



Enabling Factors to Scale Up Forest Landscape Restoration:

The Roles of Governance and Economics

Full Report with Case Studies



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Foreword



Fran Price,
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Next year will mark the start of the UN Decade on Ecosystem Restoration 2021–2030. That’s both good and bad news: good news because restoration has come to the attention of decision-makers at the highest level; bad news because it is an acknowledgement that we have lost and degraded our ecosystems to the point that we urgently need to restore them. Forests have been particularly affected – we have been losing natural forests at a rate of 11 million hectares per year over the past decade.

Recognizing this, political leaders and decision-makers have made ambitious commitments to restore vast areas of forests through voluntary mechanisms, such as the Bonn Challenge, the New York Declaration on Forests, the AFR100 and the Trillion Trees Initiative (1t.org), or through legally binding commitments under the UN environmental conventions, such as the Convention on Biological Diversity (CBD), the UN Convention to Combat Desertification (UNCCD) and the UN Framework Convention on Climate Change (UNFCCC).



Alexander Buck,
*Executive Director,
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Of the different approaches to restoring forests, forest landscape restoration (FLR) – an approach developed by WWF and IUCN in 2000 – holds the promise of reversing these sobering trends. While there exists numerous initiatives and much goodwill, there remains a need to accelerate and truly scale up efforts on the ground to restore forests – in terms of both quality and quantity. It is not just more trees that we need, but the right trees, in the right place, for the right reasons, and with the right people. This requires strong political leadership across sectors, with ambitious, time-bound and measurable targets and indicators for implementing FLR in a participatory and equitable fashion. It also requires scaling up and building on existing outreach and delivery mechanisms that reach rural areas and engage local communities effectively.

In light of this, WWF and IUFRO have come together to push the forest restoration agenda forward using our combined scientific, policy and field implementation expertise. Both of our organizations have been exploring lessons learned in FLR (IUFRO FLR Snapshot and WWF FLR Field Experiences) to understand what works and what doesn’t as a basis for informing future implementation. Today, we are pleased to see this first output of our collaboration. This study seeks to better understand enabling governance and economic factors that can inform FLR implementation, based on sound evidence gathered from diverse contexts. It draws on 10 country case studies to identify opportunities and avenues for scaling up forest restoration, providing decision-makers with an overview of the many options available so that they can take the bold steps to make the changes required, at the pace required, to upscale FLR.

The time is now to make forest restoration at scale a success so that it can contribute to reversing the degradation of forests and loss of biodiversity, as well as help move the world closer to the 1.5-degree target (under the UNFCCC). We hope this report will be used widely as a means to support the implementation of FLR and, where relevant, restoration more broadly.

Fran Price and Alexander Buck

List of acronyms

AU	African Union
BCG	Boston Consulting Group
CAR	Corporaciones Autónomas Regionales (Regional Autonomous Corporations – Colombia)
CBD	Convention on Biological Diversity
CFA	community forest association
CIF	Certificado de Incentivo Forestal (Certificate of Forest Incentive – Colombia)
CMP	Conservation Measures Partnership
CRGE	Climate-Resilient Green Economy
CSR	corporate social responsibility
ECCA	Europe, the Caucasus and Central Asia
ECF	Eco-Corridors Fund
FAO	Food and Agriculture Organization of the United Nations
FAWCDA	Forestry and Wildlife Conservation and Development Authority
FLR	forest landscape restoration
FMNR	farmer-managed natural regeneration
FONAFIFO	Fondo Nacional de Financiamiento Forestal (National Fund for Financing Forests – Costa Rica)
FRA	Forest Resources Assessment
FSSP	Forest Sector Support Programme and Partnership
GCF	gestion communautaire des forêts (community forest management – Madagascar)
GDP	gross domestic product
GEF	Global Environment Facility
GELOSE	gestion locale sécurisée (secured local management – Madagascar)
GGW	Great Green Wall for the Sahara and the Sahel
GPFLR	Global Partnership on Forest Landscape Restoration
GRP	Global Resilience Partnership
GTP	Growth and Transformation Plan
INDC	intended nationally determined contribution
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IUCN	International Union for Conservation of Nature
LDN	land degradation neutrality
MEA	Millennium Ecosystem Assessment
NBSAP	National Biodiversity Strategy and Action Plan
NDC	nationally determined contribution
NFPA	National Forest Priority Area
NFSDP	National Forest Sector Development Programme
NYDF	New York Declaration on Forests
OECD	Organisation for Economic Cooperation and Development
PES	payment for ecosystem (or environmental) services
PFES	payment for forest ecosystem (or environmental) services
PFM	participatory forest management

