customary rights, or the passing down of land through custom within the local community and indigenous groups (Hanson et al. 2015). If your land and resource rights are not clearly defined, you should consider seeking legal support from local NGOs or other agencies who may provide guidance on securing your or your project partners' right to the land and its resources before continuing.

Consider:

- ☐ Have you conducted community consultations?
- ☐ Are the land and resource rights for the target landscape clearly defined and recognized?
- ☐ Has everyone been fairly compensated for these rights?

For more step-by-step guidance on approaching land tenure in project design, see “Land Tenure and Rural Development” (FAO 2002). For a deeper understanding of how to strategize for recognizing women's land rights in your project area, see “On Equal Ground: Promising Practices for Realizing Women's Rights in Collectively Held Lands” (Salcedo-La Viña and Giovarelli 2021). The authors offer recommendations on critical enabling factors to consider for securing women's land rights in projects based on a deep dive analysis of five case studies from around the world.

Local and national regulation

You will need to understand the regulations that may impact restoration projects in the target landscape, outlined in Table 6. Regulations may span compliance, permits, and restrictions on planting and operating the intervention. You should consult with local government offices to determine which regulations apply to you and when they will take effect. Additionally, consider applying for any necessary permits before implementation of the restoration project.

Table 6 | **Types of Regulations to Consider in a Restoration Project**

REGULATION	DESCRIPTION
Compliance	Policies, international commitments, and performance and sustainability standards
Permits	Planting, harvesting, transporting, and sales
Restrictions	Species type and number, geographic area, and imports and exports In some situations, restrictions may limit species type and number, or even promote non-native species that could cause ecological harm. In those cases, it is critical for restoration planners and practitioners to engage with the appropriate policymakers to address those policy restrictions so that more ecologically and culturally sound restoration can be implemented.

Source: WRI authors.



E. DETERMINE VALUE PROPOSITION

Regardless of your specific restoration goals, it is important to understand the project's value proposition, or what the project is uniquely positioned to do within environmental, social, and economic bounds. Clearly defining what the value is, where it is created, and to whom it is delivered will help you approach partners and funders in the next stages of planning.

Consider:

- ☐ Is the project filling a specific gap in the market?
- ☐ Are there any competitors (for commercial projects) that are operating similarly?
- ☐ How can you leverage your value proposition to secure resources and/or partnerships?

Checklist

Following the scoping stage ensures that you have reviewed all potential restoration opportunities while considering the key stakeholders, costs, and benefits of the selected project/initiative. Use the checklist in Table 7 to verify that you have reviewed all necessary conditions before proceeding to the next stage.

Table 7 | **Key Conditions at the Scoping Stage**

A) DEFINE RESTORATION GOALS	B) MAP RESTORATION POTENTIAL AND PRIORITIZE LANDSCAPES	C) ANALYZE COSTS AND BENEFITS AND TRADE-OFFS AND RISKS	D) SELECT PROJECT SITE	E) DETERMINE VALUE PROPOSITION
• Goal-themes ▷ Biodiversity ▷ Culture ▷ Community ▷ Food and products ▷ Climate ▷ Soil ▷ Water ▷ Energy • Objectives • Desired outcomes	• Need for restoration ▷ Scale and drivers of degradation ▷ Type and potential of interventions, driven by local priorities and stakeholders ▷ Availability of land • Existing initiatives and incentives ▷ Government objectives ▷ International commitments • Stakeholder mapping and engagement ▷ Prior informed consent ▷ Benefit sharing ▷ Equitable compensation ▷ Conflict resolution • Other	• Feasibility • Costs and benefits • Risk mitigation ▷ Ecosystems ▷ Legal and policy ▷ Operational ▷ Economic and financial ▷ Human and cultural ▷ Other	• Current land use ▷ Bare land ▷ Cropland ▷ Forest ▷ Industrial land ▷ Mangrove ▷ Peatland ▷ Settlement ▷ Shrubland ▷ Wetland • Land characteristics ▷ Biophysical ▷ Climatic • Location and size • Land tenure ▷ State ▷ Private ▷ Communal ▷ Open access • Land and resource rights ▷ Use rights ▷ Control rights ▷ Transfer rights ▷ Customary rights • Local and national regulations ▷ Compliance ▷ Permits ▷ Restrictions	• Scope of impact ▷ Environmental ▷ Social ▷ Economic • Value chain • Competitive landscape

Source: WRI authors.







STAGE 2.

DESIGN:

WHAT ARE THE KEY STEPS AND PROCESSES
TO DESIGN A RESTORATION PROJECT?

Once a project has been selected, restoration planners and practitioners can carefully define the steps and processes to design the restoration project and bring its value proposition to life.

Choosing the right way to restore the land and using the appropriate resources and inputs, in partnership with local communities, then building a system to measure progress, will make accessing finance and implementation run more smoothly. You may discover that you require additional resources once you begin conducting the project. In this section, we offer a preliminary overview of core components and processes that you will need to account for at the design stage. It is assumed that the project proponent will lead and coordinate the project and hire required expertise, for instance, on project management or stakeholder engagement.

A. DEFINE LANDSCAPE RESTORATION INTERVENTION AND UNDERSTAND HOW IT ADDRESSES LAND USE CHALLENGES

Any outstanding land use challenges that may be drivers of degradation—such as overgrazing, poor irrigation practices, or unsustainable harvesting—should be identified through a participatory consultative process prior to or along with the strategies to resolve these challenges and while identifying a specific restoration intervention.

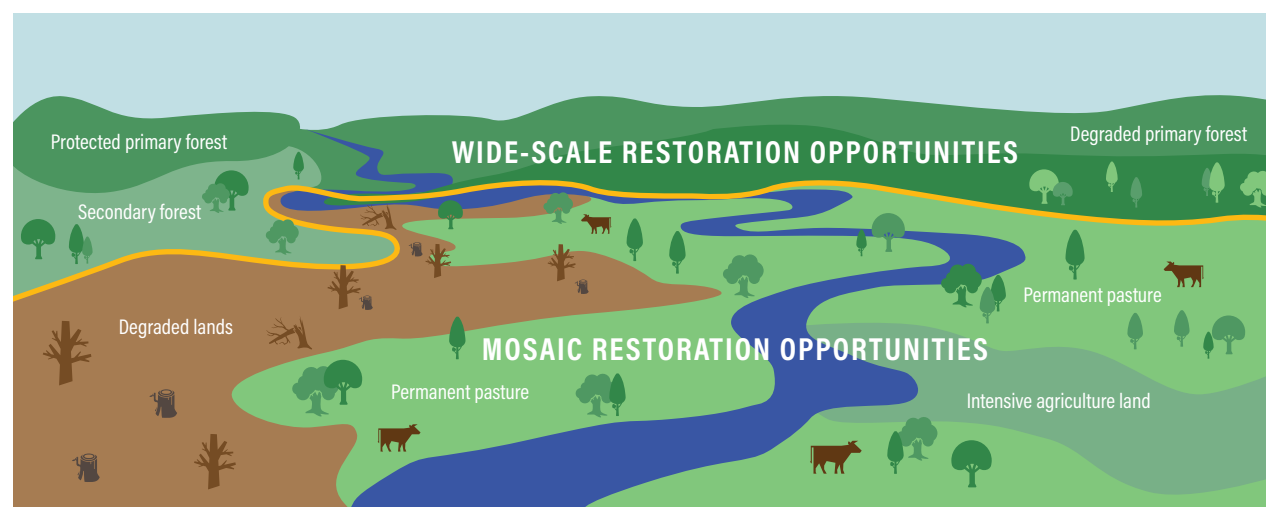
Considering the type of land use, land tenure, and biophysical features that you identified in the previous section, and the expected goals of restoration—and in consultation with the local community

and most impacted groups—you are now in a position to collectively decide how to restore the target landscape. Ecological restoration of land supports the recovery of an ecosystem that has been degraded, damaged, or destroyed (Gann et al. 2019). Figure 9 illustrates the type of terrestrial landscapes you may be working in and how they can interact with each other to create a flow of multiple ecosystem services. Wide-scale opportunities generally tend toward restoring forests, while mosaic opportunities generally tend toward restoring landscapes with multiple land uses to increase land productivity (WRI 2014). Natural grasslands, shrublands, and savannas should be protected and restoration planned for these landscapes as ecologically appropriate, which may entail removal of trees from these landscapes.

Land can be restored by planting trees or enrichment plantations in degraded forest lands, by

helping existing trees or forests grow through natural regeneration, or by removing disturbance or risks (see Table 8). Often, projects will combine multiple approaches to maximize impact and minimize costs. If the project has a commercial component, such as agroforestry or mixed species plantations, you should ensure that the selected restoration intervention supports those components' objectives in a sustainable way. Sustainable harvesting ensures that the species' population is maintained or increased over time, alongside sustainable land management practices such as protecting vulnerable lands, preventing further land degradation, and controlling erosion (Lopez-Hoffman et al. 2006). However, sustainable harvesting, particularly of timber, is not guaranteed to increase carbon sequestration on the land, though it brings several livelihood and developmental benefits to forest-dependent populations.

Figure 9 | **Types of Restoration Opportunities**



Source: IUCN and WRI 2014.

Table 8 | **Types of Tree-Based Restoration Interventions**

TYPE OF INTERVENTION	DESCRIPTION
Agroforestry	The process of adding trees to farms is widely recognized by scientists, governments, and farmers as an effective way to boost the productivity of agricultural lands and improve the income of farmers and their families, while protecting water and providing a home for biodiversity.
Assisted natural regeneration	Natural regeneration can be accelerated by lightly assisted interventions like fencing off land to protect trees from grazing and people looking for fuelwood and to expand their farms. Sometimes, planting additional trees can supplement assisted natural regeneration, fire prevention, and weed control practices.
Farmer-managed natural regeneration	Farmers protect and manage growth of trees and shrubs that regenerate naturally in their fields from root stock or from seeds dispersed through animal manure.
Silvopasture	The intentional combination of trees, forage plants, and livestock together on pasture to boost farmers' yield and income and improve the environment.
Reforestation	The re-establishment of forests after a temporary condition of low or absent tree cover due to human-induced or natural perturbations.
Mixed species plantations	A type of plantation where more than one native species of tree is grown. Only those plantations that add trees on degraded lands are considered restorative.
Rehabilitation	Mitigating the effects of industrial land uses, such as mining, by removing sources of degradation, improving soil functionality, and planting or growing trees.
Riverbank restoration	The planting of trees along rivers and streams to control erosion and reduce run-off.
Natural regeneration	Protection from livestock and human intervention so trees can naturally regenerate over time.
Conservation	All restoration interventions should protect intact forests and grasslands and maximize ecosystem functions.

Note: Ecosystem recovery is a natural process guided by people, and the spectrum of interventions may vary from lightly assisted to moderately assisted or intensively assisted recovery.

Source: Adapted from Chazdon et al. 2021; Stanturf et al. 2014; and FAO 2017a.

To learn more about each type of restoration intervention and its suitability, please see the “Sustainable Forest Management Toolbox” (FAO 2017a).

B. MANAGE KEY ACTIVITIES

Most restoration interventions involve the same key activities with variations according to goals, geography, and expertise. For example, a non-commercial project may not focus on sales and marketing, or research and innovation may be delegated to an external technical partner. You should develop a plan of all activities that must be conducted, who will manage each, when they will take place, and what resources are required (see Table 9). As you implement the project, roles may be adjusted as needed.

Consider:

- ☐ Do you have (or have access to) the necessary expertise and experience to conduct each activity?
- ☐ When should each activity begin?
- ☐ What resources do you need to support each activity?

Table 9 | **Key Operational, Social, and Institutional Restoration Categories**

CATEGORY	ACTIVITY	DESCRIPTION
Operational	Planting and growing	Planting, fertilizing, irrigation, mowing, pruning, harvesting, sorting, processing, and soil testing
	Maintenance	Site control, health and safety, and managing equipment and infrastructure
	Monitoring	Data collection and analysis
	Sustainable resource management	Regenerative practices, renewable resources, and biodiversity and ecosystem protection
	Sales and marketing	Advertising, outreach, and customer service
	Sourcing and supply chain	Procurement, quality assurance, and managing suppliers
Social	Worker capacity building and engagement	Training, incentive-sharing, knowledge-sharing, and capacity development
	Community capacity building and engagement	Consultation, incentive-sharing, knowledge-sharing, and capacity development
Institutional	Financing	Budgeting, valuation, and managing funders
	Governance and risk management	Compliance and risk assessment
	Research and innovation	Process improvement and knowledge-sharing

Source: WRI authors.

In particular, monitoring of the target landscape and the associated capacity development and knowledge-sharing with local people must be built into key activities at the beginning of the design stage. This may include, for instance, a citizen science approach to monitoring or social audit of interventions. As well as improving transparency and accountability in community-led restoration projects, participatory monitoring approaches are crucial to link the needs of local people and of global conservation (Evans et al. 2018). Establishing a monitoring system in the design phase ensures that monitoring is funded, and that restoration planners and practitioners will detect any issues that arise and adapt their management practices to keep the project moving in the right direction. Monitoring also enables better planning for project implementation. Funders and stakeholders of all types will ask you to report on your progress against metrics and indicators to prove that the project is being conducted effectively, transparently, and sustainably. Capacity development is key, especially for community-led restoration projects, to keep local people engaged around monitoring, accounting, planning, and planting activities, as demonstrated in one case study from Indonesia (Gregorio et al. 2020). Monitoring is a continuous process and needs to be tailored as the project progresses. Additional guidance on measuring the project progress and interventions is discussed in Stage 5 (Monitor) of this guidebook.

Even before you start the project and look for financing, you should identify the data you will want to collect, the targets you want to reach, and indicators that can measure progress toward those targets. You should develop indicators and metrics around

your original restoration objectives for consistency. For example, if your focus is cultural practices, your indicator might be sacred land or groves or cultural site protection, and your metric would be the area of such land protected (some examples are shown in Figure 10). You should also reflect on monitoring any experience that you or your partners have and the amount of funding that you can allocate to collecting and reporting data. Considerations that will help you design your monitoring include:

- **Performance:** You should monitor the performance and impact of the project—including both biophysical and social attributes, as appropriate—based on the goals you identified in the beginning. Some examples of biophysical attributes could include changes to forest structure, soil condition, water run-off, and biodiversity, as well as species survival rate and growth, while livelihoods and health are important social attributes. You can refer to your

goal-themes and foci from the scoping stage to determine which attributes are applicable to the project. It is important to collect intersectional gender-disaggregated data to ensure that the project benefits men and women from different race, age, class, and caste categories appropriately, while ensuring that confidentiality and data privacy of individuals is maintained.

- **Systems:** Set up a system to collect the appropriate data if the system is not already in place. The system should monitor against targets, indicators, and metrics with a standard data collection and management procedure. An indicator is a variable used to represent change or the attainment of a goal, while a metric is a specific, measurable variable used to measure change in the indicator, as represented in Figure 10 (FAO and WRI 2019). It is highly recommended to establish a baseline against which you can measure progress or backsliding in relation to restoration targets.

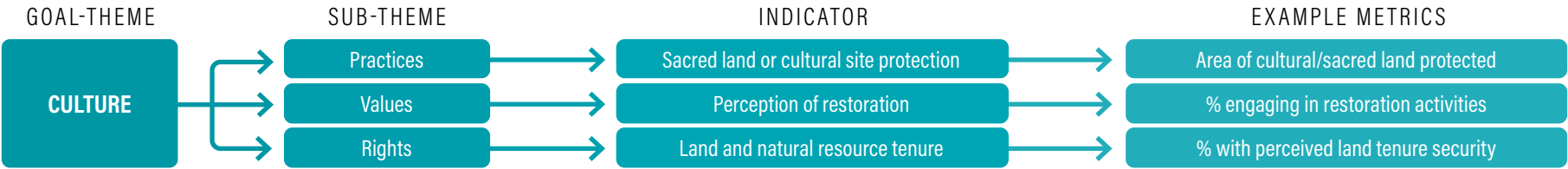
For more on how to design a monitoring system with impactful indicators, see *The Road to Restoration* (FAO and WRI 2019).

Planning an exit strategy is critical so that metrics for monitoring can be tested and reviewed during implementation and at the end of the project. An exit strategy will enable planning for resources management and team management and will set expectations regarding the duration of the project. The strategy enables planning for project durability with key stakeholders.

C. SECURE RESOURCES

You should outline and prioritize the resources you need, including tools, knowledge, and systems (see Table 10). Moreover, you will need to understand which channels provide access to the project resources so that you can prevent any disruptions to your key activities.

Figure 10 | An Example of Establishing Indicators and Metrics for Monitoring



Source: FAO and WRI 2019.

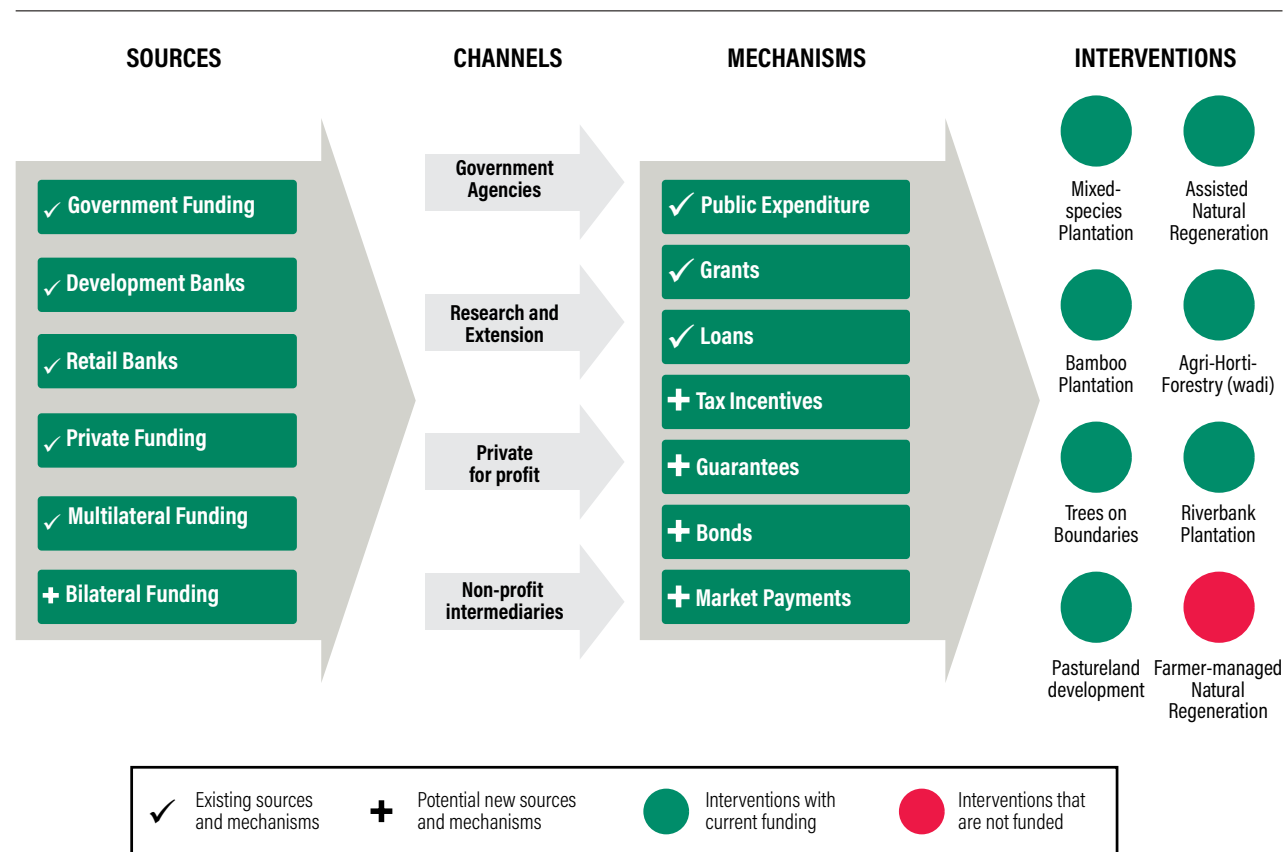
Channels are the available modes that communication, funding, or distribution of resources must go through for any given project. For example, a project may turn to a university as a channel for research or monitoring assistance. You may have already accessed certain key resources, such as local expertise or local capacity, when you identified potential restoration opportunities in the previous stage. If you are looking for potential sources to finance identified restoration interventions on the ground, then you could look at different channels, such as government agencies and research and extension agencies, to identify mechanisms for funding like public expenditure or grants. Figure 11 returns to the Sidhi, India, example to depict this approach.

Table 10 | **Key Resource Considerations When Designing a Restoration Project**

CATEGORY	RESOURCE	CONSIDERATIONS
Implementation	Land	Ensure you have secured the rights to use and manage the land and its products.
	Labor	Determine if you will hire seasonal, temporary, or permanent employees and the implications of those designations; alternatively, local user groups may identify functionaries through deliberative discussion.
	Seeds and seedlings	- Secure supply of the appropriate (preferably native) species from nurseries based on local ecological and soil conditions. - Assess if seed networks are well-developed; if not, you may need to build your own nursery and seed stock, or rely on existing root systems or seed collection that is appropriate for the local ecological and social conditions.
	Planting materials	Secure materials of plant or animal origin that can be added to soil, such as manures, biosolids, green wastes, and composts, to boost soil carbon and fertility.
	Water resources	Locate an irrigation system that is reliable and easily accessible, including water tanks, reservoirs, hoses, etc.
	Equipment	Secure any planting tools, vehicles, and machinery needed for operation.
Knowledge	Local expertise	Consult local experts to fill any gaps after you have catalogued your knowledge and resources.
	Data	- Determine what data will be helpful to inform your restoration intervention and monitoring plan. - Investigate who manages the data—whether government, local organizations, or universities—and the collection frequency. - Established collection modes may vary and include government collection, field collection and sampling, remote sensing, or data mining.
Access	Infrastructure	- Determine if fencing, access roads, warehouses, nurseries, and housing for workers already exist; if not, you may need to develop these to support the project. - Determine if social rules for access to common infrastructure, social fencing, and so on, need to be developed by local user groups. - Secure water, electricity, plumbing, and internet for employees and workers.
	Local capacity	- Determine how many trees the site can maintain, ecologically and socially. - Determine the area that could be protected through established local governance mechanisms, such as those on sustainable harvesting. - Establish a benefit share mechanism, if not in place.
	Finance	Secure funding to cover the costs of all your key resources.
	Markets	- Consider how you will access customers for your products or services, what distribution systems exist, and your role in the supply chain. - Conduct market research on competition and demand for your product or service.

Source: Adapted from Gravuer et al. 2019.

Figure 11 | **Current and Potential Sources of Restoration Finance, Identified in Sidhi District, India**



Source: Singh et al. 2020.





Consider:

- ☐ Where can you secure each resource from?
- ☐ Are there any partners or programs that can help locate resources?
- ☐ Do you have clear terms and conditions for each deal you may enter?

D. ENGAGE AND ESTABLISH PARTNERSHIPS

Partnerships can vary greatly in their types and level of involvement, spanning core functions like implementation, coordination, fundraising, research, and marketing. Successful restoration projects often bring together groups of people that contribute a wide range of knowledge and capacity to meet the end goal and ensure long-term sustainability of the project. For example, local user groups own land and have secure land rights and identify within themselves who will contribute in-kind with labor; the local administration contributes by harnessing existing public schemes; and a local NGO supports the community user groups with capacity, skills, and monitoring techniques and connects them with impact investors and donors. Alternatively, the local administration may contribute or identify land, while the local community supplies workers, a commercial business organizes the team around goals and processes, and impact investors fund the business.

Established partners are those you may have already collaborated with during the scoping stage when assessing potential restoration opportunities, or those who have already developed commitments around forest protection and landscape restoration. Table 11 identifies typical responsibilities of different types of restoration partner, though responsibilities will vary from community to community.

Consider:

- ☐ What kind of value can a partner add to the project? (For instance, credibility)
- ☐ What responsibilities do you expect a partner to take on?
- ☐ What kind of expertise do they offer? (Local knowledge, technical expertise, or a network of partners)
- ☐ What financial contribution do they require, or can they make?
- ☐ What mechanisms ensure accountability from both sides?
- ☐ How will you approach termination if necessary?

Table 11 | **Types of Partners and Support They Could Provide**

TYPE OF PARTNER	SUB-CATEGORY	ESTABLISHED PARTNERSHIP	IMPLEMENTATION	COORDINATION	FUNDRAISING	RESEARCH	MARKETING	SUSTAINABILITY
Governments	• Heads of State • Ministries of Finance; Environment; Agriculture; Forest, Rural Development, Land-Use Planning; or Education • Local governments • Park authorities	X	X		X	X	X	X
Small and medium-sized enterprises	• Natural resource-based companies		X	X			X	
Corporations	• Natural resource-based companies • Corporate social responsibility		X	X	X	X	X	
NGOs	• Local NGOs • International NGOs • Faith organizations	X	X	X	X	X	X	X
User groups	• Youth organizations • Producers' organizations • Women's groups	X	X					
Private landowners and farmers	• Farmers • Herders • Foresters • Producers		X					
Cooperatives	• Agricultural • Non-timber forest products (NTFPs) • Wood	X	X	X				
Investors	• Institutional investors • Development banks • Impact funds • Philanthropy				X			
Research organizations	• Researchers • Universities • Schools	X				X		X

Note: The boxes here are checked based on a hypothetical project.