REDD+	Reducing Emissions from Deforestation and Forest Degradation, plus the sustainable management of forests, and the conservation and enhancement of forest carbon stocks
ROAM	Restoration Opportunities Assessment Methodology
SEAMA	Secretaria de Estado para Assuntos do Meio Ambiente (State Secretariat for Environmental Affairs – Espírito Santo, Brazil)
SER	Society for Ecological Restoration
UNCCD	United Nations Convention to Combat Desertification
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WRI	World Resources Institute
WWF	World Wide Fund for Nature

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Executive summary

Forests are essential to life on earth

Forest loss and degradation continue to afflict our planet.

Forests sequester carbon; they provide us with food, medicines, and fuel; they offer areas for recreation and meditation. Forests provide habitat for about 80 per cent of terrestrial species; they protect our water courses, providing us with potable water. Forests stabilize soils, making land more productive. However, our fragile forests are being lost and degraded. Forest loss and degradation continue to afflict our planet, with an area the size of Bulgaria (11 million hectares)¹ lost every year, and much more being degraded. As we lose forests, we lose the very basis for much of life on earth. Reversing this trend will require many actions, including halting the factors that cause forest loss and degradation in the first place, protecting key forest areas, and restoration. In response, large-scale international initiatives focused on forest restoration have been launched, such as the Bonn Challenge on Forest Landscape Restoration (2011), the New York Declaration on Forests (2014) and, more recently (2019), the United Nations Decade on Ecosystem Restoration 2021–2030.

Reversing forest loss and degradation requires halting the causes driving this trend, protecting key forest areas, and restoration.

One of the approaches that has been widely embraced in recent years is forest landscape restoration (FLR), which seeks to scale up restoration while meeting both ecological and social objectives. There are many challenges in upscaling forest restoration; for example, addressing trade-offs between social and ecological priorities, establishing enabling governance measures and securing long-term financing.

This report reviews case studies of 10 locations that have scaled up forest restoration (Bhutan, Colombia, Costa Rica, Ethiopia, Georgia, Kenya, Madagascar, Viet Nam, the Great Green Wall for the Sahara and Sahel, and Brazil's Espírito Santo State) in order to identify possible enabling factors related to governance and economics and thereby to guide future FLR interventions. The broader umbrella term “forest restoration” is generally preferred in this report to reflect the fact that most of the cases were not explicitly initiated as FLR (except for the Fandriana-Marolambo project in Madagascar).

Methodology: A data collection tool was developed for use in this study (**Annex I**). It divides the FLR process into three phases – a motivational phase, an implementation phase and a sustaining phase – and seeks to understand the enabling factors for each phase. The tool was used as a framework for the collection of information for each case study. A literature review and interviews were carried out using this framework.

Audience: The main audience for this report is public-sector decision-makers and donors, though it is also of relevance to project developers and implementers.

Purpose: The **purpose** of this study is to identify the enabling factors at the national or subnational scale (including specifically **governance and economic factors**) that have motivated the initiation of forest restoration, that have enabled its **implementation** at scale, and that are key to **sustaining** it.

¹ Average calculated for 2010–2020 following FAO 2015 and 2020a.

Overview of case studies

(see Annex II for full case studies)

Bhutan

Forests represent 70 per cent of land area in Bhutan, which has inscribed in its constitution the aim of maintaining 60 per cent forest cover. Forests are particularly important for watershed protection and hydropower. Community forestry is a central piece of the government's approach to managing and restoring its forests.