Source: WRI authors.

E. PROTOCOLS AND CERTIFICATIONS

Not every project will require certifications, but they can enhance the value of a restoration project that is operating with a commercial component. Certifications are third-party verifications that your project is operating at a high quality across environmental and social issues within each of the categories listed in Table 12. If there are certain standards or certifications that may support your value proposition, you should look closely at the eligibility requirements and ensure that your project design can accommodate those needs.

Oftentimes, certifications will verify the project’s chain of custody, or the tracking of certified material from forest to consumer to provide a link between responsible production and consumption. Certifications can also verify performance, or success measured against organizational or industry-wide targets based on scientific and social guidelines. Figure 12 illustrates the value chain for a Forest Stewardship Council chain of custody certification for a timber-related forest project.

Consider:

- ☐ What certification options are there?
- ☐ How much value would certification add to the project?
- ☐ Is certification necessary to compete in your respective market?
- ☐ What is required to be eligible for certification?
- ☐ How much would certification cost?
- ☐ Do you have the data availability to support the verification process?

Table 12 | **Types of Certification Standards**

CATEGORY	TYPE OF CERTIFICATION	DESCRIPTION
Forest management	Forest Stewardship Council (FSC)	Certification program that verifies a project’s responsible forest management practices, such as respect for indigenous people’s rights, equitable benefit sharing, continuous monitoring, etc.
	Sustainable Forestry Initiative (SFI & PEFC)	Standard covering biodiversity protection, sustainable harvest levels, water quality protection, and prompt regeneration <i>*Only applicable to forests in the U.S. and Canada</i>
Carbon	Gold Standard (WWF)	Standard and certification program for non-governmental emissions reduction projects that make a net-positive contribution to economic, environmental, and social welfare of local communities
	Plan Vivo (PVF)	Standard for projects that protect and restore the environment, tackle climate change, and support climate-sensitive communities
	Verified Carbon Standard (Verra)	Standard and verification program for emissions reduction projects that address climate change, support local communities, and conserve biodiversity
	Clean Development Mechanism (UNFCCC)	Global environmental investment and credit scheme that provides a standardized emissions offset instrument, especially intended for projects in developing countries
	Climate Action Reserve (CAR)	Carbon offset registry that establishes high-quality standards for carbon offset projects, oversees independent third-party verification bodies, issues carbon credits generated from such projects, and tracks the transaction of credits over time
Ecosystem services	Certified Wildlife Friendly	A voluntary certification that promotes understanding of wildlife stewardship and the ecological management of farms, ranches, and private lands
Sustainable agriculture	Rainforest Alliance (RA)	Certification and development program that verifies action around climate-smart agriculture, deforestation biodiversity conservation, human rights, gender equality, etc.
	Organic	Certification program that verifies that product has been grown without synthetic pesticides and fertilizers for at least three years before harvest <i>*Multiple certifiers exist</i>
	Fair Trade	Certification program that ensures decent income and work for smallholder farmers; producers receive at least the set minimum price and premium for certified products <i>*Multiple certifiers exist</i>

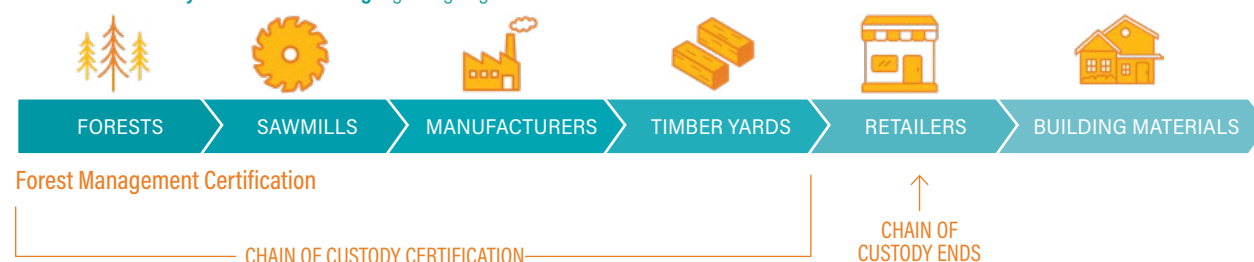
Sources: Adapted from Ecolabel Index 2021; FAO 2003; and LandScale 2019.

Figure 12 | **Chain of Custody**

WHAT IS CHAIN OF CUSTODY?

It is the path that wood fiber takes from forest to end purchaser.

It is about **traceability** and **truth in labeling** regarding origin of wood.



Source: FSC New Zealand 2018.

Checklist

The design stage offers you the chance to plan the forest protection and restoration intervention, from inputs to partners. Developing a comprehensive outline of your project implementation steps will allow the project to flow more efficiently. Use the checklist in Table 13 to verify that you have reviewed all necessary conditions before creating a budget or approaching funders in the next stage.

Table 13 | **Key Conditions at the Design Stage**

A) DEFINE RESTORATION INTERVENTION	B) MANAGE KEY ACTIVITIES	C) SECURE KEY RESOURCES	D) ENGAGE AND ESTABLISH PARTNERSHIPS	E) PROTOCOLS AND CERTIFICATIONS
• Type of interventions ▷ Agroforestry ▷ Silvopasture ▷ Reforestation ▷ Mixed species plantations ▷ Riverbank restoration ▷ Natural regeneration ▷ Assisted natural regeneration ▷ Farmer-managed natural regeneration ▷ Rehabilitation ▷ Conservation ▷ Restoration of mining areas • Other	• Operational ▷ Planting and growing ▷ Maintenance ▷ Monitoring ▷ Sustainable resource management ▷ Sales and marketing ▷ Sourcing and supply chain • Social ▷ Workers capacity and engagement ▷ Community capacity and engagement • Institutional ▷ Financing ▷ Governance and risk management ▷ Research and innovation • Other, such as exit strategy	• Implementation ▷ Land ▷ Labor ▷ Seeds and seedlings ▷ Planting materials ▷ Water resources ▷ Equipment • Knowledge ▷ Local expertise ▷ Data • Access ▷ Infrastructure ▷ Local capacity ▷ Finance ▷ Markets • Other	• Governments • Small and medium-sized enterprises • Corporations • NGOs • Local community • Private landowners and farmers • Cooperatives • Investors • Research organizations • Other	• Forest management • Carbon • Ecosystem services • Sustainable agriculture • Not applicable • Other

Source: WRI authors.





STAGE 3.

FINANCE:

WHAT TYPE OF FINANCE IS NEEDED TO
MOVE THE PROJECT FROM DESIGN TO
IMPLEMENTATION?

The finance stage is the key to moving the project from design to on-the-ground implementation.

Forest protection and landscape restoration projects can provide significant economic returns in the long run. The Economics of Ecosystem and Biodiversity (TEEB), a global initiative, found in several successful restoration projects that restoring land increased crop yields between 7 and 79 percent over time. However, managing the initial costs often falls to project developers and implementers (TEEB 2009). To guide consistent cost data collection, The Economics of Ecosystem Restoration (TEER) initiative—a multi-partner initiative under the aegis of the UN Decade on Ecosystem Restoration—published a standard framework in 2021 that aims to improve the information on costs and benefits of restoration and inform accurate budgeting access to finance for restoration projects (Bodin et al. 2021). Most restoration practitioners and planners will need to build financial partnerships with investors, donors, and/or governments to achieve their goals. Understanding the project’s financial needs over time can better prepare you to approach project funders and secure the required startup capital.

Global analysis indicates that there is an annual gap of \$300 billion for financing landscape restoration projects. To learn more on how to reduce the gap, and financing strategies and incentives for restoration for your project, please see “Roots of Prosperity: The Economics and Finance of Restoring Land” (Ding et al. 2017).

A. REVENUE SOURCES

You should begin constructing your budget with your expected revenue, or all of the activities that bring money into the project. Revenue may include money received from the sale of products like wood, fruits, crops, or livestock and services like tourism. In Table 14, you can see common examples divided into products and services.

It is important to note that restoration is a multiyear process. Its benefits can span decades, and projects may take a decade or more just to break even (Ding et al. 2017). For example, teak plantations require a minimum of 20 to 25 years before the wood is ready for harvest (Ladrach 2009). Therefore, obtaining financing that matches the timeframe of the restoration project becomes essential to maintain the benefits of restoration. Without sustained financing,

Table 14 | Different revenue sources for a restoration project

REVENUE DRIVER	EXAMPLES
Products	Wood: Timber, fuelwood, fibers for construction, pulp, biomass
	Food: Coffee, cocoa, fruits, nuts, vegetables, honey
	Agricultural commodities: Cotton, livestock, grains
	Fodder: Hay, straw, silage, malt
	Non-timber forest products: Medicinal plants, essences, bamboo, rattan, natural pesticides
Services	Other: Furniture, cosmetics, textiles, polymers
	Carbon: Carbon credits and offsets
	Ecosystem services: Beneficiaries of environmental services (funded mostly by governments), from watershed protection and forest conservation to carbon sequestration and landscape beauty, reward those whose lands provide these services with subsidies or market payments
	Eco-tourism: Restoring and conserving natural habitats for consumers to visit

Sources: Adapted from Bodin et al. 2021; Faruqi and Wu 2016; and WWF 2020.

there is the risk of reversion to activities that degrade the land, negating restoration efforts.

For projects that engage with one of these commercial components, you should consider how much revenue each type of product and/or service will generate per month and per year. Non-profit initiatives, such as sacred groves protected by local user groups, may want to raise revenues to offset some project costs or develop governance mechanisms to share costs and to ensure that community rights are not impinged upon. Keep in mind that revenues can be influenced by harvest restrictions, fluctuations in demand, general macroeconomic conditions, or climatic factors like pest attacks and floods. Understanding of the market would also be crucial to understand market-based funding available in a geography and key players that may be active. Bosshard et al. (2021) provide a good summary of land restoration market opportunities.

Consider:

- ☐ Is there a commercial component of the project?
- ☐ Will you face significant competition in the market for your products or services?
- ☐ Do you know who your target customers are and how you can reach them?
- ☐ How much revenue do you expect to bring in?

B. COSTS

The next step is to connect potential revenues, expenses, and profits together for a complete financial view of your project. Your budget should be broken down and anticipate the costs of each of your

activities, as well as tie into your objectives, work plan, and capital structure. You will need a detailed outline for project funders to demonstrate where their funding will eventually be allocated. Costs may vary depending on geography and scale of purchase. Table 15 outlines the most common types of costs you will incur as you conduct the project.

Table 15 | Types of Expenses to Consider While Developing a Restoration Project

TYPE OF EXPENSE	DESCRIPTION
Land	• Land usage: Purchase or rent land based on need, ability to secure a mortgage, and affordability. • If renting, work with local communities or the government to potentially reduce the cost and ensure landowners are compensated. • If local communities are developing the project, ensure that governance and management rules are established and/or cost of securing tenure is included.
Labor	• Wages: Pay employees and technical consultants (if applicable) and provide clear contracts, terms of reference, and incentives or work with local user groups to establish how labor will be arranged (e.g., beneficiary contribution). • Human resources: Pay training costs, payroll taxes, and other benefits.
Planting materials	• Planting: Pay for seeds, seedlings, fertilizers, pesticides, and water necessary for planting and growing.
Equipment	• Machinery: Purchase or lease equipment based on how long it will be used and affordability, or explore if machinery, for instance, for value addition, can be purchased from support of available public funding.
Infrastructure	• Facilities: Fund access roads, warehouses, nurseries, and housing for workers. • Services: Pay for water, electricity, plumbing, and internet.
Monitoring	• Monitoring system: Pay for data collection and storage, reporting, photography, videography, and staff training.
Maintenance	• Site management: Pay for maintenance of machinery, infrastructure, and project site such as pruning, mowing, and fertilizing the land.
Financing	• Interest: Pay interest on any debt/loans you take out at specified or market rate.
Insurance	• Insurance policy: Purchase a policy from private companies or government to mitigate risks such as injury, broken machinery, loss of harvest due to weather, etc., and restore losses. • Governments may offer funds for risk mitigation, such as fire prevention.
Other	• Government fees: Pay to renew licenses and permits or to export products. • Certification fees: Pay for recertification every few years. • Depreciation: Include cost of capital depreciation for equipment and infrastructure for each year in financial projections.

Source: Adapted from Gromko et al. 2019.

You can deduct your expenses from your revenues to forecast the profit or loss that your project will face (Annual Revenues – Annual Expenses = Annual Operating Profit). With this information, you can estimate the size of your potential earnings for a given period. Mechanisms for how potential earnings will be split across key stakeholders should be discussed, along with planning for how much of the profits will be channeled back to further financing of the project.