Colombia

Forests currently represent 53 per cent of the country's land area, though Colombia is continuing to lose forests. Climate mitigation, biodiversity conservation and water regulation are some of the main drivers for restoration. The government launched a national restoration plan in 2015 that covers a 20-year period.

Costa Rica

Forests cover 59 per cent of Costa Rica's territory, up from 40.5 per cent in 1986. Landowners have been encouraged to allow natural regeneration or to restore forests through a payment for ecosystem services (PES) scheme.

Ethiopia

Ethiopia's forests represent 15 per cent of the country's territory. Although net forest cover continues to decrease, there are differences across regions. With a population that is 80 per cent rural, Ethiopia's loss of land productivity and erosion have spurred restoration. Participatory forest management (PFM) is seen as a promising approach to scale up forest restoration.

Georgia

With 40 per cent forest cover, Georgia is the most forest-rich country in the Caucasus. Forests are particularly important for timber, fuelwood, mineral water and ecotourism.

Kenya

Forests currently cover just 6 per cent of Kenya, although the country's 2010 constitution includes a goal of ensuring 10 per cent forest cover. Forest cover has shown an upward trend. Forests are important to the country for their value in providing ecosystem services and revenue through ecotourism. The role of local authorities and communities has been acknowledged in recent policies.

Viet Nam

Forests cover 47 per cent of Viet Nam, up from 30 per cent in 1990. The loss of forest services – notably loss of land productivity and water services – prompted a massive drive to restore forests. Several changes in policies have taken place to support the main restoration programmes, including expanding the role of communities and their rights over natural resources.

Great Green Wall for the Sahara and the Sahel (GGW)

In 2007, 11 African countries in the Sahara and Sahel region committed to re-greening an 8,000km stretch across Africa from Senegal in the west to Djibouti in the east. By 2030, the GGW Initiative aims to have restored 100 million hectares of degraded land, sequestered 250MtC and created 10 million green jobs. The case of Niger is explored in more detail here; Niger is a country that has low forest cover, but has shown great success in farmer-managed natural regeneration (FMNR).

Madagascar

Madagascar's forest cover is currently at 21 per cent and declining, albeit at a lower rate than in the past and with regional variations. Co-management arrangements, begun in 1996, have been a significant means of engaging local rural communities in forest management and, more recently, restoration. The country developed an FLR strategy in 2017. The case study focuses on the FLR project in Fandriana-Marolambo (a landscape of 203,000ha).

Espírito Santo State (Brazil)

Forest cover in the Brazilian state of Espírito Santo is 27 per cent. Motivated by threats to its water supply, the state passed a policy and initiated a programme for restoration through payments for ecosystem services (PES) that would provide private landowners with an incentive to restore forest.

Enabling factors that motivate forest restoration: A typology of motivations was identified that includes: the provision of ecosystem services (pollination, water regulation, nutrient cycling, spiritual benefits, etc.), biodiversity conservation and ecotourism (e.g. Colombia, Costa Rica and Kenya), land stabilization and erosion control (e.g. Ethiopia, Georgia and Madagascar), increasing soil fertility and agricultural yields (e.g. Niger and Viet Nam), protection of water supply/watershed protection (e.g. Bhutan and Espírito Santo), carbon sequestration (and financing) (e.g. Ethiopia and Georgia), mitigation of floods and droughts (e.g. Ethiopia, GGW and Viet Nam), securing biomass energy (e.g. Georgia, Madagascar and Niger), safeguarding hydroelectricity (e.g. Bhutan, Colombia and Kenya), reducing vulnerability to climate change (e.g. Espírito Santo, Georgia and Viet Nam), international environmental interests and funding (e.g. Costa Rica and GGW), international markets (e.g. Costa Rica), timber security (e.g. Bhutan, Georgia and Viet Nam) and international political commitments (conventions), which were of relevance in all countries.

Enabling factors that support implementation: The creation of specific national-level **agencies** with a role in forest restoration was useful, for instance, in Colombia, Costa Rica and Espírito Santo. Financial measures and incentives to promote forest restoration include payments for different services such as water protection or carbon sequestration, as seen in the example of Espírito Santo. Tax incentives and disincentives may be applied, as was the case in Costa Rica. Policies that support implementation of forest restoration include those related to co-management or community management of forests, as is the case in Bhutan, Ethiopia and Madagascar. Increased recognition of rights for local communities, including tenure security (and tenure of trees), encourages restoration, as seen in Bhutan, Madagascar and Niger. Devolution and decentralization in the forest sector aid in the implementation of relevant forest restoration policies, as seen in Kenya, Niger and Viet Nam. Better integration across sectors, notably through climate policies (as in Ethiopia, Georgia or Kenya), can support improved land management as well as forest restoration. A number of countries have officialized targets for forest restoration, as is the case in Bhutan and Kenya, for example, which have enshrined in their constitutions a target forest cover of 60 per cent and 10 per cent respectively. In addition to the relevant ministries and their decentralized representatives, important stakeholders include local communities (farmers, villagers, landowners) and traditional authorities. For example, in Kenya, 72 per cent of community forest associations engaged in tree planting.



*Bonn Challenge 3.0 high-level meeting in Brazil in 2018, including WWF, KfW and BMU representatives.*²

The costs of forest restoration are frequently high by local standards, though estimates vary significantly, from a low of US\$35 to a high of US\$6,585 per hectare. Nevertheless, cost-benefit analyses frequently illustrate the long-term benefits of restoring forests, as identified in Kenya for example, where the cost of increasing tree cover to 10 per cent was estimated at KES48 billion (US\$442 million), while the cost of inaction was estimated at a far higher KES168 billion (US\$1.55 billion). Many external stakeholders are also influential in implementing forest restoration, from large bilateral or multilateral donors, such as GIZ in Madagascar, to NGOs such as WWF in Georgia.

Enabling factors that sustain forest restoration: Embedding forest restoration in long-term institutions is important. Commitments under the three Rio Conventions, for example, provide opportunities for long-term programmes, both government-led and externally driven, on forest restoration. All countries referred to forest restoration in their commitments under at least two of the three Rio Conventions, with most including it in all three. Increasingly diverse sources of sustainable and alternative financing are being sought for forest restoration, including the blended financing of private and public sources. Engaging and empowering local stakeholders is a means of securing and sustaining long-term forest restoration, as seen in Niger, for example.

² www.cifor.org/knowledge/photo/39233417510

Summary of key findings and associated recommendations

Phase I - Motivation

- A. There are multiple social, ecological, political and economic factors that motivate the initiation of forest restoration.
- B. The trigger that motivates engagement in forest restoration might not always be self-evident.
- C. Engaging local-level stakeholders in forest restoration requires sound measures that are locally appropriate and proven.

Recommendation 1. *Decisions to initiate forest restoration should be grounded in a sound understanding of the context (including local expertise, traditional knowledge and practices), the drivers of forest loss and degradation, and a clear identification of the leverage points so as to increase the chances of long-term success.*

Phase II - Implementation

- D. A package of different governance measures can support forest restoration.

Recommendation 2. *A package of locally adapted governance measures is necessary for effective large-scale forest restoration; and it may need to evolve and adapt over time in view of the changing national or local, or even international, context.*

- E. Accurate monitoring is needed to know which governance measures work.

Recommendation 3. *Data collection and monitoring must be improved so that governance measures can be informed by solid data.*

- F. Learning and building from positive experiences advances forest restoration.

Recommendation 4. *It is useful to build on pilot initiatives that include rigorous monitoring where evidence can be collected and lessons learned on a smaller scale before scaling up to the country level.*

- G. Integration across ministries helps to reduce conflicting land-use interventions.

Recommendation 5. *Remove inconsistencies and contradictions in land-use-related policies and promote cross-sectoral integration for effective forest restoration.*

- H. Devolved and decentralized government and extension officers are key facilitators in forest restoration.