You should run simple financial models with various economic scenarios that the project could face, from a strong market with above-average demand for your products to a weak market that could hurt your potential profits. You can vary the volume of production, the prices of your product, inputs, and labor, or any other variable that seems sensible. For example, if revenues include carbon payments, it is a good idea to run the model with different carbon prices to understand how a higher or lower price could affect your bottom line and how risks could be mitigated.

Consider:

- ☐ How much funding will you need to begin the project?
- ☐ Can you negotiate any discounts or cost reductions?
- ☐ If applicable, when do you expect the project to be profitable?

To learn more on how to project costs and benefits for a restoration project, with customized decision-making tools, please see “Economics of Forest Landscape Restoration: Estimating Impacts, Costs and Benefits from Ecosystem Services” (Gromko et al. 2019).

C. FINANCING OPTIONS

There are several financing options and incentives for restoration projects that vary in scale and ease of access, including, for instance, forest finance, biodiversity finance, climate finance, and agriculture finance. Some options may specify a payback period, while others may accept a percentage of ownership or a service in return. Restoration projects are influenced by broad economic and investment trends, so you should choose a financing option that reflects your ability to borrow and contextualizes current market conditions, such as inflation and interest rates (see Table 16). For the long-term sustainability of your project, also consider a blended finance mechanism of public and private finance that could support project implementation once initial financing for the project is exhausted.

Consider:

- ☐ Do you have access to traditional financing?
- ☐ Are you eligible for any grants or incentives?

You should also avoid any incentives in other sectors that may promote unsustainable or resource-intensive practices. For instance, subsidies that support the overuse of chemical fertilizers can further degrade land.

To learn more about the flow of financial incentives possible through payment for ecosystem services based on learning from global case examples, see “Economic Incentives for SFM and Landscape Restoration” (World Bank 2004). For an in-depth understanding of sustainable financing options and how to improve investment for landscape restoration, see “Sustainable Financing for Forest and Landscape Restoration” (FAO and Global Mechanism of the UNCCD 2015).

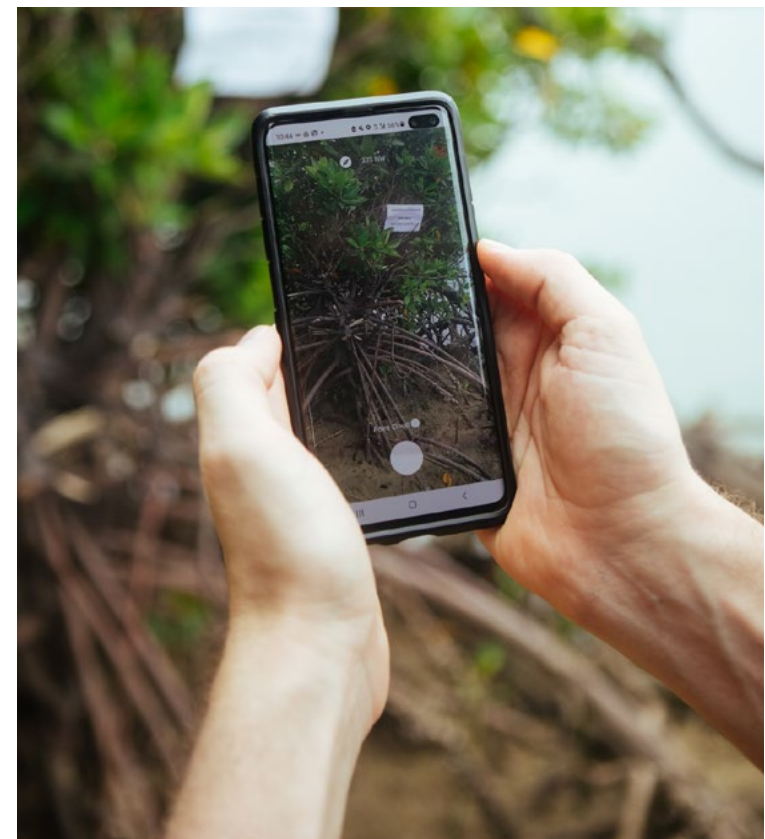


Table 16 | Types of Financing Available for Restoration Initiatives

TYPE OF FINANCING	DEFINITION	CONSIDERATIONS
Debt	Project borrows money from an outside source, promising to pay it back with interest by a set date in the future	High interest rates (amount charged by a lender to a borrower) may make interest payments too costly and prohibitive
Equity	Funder puts money or assets into the project in exchange for some percentage of ownership	- There may be a minimum required rate of return on investment (hurdle rate) - Investors tend to expect higher rates of return overall
Grants	Governments, private sector companies, and institutions fund projects at no cost to further certain goals and targets	May be available through foreign aid programs, but projects must meet certain criteria to be eligible
Incentives	Subsidies: Governments grant money to assist an industry or business so that price of a product or service may remain low or competitive	- Governments may subsidize the cost of project resources, like seeds and water - Governments may offer tax exemptions, concessions, or rebates based on local tax law
	Government guarantees: Governments assume debt in the event that the project owner defaults on payments	- Credit subsidies and guarantees are available at below-market interest rates to help encourage sustainable practices at lower costs - Particularly helpful for smallholder farmers and small companies that have trouble qualifying for loans
	Direct payments: Payment for ecosystem services (PES) schemes pay people who manage land to provide ecosystem services at competitive rates	- Landowners participate in conservation tenders, a competitive bidding process, to receive PES contracts with governments and private sector companies - Restoration projects may qualify for PES through improved water, healthier soils, and cleaner air
	Carbon credits: Tradeable certificates or credits created in exchange for the greenhouse gas emissions that project's trees remove from the air	- Governments, private sector companies, and other institutions can buy these credits to fulfil their emissions reduction targets - Local protocols are being developed by different companies depending on species and ecosystems
	Minimum support price (MSP): Governments set a minimum price for the products grown through restoration projects	MSPs vary by product and region
	Buy back agreements: Binding contracts issued by forest, agroforestry, or agriculture companies, guaranteeing viable markets from products	- Government, private sector companies, traditional investors, and impact funds can enter into a buy back agreement - Strong engagement at the local level with small land holders or forest user groups to build a strong landscape vision
Non-traditional sources	Other: Certification schemes, export assistance, or government-provided technical assistance Projects raise money through crowdsourcing, for instance	Restoration projects can be crowdsourced through donations or lending from citizen-to-citizen financing approaches

Sources: Adapted from World Bank 2004; FAO and Global Mechanism of the UNCCD 2015; and Ding et al. 2021.

D. FUNDERS

There are many types of project funders, ranging from venture capitalists to retail investors (see Table 17). Each project may align with certain funders more than others, so it is important to carefully compare the different options before deciding which to approach. Based on the criteria listed below, think about which funders offer the best fit for your financial needs.

Consider:

- ☐ When do you need funding for the project?
- ☐ How much control do you want over the project?
- ☐ Are you eligible for the type of funding you are looking for?

To learn more about designing projects to seek adequate private capital, finding the right investors, and writing business plans, see “Attracting Private Investment to Landscape Restoration: A Roadmap” (Faruqi and Landsberg 2017).

Table 17 | **Types of Funders and Investments to Explore, Depending on the Investment Stage of a Project**

FINANCIAL INSTITUTION	TYPE OF FUNDER	TYPE OF INVESTMENT	INVESTMENT STAGE	INSTITUTIONAL STRATEGY
Institutional investors	Venture capital	Debt/equity	Early	- Finance early-stage businesses with substantial risk but long-term growth potential - Often seek very high returns to compensate for risks taken
	Private equity	Debt/equity	All stages	Invest in privately held companies with the primary goal of generating above-market-rate financial returns
	Impact investors	Debt/equity	Early	- Invest directly in early-stage businesses with the goal of generating financial, environmental, and social returns - Often seek at least a market-rate return
Banks	Commercial banks	Debt	Middle/late	Finance businesses by providing loans, bonds, and other financial products
	National banks	Debt/grant	Middle/late	- Government-owned banks that provide financing for projects that further national interests - Financing may be at market or below-market rate
	Multilateral development banks	Debt/grant	Early/middle	- Finance projects and businesses for the purpose of economic development, typically with social and/or environmental benefits in mind - Often provide financing at below-market rates, including grants and no-cost loans
Governments	Bilateral	Debt/grant	Early/middle	- Assistance from one government to another in order to achieve development, philanthropic, and/or political goals - Assistance may take the form of financial aid, capacity building, or other forms of structural support
	Municipal and regional	Grant/incentives	Early	- Develop programs and implement projects at the municipal or regional level - Primarily interested in increasing public benefit and in a mix of economic, social, and environmental returns
	National	Grant/incentives	Early	- Develop policies and programs and implement incentives and projects at the national level - Primarily interested in creating public benefit and is interested in a mix of economic, social, and environmental returns
Philanthropy	Civil society	Grant	Early	Engage in a wide variety of actions, from implementing projects and fundraising to research and advocacy
	Foundations	Grant	Early	- Develop programs to implement projects directly or build capacity through research and policy - May contribute their own funds or attract investment from public and private partners
	Wealthy individuals	Grant/equity	Early	- Finance projects through a variety of means, either by donating to existing groups and projects or by developing their own organizations - Projects are developed based on their personal interests and typically do not seek a financial return
Other	Pension funds	Debt/equity	Late	May invest directly in forests for their real estate value and/or commercial potential for timber
	Timber investment management organizations (TIMOs)	Debt/equity	Middle/late	Analyze and acquire timberland on behalf of institutional clients
	Retail investors	Equity/grant	Early	- Individuals who pool small sums of money to invest in businesses and ideas, typically through a crowdfunding platform - May or may not seek financial returns

Source: Adapted from Ding et al. 2017.

Checklist

Considering each part of the finance stage, from securing the appropriate investment to managing the project’s profits, will help you mobilize the project so that you can begin your restoration work. Use the checklist in Table 18 to verify that you have reviewed all necessary conditions before proceeding to the next stage.



Table 18 | Key Aspects to Consider at the Finance Stage

A) REVENUE SOURCES	B) COSTS	C) FINANCING OPTIONS	D) FUNDERS
• Products ▷ Wood ▷ Food ▷ Agricultural commodities ▷ Fodder ▷ Non-timber forest products (NTFPs) • Services ▷ Carbon ▷ Biodiversity ▷ Water • Not applicable • Other	• Land • Labor • Planting materials • Equipment • Infrastructure • Monitoring • Maintenance • Financing • Insurance • Other	• Debt • Equity • Grants • Incentives ▷ Subsidies ▷ Government Guarantees ▷ Direct payments ▷ Carbon credits ▷ Minimum support price • Not applicable • Other	• Institutional ▷ Venture capital ▷ Private equity ▷ Impact investors • Banks ▷ Commercial ▷ National ▷ Multilateral development • Governments ▷ Bilateral ▷ Municipal and regional ▷ National • Philanthropy ▷ Civil society ▷ Foundations ▷ Wealthy individuals • Other ▷ Pension funds ▷ TIMOs ▷ Retail investors • Not applicable

Source: WRI authors.





STAGE 4.

IMPLEMENT:

HOW DO YOU PLAN FOR IMPLEMENTATION?

Considering the landscape approach to restoration when planning implementation is key. The implementation stage reviews activities you must conduct before, during, and following the planting, regenerating, or growing of trees in line with ecological and social principles.

There are several techniques and practices used to implement restoration projects (see, for example, Danton 1993; Campos-Filho et al. 2013; Willoughby et al. 2004), so the choices you make will depend on the scale and purpose of the project, and the level of degradation. Successful projects usually rely on

- efficient resource allocation;
- appropriate organizational structures;
- stakeholder engagement;
- comprehensive training;
- inclusion of local knowledge;
- careful design and implementation on site;
- use of high-quality seeds and seedlings; and
- a commitment to monitor progress.

Considering the landscape approach to restoration when planning implementation will be key, as discussed in previous sections. Once the restoration plan has considered the landscape approach and key priorities of the stakeholders and multifunctionality of landscapes, the focus of restoration planners and practitioners should be on setting up a project management office or team, engaging with multiple stakeholders on the project, assessing needs for capacity building to support implementation, and assessing market linkages, among others.

The implementation stage reviews activities you must conduct before, during, and following the planting, regenerating, or growing of trees in line with ecological and social principles. This section will provide only a high-level overview of planning con-

siderations, so please refer to the examples of more detailed implementation guides listed below.

Recommended further reading:

- To learn more on how the implementation of landscape restoration can lead to climate change mitigation or adaptation benefits and plan that for your landscape, see “Implementing forest landscape restoration: A practitioner’s guide” (Stanturf et al. 2017).
- To know more about how to develop an agroforestry system that can lead to transformation of degraded landscapes while improving social and economic benefits for people, based on case examples from two biomes in Brazil, see “Agroforestry Systems for Ecological Restoration” (Miccolis et al. 2016).
- To learn further about various decision support tools that can aid forest and landscape restoration planning, tested in multiple geographies and offering helpful resources for in-depth learning, such as species selection, see “Decision support tools for forest landscape restoration: current status and future outlook” (Chazdon and Guariguata 2018).
- To learn more on different paths to follow for restoration implementation, with a case example from the Amazon, see “Forest Landscape Restoration in the Amazon – Overview and Paths to Follow” (Alliance for Restoration in the Amazon 2020).
- To learn further on “International principles and standards for the practice of ecological restoration,” see Gann et al. (2019).

A. PREPARE SITE AND RESOURCES

Any process of systematization will reduce the possibility of errors and increase the effectiveness of implementation. Preparing the site, resources, and a comprehensive plan for planting will ease the process as you approach planting season. If you are pursuing any certifications, you should ensure that the site supports the respective protocols. Technical partners and local experts may be able to assist during this stage.

Soil preparation

The first step is to protect and recover the soil’s biological processes and microorganisms, especially in tropical soils. This can be achieved by completing a soil analysis, then protecting and enhancing fungi, bacteria, micro- and mesofauna in the soil, and area to be restored. Best practices for soil management include minimizing tillage, subsoiling (breaking up deep soil) instead of plowing, reducing chemical inputs, mulching over soil cover, and using green manure as much as possible (FAO 2017b).

To view guidelines for sustainable soil management that can help restoration practitioners and planners achieve multiple restoration goals and improve soil health and may be helpful to consider while developing projects, please see “Voluntary Guide for Sustainable Soil Management” (FAO 2017b).

Zoning and accessibility

The area being restored should be demarcated clearly. It might be necessary to fence the perimeter of the area to prevent the presence of livestock and other wild animals that might damage the seedlings or plants at an early stage.

Workers' training and rights

Effective implementation depends upon a good level of understanding and acceptance on the part of workers, machinery operators, landowners and rural communities, and government officials. You should conduct a training program, possibly with the support of technical partners, to ensure that all implementers understand best practices for planting or growing and have clearly defined roles. For example, assigning people to distribute the seedlings in their planting holes based on the planting design can avoid misallocation of the different species. Workers' rights guarantee workers the freedom of association, elimination of any form of forced or child labor, as well as elimination of discrimination in employment (U.S. DOL 2021). Additionally, developers should ensure that implementers have access to resources such as housing and transport, and equitable compensation during the whole implementation process.

Species selection

It is critical to understand the intrinsic characteristics and attributes of each candidate species and how they interact and adapt to the environment in which they will grow; not all species will suit the site and meet local restoration goals. Where possible

and appropriate, native species should be prioritized. The species selection process should depend on local ecological conditions and soil characteristics, while anticipating how climate change might alter conditions and affect growth behavior, canopy structure, crown architecture (positioning of tree foliage), and demand for light, nutrients, and water. Species selection should also take account of social conditions, such as which species may be preferred by men or women in the community. You may have gathered some of this data when analyzing your project's land characteristics and tenure in the earlier stages; if not, you can rely on local knowledge to fill any gaps. The species should preferably belong to the same biome and region where the project will be implemented. In some cases, such as silviculture or agroforestry, the use of exotic species may be more effective than native species (this will depend on the site and the project objectives), but close attention should be paid to the invasive or otherwise damaging potential of some exotic species. Emphasis should be on growing native species.

Another component of successful restoration is the use of service tree species. The main services provided by trees in general are shade, nutrient cycling, nitrogen fixation, water infiltration and retention, soil decompaction, fauna attraction, carbon sequestration and, consequently, micro-climate regulation. Service tree species are those which, in addition to these ecosystem services, are inserted in the system intentionally to fill the "service" niche in productive restoration without expecting direct economic return from them. Plants with a good pruning response (high regrowth rate), strong ecological resilience, and adaptability, with notable biomass production,

are suitable as service species. Sometimes, the "best" service species for biomass production, for instance, are those considered aggressive or even with invasive potential—in this case, it is mandatory to manage and control them properly for the benefit of the entire ecosystem. If they cannot be managed, you should instead choose different service species that still meet services but won't cause damage if unmanaged. This is an important component of risk management.

Consider:

- ☐ What species are supported by local ecological conditions?
- ☐ Are they native or non-native species? Is there a potential for invasiveness?
- ☐ Are there service tree species that may support the growth of the primary species?
- ☐ Do the selected species benefit both men and women?

To learn more about the ecological conditions and soil characteristics for potential species of interest, please see "The Functional Attributes and Ecological Database" (ICRAF n.d.).

To use a species selection decision support tool for agroforestry projects, please see "The Agroforestry Database" (Orwa et al. 2010); to ensure adequate diversity and select the right species, see the Botanic Gardens Conservation International tree database (<https://www.bgci.org/>) and connect with local agricultural universities.

Seeds and seedlings

To acquire high-quality seeds and seedlings, it is necessary to understand and organize the entire supply chain, starting with the establishment of seed networks and capacity building, along with the identification and demarcation of mother trees. Seed collection should be carried out at the correct maturation period of each species, which will ensure longer storage and higher germination rates (development from seed to plant) (Gregorio et al. 2017).

Decisions on whether to proceed with seedlings (young plants sprouted from the seed) or direct seedlings (seeds planted in the ground) may depend on several project-specific criteria. For large-scale projects, direct seeding can be carried out using seed planters that are normally used for traditional annual crops, such as corn and soybeans.

The seeds of many plants are often impervious to water and gas and have a dormancy period (temporary pause in development) that prevents or delays the germination. Breaking the dormancy—which is necessary to promote rapid and homogeneous germination—can be done mechanically, thermally, or chemically. When calculating the number of seeds to produce the expected number of seedlings, you should consider the germination rate and the losses due to mortality after planting. In general, you can estimate using at least five times more seeds than the expected final planting density.

Consider:

- ☐ Do you have access to high-quality seeds and seedlings?
- ☐ How many seeds or seedlings do you need?
- ☐ Is the site appropriate for direct seeding?
- ☐ How will dormancy of seeds be broken?

B. PLANTING AND GROWING

Creating a management schedule—including when each implementation activity must occur, its frequency, and the resources required—will increase the likelihood of the early stages of planting being successful. Planting must be done carefully based on the design and timeline you establish.

Planting

The planting and growing seasons depend on the local climate. Consult with your local agriculture and forest university for the appropriate time for planting in the target landscape. After planting, it may be necessary to conduct successive mowing and weeding to prevent infestation or competition from weeds and invasive species during the establishment and growth of seedlings. Ensure secure access to irrigation in the early months (as appropriate) to avoid high mortality of the young plants, especially in

dryland and rain-fed areas. It would help to choose when to plant in line with the local climatic conditions, rainfall patterns, and other climatic land characteristics you identified during the scoping stage, as well as your access to resources.

Developing an efficient planting design can optimize nutrient cycling and even costs. A planting design divides the landscape into subregions and creates species arrangement blocks based on ecological, functional, and architectural characteristics. You should determine how you will group each species based on characteristics such as successional stage (position in ecosystem development), strata (level of soil to be planted in), and crown architecture (positioning of tree foliage). For example, service species may be planted before the planting of the main species to provide shading, nitrogen fixation, and soil decompaction. Service species can also be planted together with other trees, thus optimizing logistics when ordering seedlings from nurseries and lowering implementation costs.

Figure 13 illustrates an example of a planting design that takes into consideration soil type, potential for flooding, amount of available sunlight, existing plant competition, and topography, with a focus on growing coffee trees for harvest (PRETATERRA 2019). Developers should consult technical partners to determine what kind of planting patterns are most suitable to local conditions and species.

Consider:

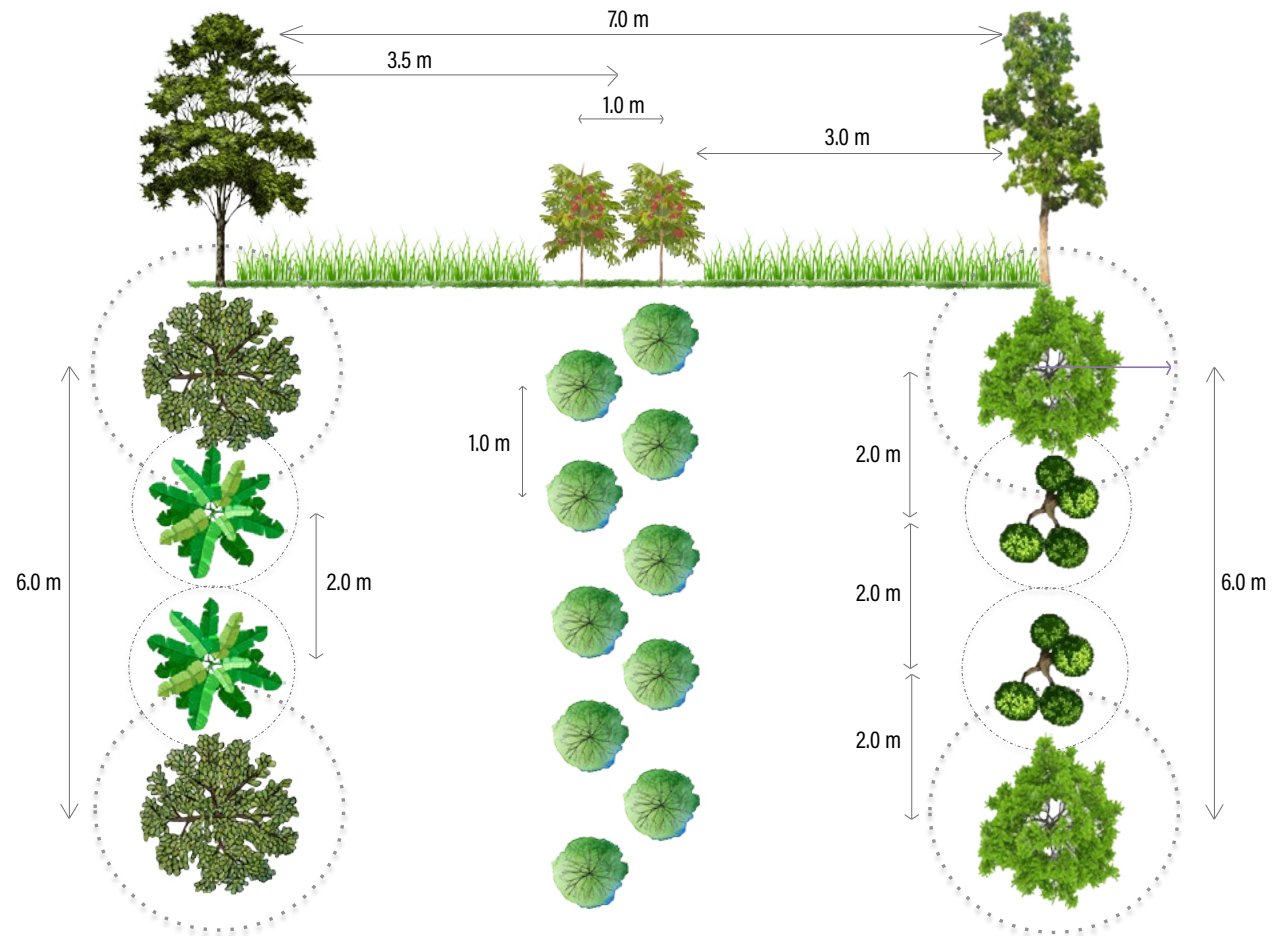
- ☐ How will the selected species interact with each other?
- ☐ Is there a particular order in which planting should occur?
- ☐ Do any of the species require special access to resources?

To learn more, refer to “Special Issue: Standards for native seeds in ecological restoration” (Pedrini, Dixon, Cross, eds. 2020).

Recurring implementation activities

The required frequency and intensity of recurring implementation activities will vary based on the ecological characteristics of each project site (see Table 19). For example, restoration projects that focus on carbon storage may not need to allocate labor or resources to harvesting, sorting, or processing, while projects that focus on a food or agricultural product may need to optimize these same processes to fulfill their demand. In some cases, fire protection will be a critical aspect of management, and a local governance mechanism for managing fires should be established. In other cases, it may be about mitigating risks from pest attacks by applying natural pest control solutions to affected areas or creating controls to prevent flooding.

Figure 13 | Illustration of a Planting Design



Note: This is an example of an agroforestry system, with the coffee crop integrated with various tree species.

Source: PRETATERRA 2019.