Recommendation 6. *Devolve responsibility for restoration to local authorities wherever feasible and give them the necessary means to carry out restoration.*

- I. Secure tenure and property rights promote better forest management and restoration.

Recommendation 7. *Granting secure tenure rights to local land users and rightsholders is important for successful forest restoration.*

- J. Financial incentives and measures can accelerate forest restoration.

Recommendation 8. *Acknowledge the opportunity cost of forest restoration for private landowners and rightsholders by providing well-designed financial incentives and measures.*

Phase III - Sustaining

K. Forest restoration requires long-term financing.

Recommendation 9. *Schemes to financially support forest restoration need to be designed for the long term, and alternative and blended financing arrangements should be explored.*

L. Fair access, distribution and benefit-sharing arrangements need to be in place.

Recommendation 10. *Mechanisms should be in place to ensure that benefits and costs of forest restoration can be fairly distributed.*

M. The role of local communities as custodians of the land and forests is paramount.

Recommendation 11. *Acknowledge, empower and engage local communities in forest restoration.*

Recommendation 12. *Take into account and engage with local and traditional land-use practices that support forest restoration.*

N. Long-term political engagement is required for forest restoration.

Recommendation 13. *Governments should engage for the long term in forest restoration, and establish long-term and stable measures and agencies that reflect the extended nature of the engagement.*

Outstanding questions remain with respect to upscaling forest restoration: How can we achieve both forest quality and forest quantity? How do we define success in FLR? How much scaling up is feasible? How do we measure progress? And how can we attribute cause and effect?

The need for forest landscape restoration is clear, and commitments are in place, but we are still unable to truly implement forest restoration at scale. Through this study we begin to identify some avenues for ensuring that the necessary enabling factors are in place to make certain that this upscaling toward forest landscape restoration can occur. Action is needed at all levels. The time is right, and there are several opportunities to facilitate these changes, including the post-2020 Global Biodiversity Framework and the UN Decade on Ecosystem Restoration.