Table 19 | **Common Recurring Implementation Activities**

ACTIVITY	DESCRIPTION
Fertilization	Fertilizer application (organic or inorganic) may be needed up to 2 additional times per year based on the nutrient demand and behavior of the species and the stage of the tree growth. Organic fertilizers are recommended, given their low environmental impact. When using natural and organic manure, this demand may go up. Overall, you may customize the nutrient application to the local situation.
Irrigation	Drip-irrigation at the base of the plants, using hoses stretched along the tree lines and supplied by water tanks or reservoirs, is most recommended where possible for all species to conserve water. Irrigation should ideally be done based on local climatic conditions. For instance, in hot climates, early in the morning or late afternoon irrigation could avoid water losses and overheating the plants.
Mowing and weed control	Mowing for control of weeds or other undesired plants during the first 6–24 months after planting is critical and can be done by hand or machine.
Pruning and thinning	Pruning or thinning are common practices when implementing agroforestry systems, fruit orchards, and silviculture with native species. It may also occur at different stages after planting.
Harvesting	Harvesting will be necessary in projects producing food and non-food products, and can be done by hand or machinery.
Sorting	Sorting will be necessary if there are multiple harvested products, or if products will be sent to various locations for processing.
Processing	Processing will be necessary where products are destined for consumer use and need to be transported for distribution.

Source: WRI authors.

C. SITE MAINTENANCE AND RESOURCES

Maintaining the site is critical to the project's long-term viability, especially as threats to the intervention site from fire, drought, flooding, and other disturbances are likely to become greater with climate change. You should regularly monitor the site to determine which actions to take in response to observed disturbances, such as pests or disease

(see Table 20). Early intervention can prevent the disturbances from becoming too difficult to control.

Checklist

The implementation stage requires that you create a detailed plan for planting, assign roles and responsibilities to implementers, and managing the growth of the trees over time. Use the checklist in Table 21 to verify that you have reviewed all necessary conditions before reviewing the progress you have made over the course of each stage of the framework.

Table 20 | **Important Activities for Site Maintenance**

ACTIVITY	DESCRIPTION
Erosion control	• Mulching, or covering the soil with biomass, can form cover protection against erosion, drought, and weed growth, and increase nutrient cycling. • Alternative, biodegradable materials such as cardboard or woodchips may be used.
Invasive species control	• Ensure invasive species do not threaten native species and threaten existing ecosystems.
Pest and disease control	• Apply natural pest control solutions to affected areas, remove any attacked plants, and reevaluate the system's design and soil management. Some use of chemical herbicides may be recommended if done carefully and in a targeted way. • Ensure all controls and soil amendments are safe for the local ecosystem, such that it maintains water quality, prevents pollution, and is suitable for sustainable agriculture practices.
Waste control	• Ensure there are well-managed waste disposal systems.
Flooding control	• Create controls to prevent flooding, such as a well-tested drainage system and installing water control structures, to manage water movement.
Fire prevention	• Ensure project areas are cleared of debris with adequate water supply available to create noncombustible zones.
Biodiversity protection	• Maintain intact habitats, control emerging threats, and reinstate ecological processes when possible.
Infrastructure maintenance	• Utilities such as water, electricity, internet, and fuel need to be available in the area. • Fencing around the perimeter should be maintained to prevent animals from grazing and other intruders. • Road access should be maintained to enable efficient transport of equipment and produce. • Storage needs to be maintained as a refrigerated, dry, or adequately ventilated place to transition produce to market or processing.
Workers' health and safety	• Ensure that the project site follows all safety protocols and workers are not subject to prolonged sun or chemical exposure.

Source: WRI authors.

Table 21 | **Aspects to Consider at the Implementation Stage**

A) PREPARE SITE AND RESOURCES	B) MANAGE PLANTING AND GROWING	C) MAINTAIN SITE AND RESOURCES
• Species selection ▷ Ecological conditions ▷ Soil characteristics ▷ Service species • Seeds and seedlings preparation • Seed networks • Direct seeding • Planting timeline • Planting design • Soil preparation • Zoning and accessibility ▷ Fencing • Workers' training and rights • Other	• Planting • Fertilization • Irrigation • Mowing • Pruning • Harvesting • Sorting • Processing • Other	• Erosion control • Invasive species control • Pest and disease control • Waste control • Biodiversity protection • Infrastructure maintenance • Workers' health and safety • Other

Source: WRI authors.

Depending on the intervention that is conducted, it may be appropriate to conduct a forest inventory of the current land use and forest resources. This will help with estimating survivability and carbon estimates. For further details, see “Tree Restoration Monitoring Framework,” by CI and WRI (2022).







STAGE 5.

MONITOR:

HOW CAN YOU MAINTAIN OR IMPROVE
YOUR RESTORATION PROJECT?

Throughout the planning phase and especially following implementation, project developers should monitor how their project is performing relative to their objectives.

Restoration projects may have vastly different outcomes due to the number of variables involved; even when following a comprehensive project plan, there may be events that cannot be anticipated from the start. Therefore, understanding your successes and challenges during the monitoring stage can help improve the project and determine the appropriate next steps.

Establishing a monitoring system early, at the design stage, is critical to measuring performance. Monitoring can be initiated early on with the collection of baseline data needed to assess the impacts of implementation. Once you begin implementation and the project progresses, you can tailor your indicators and metrics further. As the forests and trees remain protected or grow, you may use observation, sampling, a citizen science approach, remote sensing, and various analytical methods at varied frequencies to gather the data for the indicators.

Observational data may include recording nutrient deficiencies, diseases, or visual anomalies. Sampling data may include more quantitative methods, such as measuring the number of plants, mortality rates, and height, or chemical methods such as testing soil or leaves for nutrients. The data and trends in the indicators will guide your decisions on what management actions to take.

Consider:

- ☐ Do the indicators and metrics match your restoration objectives?
- ☐ What is your project's impact on the well-being of ecosystems and people?

Recommended further reading:

- To learn more about key indicators to measure different restoration priorities and restoration goals with examples that can aid you to set up useful monitoring systems, please see *The Road to Restoration* (FAO and WRI 2019).
- To learn more about key headline indicators and how to align with UN decade principles, please see “Restoration project information sharing framework: A resource for coordinated monitoring and reporting on ecosystem restoration” (Gann et al. 2022).

A. PERFORMANCE

Part of conducting a successful project is communicating your successes to partners and funders in order to build momentum and further the global restoration agenda. Projects like yours serve as powerful stories for how restoration can rebuild ecosystems and livelihoods. Evaluating your project's performance will give you the ability to track and visualize your progress. You can find the necessary data through the monitoring systems, stakeholder interviews, and internal audits that you set up during the design phase. Monitoring and evaluation will enable learning and knowledge sharing (see Table 22).



Table 22 | **Key Considerations for Periodic Monitoring and Evaluation of Restoration Projects**

PROJECT EVALUATION CRITERIA	DESCRIPTION
Impact on restoration goals	Consider the initial eight restoration goal-themes: biodiversity, culture, community, food and products, climate, soil, water, and energy. What objectives did you set and what progress have you made towards them? <i>For instance, if your focus is biodiversity protection, what is the biodiversity target status? How did you fare on ecosystem integrity?</i>
Delivery of value proposition	Consider your unique environmental, social, and economic offerings. Was value delivered justly across your value chain? <i>If your value proposition is selling organic cocoa to a new market, for example, were you able to restore the land and hire local workers as well?</i>
Effectiveness of restoration intervention	Consider the restoration opportunities and landscapes you identified. How many hectares of land have been restored or improved from their pre-implementation conditions? <i>For instance, tree cover gain, species survival rate, natural generation. Notably, you may recognize that you will not reach 100% survival and that sapling mortality is part of the process. Monitoring survival will help to determine the optimal density, species mixture, etc.</i>
Ecological functions	Consider secondary objectives that interest you. What was the impact of the project on ecosystem services outside of your restoration goals? <i>For instance, has the project contributed to sustaining biodiversity, erosion or flood control, or improving air quality?</i>
Institutional support	Consider how you have aligned the project with governments and funders. What have you accomplished with them? <i>For instance, has the project contributed to international pledges or created country-level restoration opportunity assessment?</i>
Impact on stakeholders	Consider the various stakeholders you have engaged so far. Have partners and the local community accepted and benefitted from this project, and how? <i>For example, has the project created jobs, supply chain support, or community investment?</i>
Revenues generated	If the project is linked to providing a good or service for economic benefit, have you been able to generate revenue? Did you meet investor expectations?
Compliance	Have you complied with all necessary policies, regulations, and technical guidelines? Have you been eligible for any certifications along the way?
Challenges	What have been the most difficult parts of the planning and implementation processes?

Source: WRI authors.

B. ADAPTIVE MANAGEMENT

Now that you have measured the project's progress, you can address any of the challenges faced; continuous improvement is the backbone of every successful long-term project (Table 23). Using the performance data you have already gathered will help to create strong feedback loops. Throughout the monitoring stage, you should consider which of your key activities can be maintained versus improved, from re-examining grant opportunities, to hiring another local expert, to learning better planting techniques. Not all process improvements can take place right away, given project constraints like time, money, or labor. You can prioritize which of the following activities require immediate attention by considering the process improvement steps for each part of the value chain.

Consider:

- ☐ Have your restoration goals changed?
- ☐ What process improvements do you want to pursue in the future?
- ☐ Do you have sufficient resources to support maintenance?
- ☐ Will ecological, social, and economic conditions allow you to continue?

Table 23 | **Key Considerations for Adaptive Management in a Restoration Project**

TYPE OF ACTIVITY	STEPS OF PROCESS IMPROVEMENT
Operational	
Planting and growing	
Monitoring	
Maintenance	
Sustainable resource management	
Sales and marketing	☐ Map process: Where is the value delivered within this activity?
Sourcing and supply chain	☐ Analyze process: Where is there room to optimize?
	☐ Redesign process: How do you want to change the activity?
	☐ Acquire resources: What part of the activity is the most resource-intensive?
Social	☐ Implement and communicate changes
Workers' capacity and engagement	
Community capacity and engagement	
Institutional	
Financing	
Governance and risk management	
Research and innovation	

Source: NHS 2005.

C. SCALING AND EXIT

Because restoration is a long-term commitment, the results and the benefits may become apparent after a few years or not for several decades, depending on the goal of the restoration project (ecological restoration versus cultural or economic use). Once implementation and process improvements are underway, you may be wondering what the project will look like in the future. There are two clear paths that may be open to you: expand or exit the project. Regardless of

which path you choose, you must ensure that there is a long-term management plan for the project, especially if you will no longer be directly involved as a developer or implementer or practitioner or planner.

Expand

The lessons you have learned during the scope, design, finance, and implement stages will help you decide whether you want to scale up the restoration project based on the opportunities and constraints presented. If you are interested in expanding, you can

revisit this guide's framework for a structured map of the project planning process.

Consider:

- ☐ Is the restoration model or its products accepted by the new stakeholders, including business model adopters, communities under the area of influence, and market participants? If not, are there viable options to address any issues?
- ☐ Are the ecosystems services positively leveraged by the expansion?
- ☐ Will institutional partners continue to operate in partnership? Or which will be the new institutions involved?
- ☐ Which new policies and regulations will be applicable?
- ☐ How are the markets structured and how will they be influenced by your expansion?
- ☐ How are the conditions of infrastructure regarding access, telecommunications, and outflow of products?
- ☐ Can you access new land and labor? If yes, which investments are necessary in the training of new workers or assistance to new adopters of the model?

Close and exit

After a project reaches maturity or delivers the results defined during the design phase, the project proponents or investors may exit the project. If exiting before the project reaches maturity, it is extremely important to secure a team that can carry

out the remainder of the project in an effective and sustainable manner. You should work on transitioning the team through a knowledge sharing process and manage future expectations with all relevant stakeholders in the value chain.

Potential exit strategies include handing off the project internally to partners, management, family, or employees, or externally to investors, other project developers, or companies. If the project generates returns for investors, you should understand their expectations and any buyers' expectations (if applicable) before defining an exit strategy.

Consider:

- ☐ Who has enough knowledge and/or resources to continue the project?
- ☐ Have you consulted all the stakeholders in the value chain?
- ☐ Have your restoration goals been achieved, or can you ensure that they will be in the future?

Checklist

Following each part of the Monitor stage, from celebrating the project's accomplishments to identifying areas of improvement, will help you better understand where the project stands. Use the checklist in Table 24 to verify that you have reviewed all necessary conditions before selecting your next steps. You may want to revisit the framework or continue for additional project planning resources.

Table 24 | **Key Considerations for the Monitoring Stage**

A) PERFORMANCE	B) ADAPTIVE MANAGEMENT	C) SCALING AND EXIT
• Impact on restoration goals • Delivery of value proposition • Effectiveness of restoration intervention • Ecological functions • Institutional support • Impact on stakeholders • Revenues generated • Compliance • Challenges • Other	• Map processes ▷ Operational ▷ Social ▷ Institutional • Analyze processes • Redesign processes • Acquire resources • Implement and communicate changes	• Maintain ▷ Goal reassessment ▷ Resource availability ▷ Feasibility • Exit ▷ Knowledge sharing ▷ Stakeholder consultation ▷ Internal vs. external transition • Expand ▷ Revisit framework

Source: WRI authors.



APPENDIX A. METHODOLOGICAL NOTE

This guide was designed using three methods:

1. A systematic literature review sought to identify existing restoration implementation guides and determine whether there are gaps in resources for restoration planners and practitioners. The literature review was carried out using Google Scholar, Google Advanced Search, and Google Search to identify publications, guidebooks, manuals, and catalogs for implementing restoration. The review was carried out in July 2019. Keywords or proxy terms used for the online search were generic and not tailored to geography, language, or study area to glean globally available resources for restoration planners and practitioners. Keywords used for online search for the literature review were:
 - Landscape Restoration: restoration, ANR, assisted natural regeneration, ecosystem restoration, agroforestry, silvopasture development, plantation, horticulture, bamboo plantation, trees on boundaries, land
 - Implementation: operationalizing, typology, methodology, procedure, guidebook, training manual
 - Combinations of phrases used (here some geography-specific phrases were added, such as *wadi*):
 - How to implement landscape restoration/restoration?
 - How to operationalize landscape restoration/restoration?
 - Restoration typology
 - Technical guidebook for restoration/

landscape restoration?

- Training manual for agroforestry
- Guidebook on agroforestry
- Training manual on ANR/assisted natural regeneration
- Implementation of ANR/assisted natural regeneration
- Guidebook on silvopasture
- Guidebook on *wadi*
- Training manual on *wadi*

The online search results led to 20 guides or publications, after discarding those that were not relevant for the study. Review indicated that most of these guides were specific to a type of restoration intervention, biome, and geography, or did not include a focus on gender equity and social inclusion, financing, or monitoring considerations. Some guides were broader in the application, and we have included them as additional reading in this guidebook.

2. Knowledge of the requirements and needs of restoration practitioners at the country level—drawn from the authors' years of interaction with 100+ collective project developers, funders, and implementers that are involved with restoration projects through WRI, WRI Brasil, WRI India, and WRI México—was synthesized to create a first draft of a universal five-stage framework. Of the many projects the authors worked on and reviewed, three successful case study projects were chosen for drawing examples in order to develop a baseline understanding of good practices in restoration planning processes and to further strengthen and streamline the five-stage framework. This was an iterative process. The case study analysis helped to streamline commonalities in the restoration planning

process and map out the initial five universal stages of the framework—Scope, Design, Finance, Implement, and Monitor—across the different geographies and restoration models, and to draw out learning from 100+ projects. The case studies that supported the authors' existing knowledge were India's *wadi* project (NABARD 2021), Mexico's Planalto tree planting project (Planalto 2021), and Brazil's coffee regenerative agriculture project (Ziantoni et al. 2019). India's *wadi* project was chosen due to its careful consideration of gender equity and community consultation; the Planalto project was chosen due to its effective financing scheme and impact of one million trees planted; and the coffee regenerative agriculture project was chosen due to its sustainable agroforestry model. The five-stage framework was further fleshed out by discussing the learnings about landscape restoration implementation from Brazil, India, and Mexico in these countries and the global experience of the authors through a series of online internal meetings over a period of six months.

3. Individual consultations with six expert restoration project developers, funders, and implementers then helped to refine the framework, including:
 - a Norwegian institutional investor with reforestation and carbon capture projects in Nicaragua;
 - an Argentine company restoring native forests, and measuring and offsetting corporate carbon emissions;
 - a Moroccan foundation planting fruit trees to support rural incomes and livelihoods;
 - a global company engaged in agroforestry and sustainability consulting services;
 - an agroecologist specializing in landscape restoration and people-nature interactions; and

- a senior researcher specializing in forest management and restoration implementation.

In hour-long, virtual call sessions held between February and May 2021, each interviewee was asked to describe the main stages of the restoration planning process in order to verify the applicability of the framework and provide input into the main topics under each stage of the framework. Guiding questions included: what are the most important steps in the project planning process; what makes a project feasible; and what challenges have you faced during the planning process? Discussions were open-ended and adapted based on the interviewees' responses.

Following these interviews, an outline of *The Restoration Roadmap* checklists was reviewed by each interviewee to ensure that none of the universal, critical steps in the planning process was missing. The authors incorporated information from the expert consultations into the framework and its contents. The contents of this beta version of this guidebook may be changed over time as the guidebook is road-tested by on-the-ground implementers.

APPENDIX B. OVERVIEW OF KEY RESTORATION INITIATIVES AND ACTORS

SCOPE OF INITIATIVE	INITIATIVES AND ACTORS
Global	• Bonn Challenge: Bring 150 Mha of degraded and deforested landscapes into restoration by 2020 and 350 Mha by 2030 (Bonn Challenge) • New York Declaration on Forests: Bring 200 Mha of forest into restoration and halve deforestation by 2030 (NYDF) • Aichi Target 15: Restore at least 15% of degraded ecosystems by 2020 (Convention on Biological Diversity) • SDG 15.3 and Land Degradation Neutrality (LDN): Combat desertification; restore degraded land and soil, including land affected by desertification, drought, and floods; and strive to achieve a land degradation-neutral world by 2030 (UNCCD) • Trillion tree pledge by 2030 by private corporations (It.org n.d.)
Continental	• African Forest Landscape Restoration Initiative (AFRI00): A country-led effort to bring 100 Mha of land in Africa into restoration by 2030 (WRI) • Initiative 20x20: A country-led effort to bring 20 Mha of land in Latin America and the Caribbean into restoration by 2020 (WRI) • Agadir Commitment: A country-led effort to bring 8 Mha of forests in the Mediterranean Basin into restoration by 2030 (Bonn Challenge) • Asia-Pacific Economic Cooperation Goal: A country-led effort to bring 20 Mha of land in the Asia-Pacific region into restoration by 2020 (FAO) • Europe, the Caucas and Central Asia Commitment: A country-led effort to bring 30 Mha of degraded and deforested land into restoration by 2030 (Bonn Challenge) • India National Commitment: A country-led effort to bring 26 Mha of land in India into restoration by 2030 under the Bonn Challenge and LDN target
National	• Governments • Private sector • Civil society • Research institutions
Regional	• Non-governmental organizations • Communities and indigenous people • Private sector • Local authorities

Note: All Continental initiatives are being carried out in alignment with the Bonn Challenge.

Sources: Adapted from Bonn Challenge 2020b; CBD 2012; NYDF n.d.; UNCCD 2015; and It.org n.d.

APPENDIX C. RESTORATION ROADMAP STAGE 1 – SCOPE

STEP	CHECKLIST		CONSIDERATIONS
A) Define restoration goals	☐ Goal-themes ☐ Biodiversity ☐ Culture ☐ Community ☐ Food and products ☐ Climate	☐ Soil ☐ Water ☐ Energy ☐ Objectives ☐ Desired outcomes	☐ Why is restoration needed? ☐ How will you make your goals actionable? ☐ Are all the necessary groups represented in your goals? ☐ What are the desired outcomes? Recommended further reading: ▪ <i>The Road to Restoration</i> (FAO and WRI 2019) ▪ “Principles for ecosystem restoration to guide the United Nations Decade 2021–2030” (FAO et al. 2021) ▪ “International principles and standards for the practice of ecological restoration” (Gann et al. 2019) ▪ “Ten people-centered rules for socially sustainable ecosystem restoration” (Elias et al. 2021)
B) Map restoration opportunities and prioritize landscapes	☐ Need for restoration ☐ Scale and drivers of degradation ☐ Type and potential of interventions ☐ Availability of land ☐ Potential for social inclusion ☐ Existing initiatives and Incentives ☐ Government objectives	☐ International commitments ☐ Stakeholder mapping and engagement ☐ Prior informed consent ☐ Benefit sharing ☐ Equitable compensation ☐ Conflict resolution ☐ Other	☐ Where is landscape degradation most severe? ☐ Which restoration interventions are needed where, and what is the estimated impact? ☐ In which regions could you best pursue your restoration goals? ☐ Is there overlap between your identified landscapes and existing initiatives? ☐ Has the government in your geography set restoration objectives that you can contribute to? ☐ What benefits can you leverage on a global/continental/national/regional level? ☐ What are the priorities and needs of key stakeholders in each identified landscape? ☐ What are the connections and relationships among them? ☐ Can you feasibly secure the support of stakeholders for your project? ☐ Have you consulted the local community and established equitable benefit sharing systems? ☐ Are your land rights clearly defined? ☐ Has everyone been fairly compensated for these rights? Recommended further reading: ▪ “Restoration Opportunities Assessment Methodology” (IUCN and WRI 2014) ▪ “Restoring Landscapes in India for Climate and Communities” (Singh et al. 2020) ▪ “Mapping Social Landscapes” (Buckingham et al. 2018) ▪ “Gender-Responsive Restoration Guidelines” (IUCN 2017) Recommended resources: ▪ Atlas of Forest and Landscape Restoration Opportunities (WRI 2014) ▪ Restoration Opportunities Atlas (India) (WRI India) ▪ InfoFLR FLR Activities by Country (IUCN 2016)

STEP	CHECKLIST		CONSIDERATIONS
C) Analyze trade-offs and risks	☐ Feasibility ☐ Costs and benefits ☐ Risk mitigation ☐ Ecosystems ☐ Legal and policy	☐ Operational ☐ Economic and financial ☐ Human and cultural ☐ Other	☐ What kinds of trade-offs and risks exist and to what extent can they influence a project? ☐ What resources do you require to mitigate any potential risks? ☐ Do the potential benefits of the project outweigh the costs?
D) Select project site	☐ Current land use ☐ Bare land ☐ Cropland ☐ Forest ☐ Industrial land ☐ Mangrove ☐ Peatland ☐ Settlement ☐ Shrubland ☐ Wetland ☐ Land characteristics ☐ Biophysical ☐ Climatic ☐ Location and size	☐ Land tenure ☐ State ☐ Private ☐ Communal ☐ Open access ☐ Land rights ☐ Use rights ☐ Control rights ☐ Transfer rights ☐ Customary rights ☐ Local and national regulations ☐ Compliance ☐ Permits ☐ Restrictions	☐ What kind of landscape is the project operating within and what are its key features? ☐ What scale of project can the landscape support? ☐ Do I have the rights to use and manage the land and its products? ☐ What policies do I need to comply with before I can start the project? ☐ How much degraded land to be restored does not conflict with other land use needs, such as food, fiber, and energy production? ☐ What is the potential value for timber, non-timber, and/or ecosystem services, such as carbon storage and removal? ☐ How can you improve the livelihoods of forest dependent people? ☐ Are forests natural or planted? ☐ Are forests pre-existing or newly established? ☐ Are forests composed of native or non-native species? ☐ Are your land rights clearly defined? ☐ Has everyone been fairly compensated for these rights? Recommended further reading: • "The Restoration Diagnostic" (Hansen et al. 2015) • "Land Tenure and Rural Development" (FAO 2002) • "On Equal Ground: Promising Practices for Realizing Women's Rights in Collectively Held Lands" (Salcedo-La Viña and Giovarelli 2021)
E) Determine value proposition	☐ Scope of impact ☐ Environmental ☐ Social	☐ Economic ☐ Value chain ☐ Competitive landscape	☐ Is the project filling a specific gap in the market? ☐ Are there any competitors (for commercial projects) that are operating similarly? ☐ How can you leverage your value proposition to secure resources and/or partnerships?

Source: WRI authors.

APPENDIX D. RESTORATION ROADMAP STAGE 2 – DESIGN

STEP	CHECKLIST		CONSIDERATIONS
A) Define restoration intervention	☐ Active interventions ▷ Agroforestry ▷ Silvopasture ▷ Reforestation ▷ Mixed species plantations ▷ Riverbank restoration	☐ Passive interventions ▷ Natural regeneration ▷ Assisted natural regeneration ▷ Farmer-managed natural regeneration ▷ Conservation ☐ Other	☐ Does the intervention support your restoration goals? ☐ Does the intervention maximize impact and minimize costs? ☐ Does the intervention work across landscapes? Recommended further reading: ▪ “Contemporary forest restoration: A review emphasizing function” (Stanturf et al. 2014) ▪ “Sustainable Forest Management Toolbox” (FAO 2017a) ▪ “International principles and standards for the practice of ecological restoration” (Gann et al. 2019)
B) Manage key activities	☐ Operational ▷ Planting and growing ▷ Maintenance ▷ Monitoring ▷ Sustainable resource management ▷ Sales and marketing ▷ Sourcing and supply chain ☐ Social ▷ Workers’ engagement ▷ Community engagement	☐ Institutional ▷ Financing ▷ Governance and risk management ▷ Research and innovation ☐ Other, such as exit strategy	☐ Do you have (or have access to) the necessary expertise and experience to conduct each activity? ☐ When should each activity begin? ☐ What resources do you need to support each activity? ☐ Has a monitoring system been developed with appropriate baseline indicators? Recommended further reading: ▪ <i>The Road to Restoration</i> (FAO and WRI 2019)
C) Secure key resources	☐ Implementation ▷ Land ▷ Labor ▷ Seeds and seedlings ▷ Planting materials ▷ Water resources ▷ Equipment ☐ Knowledge ▷ Local expertise ▷ Data	☐ Access ▷ Infrastructure ▷ Local capacity ▷ Finance ▷ Markets ☐ Other	☐ Where can you secure each resource from? ☐ Are there any partners or programs that can help locate resources? ☐ Do you have clear terms and conditions for each deal you may enter?