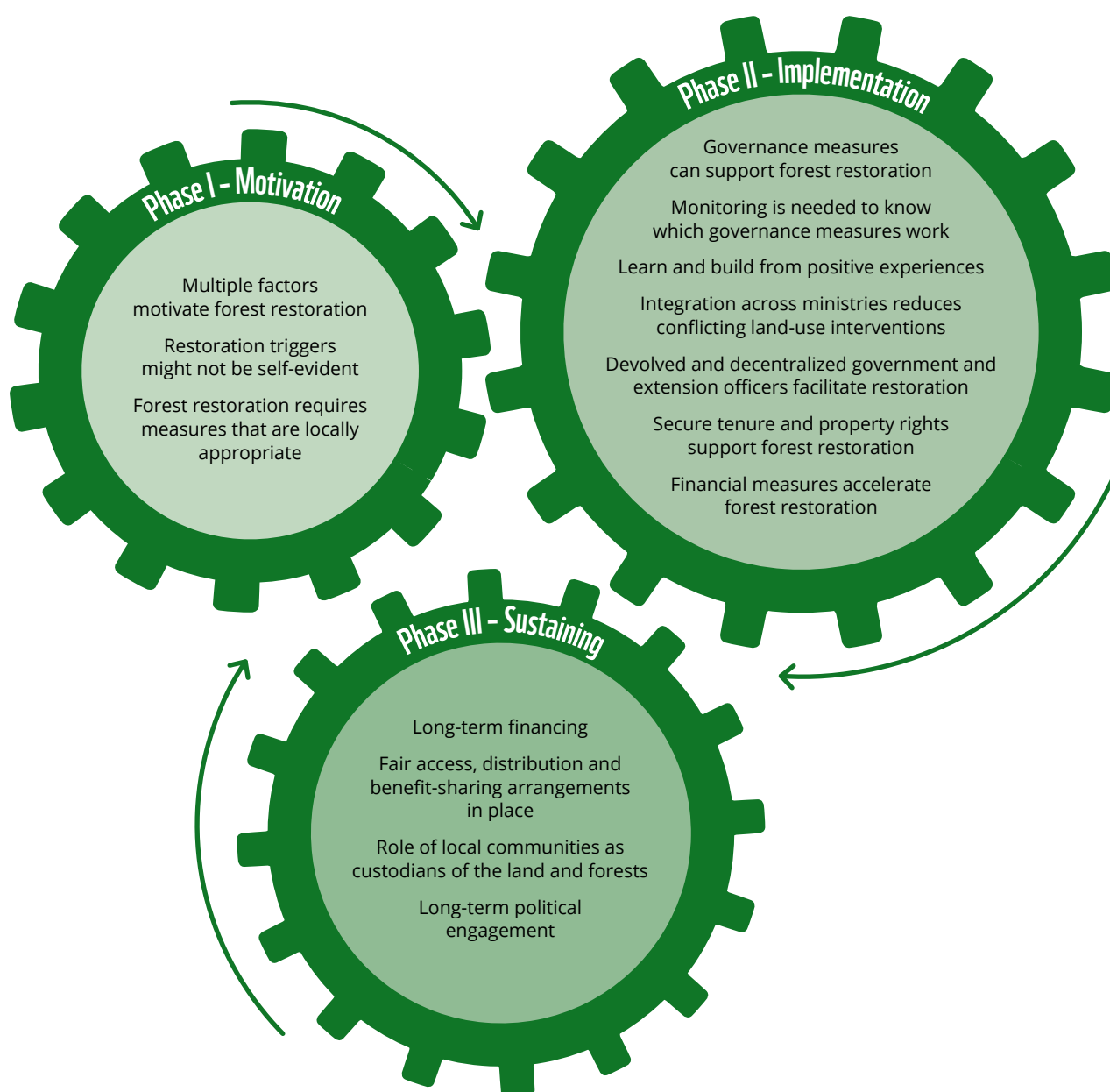
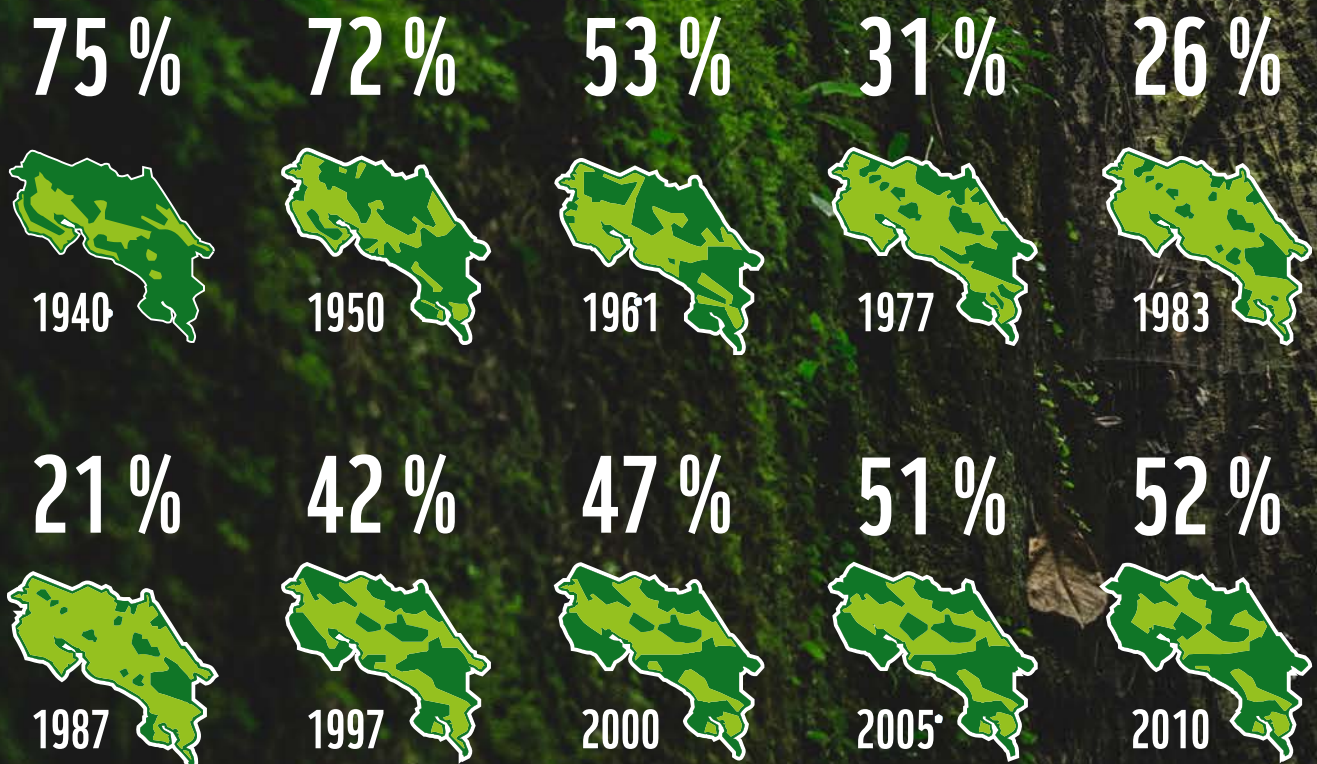


Figure 1: Key success factors for forest landscape restoration

Accurate monitoring is needed to know which governance measures work.



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Figure 2: Bending the curve in forest cover loss in Costa Rica through forest landscape restoration

1 Reversing forest loss and degradation

Forest loss and degradation

The year 2019 saw some of the world's worst forest fires raging across North America, Australia, the Amazon, Russia and southern Europe. One fifth of Australia's temperate broadleaf and mixed forest biome was destroyed in the 2019–2020 fire season (WWF and BCG, 2020). And 2020 is not looking any better. Globally, forests continue to lose ground at a rate of 11 million hectares each year (between 2010 and 2020) – an area the size of Bulgaria (average of FAO, 2015 and FAO, 2020a). Although new forests are being added, we are still unable to fully compensate for this loss – both in quality and in quantity. Furthermore, forest degradation, although much harder to define (e.g. Hobbs, 2016), is also a growing challenge.

Forests
are essential
to life on earth.

Forests are important not only as a habitat for biodiversity, but also for the multiple goods and services that they provide people: nature's contribution to people (IPBES, 2018; Díaz et al., 2018; FAO, 2020b). As we lose forests, it is not only the trees that we lose but also all of the goods and services that they supply, including microclimate regulation, water filtration, soil stabilization, the provision of food, medicinal plants and much, much more (MEA, 2005; IPBES, 2018). Forests are essential to about 80 per cent of terrestrial species and, as such, play an important role in preventing the extinction crisis we are currently observing (Pimm et al., 2014). Furthermore, the role of forests in climate change has received growing attention in recent years, particularly since the Paris Agreement of 2015. While forests act as a carbon sink mitigating the impacts of climate change, they may also contribute to climate change as they burn and release further CO₂ emissions, frequently as a result of climate change itself (e.g. Anderegg et al., 2020). In this context it is evident that ensuring that we protect forests is essential, but so is reversing forest loss and degradation through forest restoration.

Options for returning trees to the landscape

There have been many efforts to reverse forest loss and degradation, both active (e.g. plantations) and passive (e.g. natural regeneration). Some of these efforts have focused on large-scale plantations that are frequently of non-native species, with 45 per cent of planted forest worldwide consisting of even-aged exotic plantations of one to two species (FAO, 2020b). Other efforts have centred on natural regeneration of forests (e.g. **see the Costa Rica case study in Annex II**; Chazdon, 2008), which is a passive process whereby trees grow back naturally without human interference (although assisted natural regeneration does include human assistance, e.g. through fencing) (Chazdon and Guariguata, 2016). Preconditions for natural regeneration to be successful include that sites should not be too degraded to retain sufficient seed material, and that there should be an absence of degradation factors (Chazdon, 2008; Stanturf et al., 2014).