STEP	CHECKLIST		CONSIDERATIONS
D) Engage and establish partnerships	☐ Governments ☐ Small and medium-sized enterprises ☐ Corporations ☐ Non-governmental organizations ☐ Local community	☐ Private landowners and farmers ☐ Cooperatives ☐ Investors ☐ Research organizations ☐ Other	☐ What kind of value can a partner add to the project? ☐ What responsibilities do you expect a partner to take on? ☐ What kind of expertise do they offer? (For instance, local knowledge, technical expertise, or a network of partners) ☐ What financial contribution do they require, or can they make? ☐ What mechanisms ensure accountability from both sides? ☐ How will you approach termination if necessary?
E) Protocols and certifications	☐ Forest management ☐ Carbon ☐ Ecosystem services	☐ Sustainable agriculture ☐ Not applicable ☐ Other	☐ How much value would certification add to the project? ☐ Is certification necessary to compete in your respective market? ☐ What is required to be eligible for certification? ☐ How much would certification cost? ☐ Do you have the data availability to support the verification process?

Source: WRI authors.

APPENDIX E. RESTORATION ROADMAP STAGE 3 – FINANCE

STEP	CHECKLIST		CONSIDERATIONS
A) Revenue sources	☐ Products ▷ Wood ▷ Food ▷ Agricultural commodities ▷ Fodder ▷ Non-timber forest products (NTFPs)	☐ Services ▷ Carbon ▷ Biodiversity ☐ Water ☐ Not applicable ☐ Other	☐ How much revenue will your product/service generate, and how often? ☐ Is there a commercial component of the project? ☐ Will you face significant competition in the market for your products or services? ☐ Do you know who your target customer segment is and how you can reach them? ☐ How much revenue do you expect to bring in? Recommended further reading: ▪ "The Roots of Prosperity: The Economics and Finance of Restoring Land" (Ding et al. 2017)
	B) Costs	☐ Land ☐ Labor ☐ Planting materials ☐ Equipment ☐ Infrastructure	☐ Monitoring ☐ Maintenance ☐ Financing ☐ Insurance ☐ Other ☐ Do your costs tie into your objectives and intended capital structure? ☐ How much funding will you need to begin the project? ☐ Can you negotiate any discounts or cost reductions? ☐ Have you tested out multiple macroeconomic and pricing scenarios? ☐ If applicable, when do you expect the project to be profitable? Recommended further reading: ▪ "Economics of Forest Landscape Restoration: Estimating Impacts, Costs and Benefits from Ecosystem Services" (Gromko et al. 2019) ▪ "Economic Incentives for SFM and Landscape Restoration" (World Bank 2004) ▪ "Attracting Private Investment to Landscape Restoration: A Roadmap" (Faruqi and Landsberg 2017)

STEP	CHECKLIST		CONSIDERATIONS
C) Financing options	☐ Debt ☐ Equity ☐ Grants ☐ Incentives	☐ Subsidies ▸ Government guarantees ▸ Direct payments ▸ Carbon credits ▸ Minimum support price ☐ Not applicable ☐ Other	☐ Do you have access to traditional financing? ☐ Are you eligible for any grants or incentives? ☐ Have you considered the impacts of market conditions, such as inflation and interest rates, on your financing options?
D) Funders	☐ Institutional ▸ Venture capital ▸ Private equity ▸ Impact investors ☐ Banks ▸ Commercial ▸ National ▸ Multilateral development ☐ Governments ▸ Bilateral ▸ Municipal and regional ▸ National	☐ Philanthropy ▸ Civil society ▸ Foundations ▸ Wealthy individuals ☐ Other ▸ Pension funds ▸ TIMOs ▸ Retail investors ☐ Not applicable	☐ When do you need your funding? ☐ How much control do you want over the project? ☐ Are you eligible for the type of funding you are looking for?

Source: WRI authors.

APPENDIX F. RESTORATION ROADMAP STAGE 4 – IMPLEMENT

STEP	CHECKLIST	CONSIDERATIONS
A) Prepare site and resources	☐ Soil preparation ☐ Zoning and accessibility ▷ Fencing ☐ Workers' training and rights ☐ Species selection ▷ Ecological conditions ▷ Soil characteristics ▷ Service species	☐ Seeds and seedlings ▷ Seed networks ▷ Direct seeding ☐ Other ☐ What species support local ecological conditions? ☐ Are they native or non-native species? Is there a potential for invasiveness? ☐ Are there service tree species that may support the growth of the primary species? ☐ Do the selected species benefit both men and women? ☐ Do you have access to high-quality seeds and seedlings? ☐ How many seeds or seedlings do you need? ☐ Is the site appropriate for direct seeding? ☐ How will dormancy of seeds be broken? Recommended further reading: ▪ "Implementing forest landscape restoration: a practitioner's guide" (Stanturf et al. 2017) ▪ "Agroforestry Systems for Ecological Restoration" (Miccolis et al. 2016) ▪ "Approaches to classifying and restoring degraded tropical forests for the anticipated REDD+ climate change mitigation mechanism" (Sasaki et al. 2011) ▪ To learn further on "International principles and standards for the practice of ecological restoration," see Gann et al. (2019) ▪ To learn further on "Standards for native seeds in ecological restoration," see Pedrini et al. (2020).
B) Planting and growing	☐ Planting ▷ Planting timeline ▷ Planting design ☐ Recurring implementation activities ▷ Fertilization ▷ Irrigation	☐ Mowing ☐ Pruning ☐ Harvesting ☐ Sorting ☐ Processing ☐ Other ☐ How will the selected species interact with each other? ☐ Is there a particular order in which planting should occur? ☐ Do any of the species require special access to resources? Recommended further reading: ▪ "Tree Restoration Monitoring Framework: Field Test Edition" (CI and WRI 2022)
C) Site maintenance and resources	☐ Erosion control ☐ Invasive species control ☐ Pest and disease control ☐ Waste control	☐ Biodiversity protection ☐ Infrastructure maintenance ☐ Workers' health and safety ☐ Other ☐ Do you have systems in place to address any disturbances?
D) Monitor key indicators	☐ Indicators ▷ Output ▷ Species survival rate ▷ Natural generation ▷ Ecosystems impact ▷ Social impact and well-being	☐ Methods ▷ Observation ▷ Sampling ▷ Analysis ☐ Other ☐ Do the indicators match your restoration objectives? ☐ Are you measuring output, species survival rate, and natural generation? ☐ What is the project's impact on the well-being of both ecosystems and people?

Source: WRI authors.

APPENDIX G. RESTORATION ROADMAP STAGE 5 – MONITOR

STEP	CHECKLIST		CONSIDERATIONS
A) Performance	☐ Impact on restoration goals ☐ Delivery of value proposition ☐ Effectiveness of restoration intervention ☐ Ecological functions ☐ Institutional support	☐ Stakeholder acceptance ☐ Revenues generated ☐ Compliance ☐ Challenges ☐ Other	☐ Has the project achieved your desired outcomes? ☐ Is the project ecologically sustainable? ☐ Is the project socially inclusive? ☐ Is the project still economically feasible? ☐ Has there been support for the project from the local community, partners, funders, and institutions? ☐ Have you communicated your successes to your audience? Recommended further reading: ▪ To learn further on key indicators to measure different restoration priorities and restoration goals, with examples that can aid you to set up useful monitoring systems, please see “The Road to Restoration” (FAO and WRI 2019). ▪ To learn further on key headline indicators and how to correspond with UN decade principles, please see “Restoration project information sharing framework: A resource for coordinated monitoring and reporting on ecosystem restoration” (Gann et al. 2022) and “Tree Restoration Monitoring Framework: Field Test Edition” (CI and WRI 2022).
B) Adaptive management	☐ Map processes ▸ Operational ▸ Social ▸ Institutional ☐ Analyze processes	☐ Redesign processes ☐ Acquire resources ☐ Implement and communicate changes	☐ Have your restoration goals changed? ☐ What process improvements do you want to pursue in the future? ☐ Do you have sufficient resources to support maintenance? ☐ Will ecological, social, and economic conditions allow you to continue?
C) Close and exit	☐ Maintain ▸ Goal reassessment ▸ Resource availability ▸ Feasibility ☐ Expand ▸ Revisit framework	☐ Exit ▸ Knowledge sharing ▸ Stakeholder consultation ▸ Internal vs. external transition	☐ Is the restoration model or its products accepted by the new stakeholders, including business model adopters, communities under the area of influence, and market participants? If not, are there viable options to address any issues? ☐ Are the ecosystems services positively levered by the expansion? ☐ Will institutional partners continue to operate in partnership? Or which will be the new institutions involved? ☐ Which new policies and regulations will be applicable? ☐ How are the markets structured and how will they be influenced by your expansion? ☐ How are the conditions of infrastructure regarding access, telecommunications, and outflow of products? ☐ Can you access new land and labor? If yes, which investments are necessary in the training of new workers or assistance to new adopters of the model? ☐ Who has enough knowledge and/or resources to continue the project? ☐ Have you consulted all the stakeholders in your value chain? ☐ Have your restoration goals been achieved, or can you ensure that they will be in the future?

Source: WRI authors.

ENDNOTES

1. Castes, races, or tribes or parts of such social groups that form a category defined as “backward classes,” or socially-deprived people for whom the Constitution of India, under Article 341, has made separate provisions for upliftment and protection.
2. Tribes or tribal communities deemed as “scheduled tribes” under Article 342 of India’s Constitution. The constitution makes special provisions for the protection of these communities, and the state is expected to execute schemes for their welfare and upliftment.

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ACKNOWLEDGMENTS

Immense gratitude and thanks to those who have helped develop this guidebook. The authors express their particular thanks to the following individuals for their valuable guidance and critical reviews: Bethanie Walder (SER), Claudia Schepp (The "4 per 1000" Initiative), Harma Rademaker (Commonland), Lilian Goredema (FAO), Marie Veyrier (Global Shea Alliance), and Mike Wong (IUCN). We are also grateful for review and feedback from Robin Chazdon (WRI), Bernadette Arakwiye (WRI Africa), Cosmas Ochieng (WRI), Madhu Verma (former WRI India), and Rod Taylor (WRI), and for the assistant support from Meenakshi Kakkar (WRI India).

The authors would also like to acknowledge those involved with graphic design, editing, the RDI review process, and layout, as well as communications and outreach: Emily Matthews, Gregory Taff, Kate Musgrave, Jerin Tan, Shweta Prajapati, Romain Warnault, and Billie Kanfer.

This report is an output of the WRI South-South collaboration project on restoration. We are pleased to acknowledge our institutional strategic partners, who provide core funding to WRI: Netherlands Ministry of Foreign Affairs, Royal Danish Ministry of Foreign Affairs, and Swedish International Development Cooperation Agency.

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PHOTO CREDITS

Cover, pg. 4, 13, 15, 16, 31, 33, 34, 42, 50, veritree; Pg. 2 Hu Chen/Unsplash; Pg. 10, 24, 41, 46, WRI India; Pg. 20, Urvara Krsi; Pg. 53, SenzAgro.

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Natural resources are at the foundation of economic opportunity and human well-being. But today, we are depleting Earth's resources at rates that are not sustainable, endangering economies and people's lives. People depend on clean water, fertile land, healthy forests, and a stable climate. Livable cities and clean energy are essential for a sustainable planet. We must address these urgent, global challenges this decade.

Our vision

We envision an equitable and prosperous planet driven by the wise management of natural resources. We aspire to create a world where the actions of government, business, and communities combine to eliminate poverty and sustain the natural environment for all people.

Our approach

COUNT IT

We start with data. We conduct independent research and draw on the latest technology to develop new insights and recommendations. Our rigorous analysis identifies risks, unveils opportunities, and informs smart strategies. We focus our efforts on influential and emerging economies where the future of sustainability will be determined.

CHANGE IT

We use our research to influence government policies, business strategies, and civil society action. We test projects with communities, companies, and government agencies to build a strong evidence base. Then, we work with partners to deliver change on the ground that alleviates poverty and strengthens society. We hold ourselves accountable to ensure our outcomes will be bold and enduring.

SCALE IT

We don't think small. Once tested, we work with partners to adopt and expand our efforts regionally and globally. We engage with decision-makers to carry out our ideas and elevate our impact. We measure success through government and business actions that improve people's lives and sustain a healthy environment.

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