Some efforts to reverse forest loss and degradation have been at a very large scale, while others have been more localized. In some cases, the objectives have been multiple; in many cases they have been unique, e.g. carbon sequestration, water provision, timber production or biodiversity conservation. Ecological restoration – defined as “the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed” (Gann et al., 2019) – emphasizes both a historical dimension (seeking to recreate an ecosystem as it was believed to have been in the past) and the concept of a natural trajectory. Reforestation and afforestation are promoted under the United Nations Framework Convention on Climate Change (UNFCCC). Reforestation refers to returning trees to a site that is already classified as forest but that has lost forest relatively recently, while afforestation takes place on a site that has not been forested for a long time (generally 50 years) (FAO, 2012). In total, at least 24 different terms have been recorded (Mansourian, 2018) that fall under the broad umbrella of “forest restoration” (see Table 1). One such approach is forest landscape restoration (FLR), which has developed into one of the most important approaches to reversing forest loss and degradation that is currently promoted by governments and international organizations.

Term	Definition (source)
Afforestation	“Establishment of forest through planting and/or deliberate seeding on land that, until then, was not classified as forest” (FAO, 2012).
Reforestation	“Re-establishment of forest through planting and/or deliberate seeding on land classified as forest” (FAO, 2012).
Ecological restoration	“the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed” (Clewell et al., 2004).
Natural regeneration	“a gradual process of recovery of the structure, function, and composition of the pre-disturbance ecosystem” (Chazdon and Guariguata, 2016).
Plantation forest	“Planted forests that have been established and are (intensively) managed for commercial production of wood and non-wood forest products, or to provide a specific environmental service (e.g. erosion control, landslide stabilisation, windbreaks, etc.)” (Carle and Holmgren, 2003).
Rehabilitation	“emphasizes the reparation of ecosystem processes, productivity and services” (Clewell et al., 2004).
Forest landscape restoration	“a planned process that aims to regain ecological integrity and enhance human wellbeing in deforested or degraded landscapes” (WWF and IUCN, 2000).

Adapted from: Mansourian, 2018

Table 1: Key definitions

Forest landscape restoration seeks to optimize the multiple functions of forests and trees within a landscape.

What is forest landscape restoration?

Forest landscape restoration was defined in 2000 as “a planned process that aims to regain ecological integrity and enhance human wellbeing in deforested or degraded landscapes” (WWF and IUCN, 2000). While there have been numerous modifications and adaptations made to this initial definition (e.g. Sabogal et al., 2015), it still remains relevant and in use. The key dimensions of FLR are its scale (focusing on an entire landscape, generally over 10,000ha, or a water catchment) and the fact that it acknowledges the dependence of human welfare on landscape functionality. Thus, unlike ecological restoration, which tends to be small in scale and focuses on ecological dimensions, FLR seeks to optimize the multiple functions of forests and trees within a landscape for both human and ecological reasons. Equally, unlike large-scale afforestation projects, FLR does not intend to replace non-forested areas with forests (Veldman et al., 2015) but instead seeks to ensure a balance of forest species that can fulfil the supporting, provisioning, regulating and cultural roles (MEA, 2005) of forests within landscapes. It is also by definition a multipurpose approach, seeking to restore forests in order to address several social and ecological objectives.

A process such as FLR is necessarily long-term and requires negotiations between stakeholders and interest groups (Boedhihartono and Sayer, 2012). Trade-offs are often inevitable while treading the fine line between long-term ecological requirements and short-term human needs. FLR necessitates adaptation over time, as restored forests take years to grow and during that time new information, new stakeholders and new challenges will emerge. Yet, its appeal has come from the fact that it considers the reality on the ground and seeks to achieve a long-term result that is sustainable precisely because it has taken into consideration the ecological prerequisites for fulfilling socio-economic needs and supporting livelihoods.

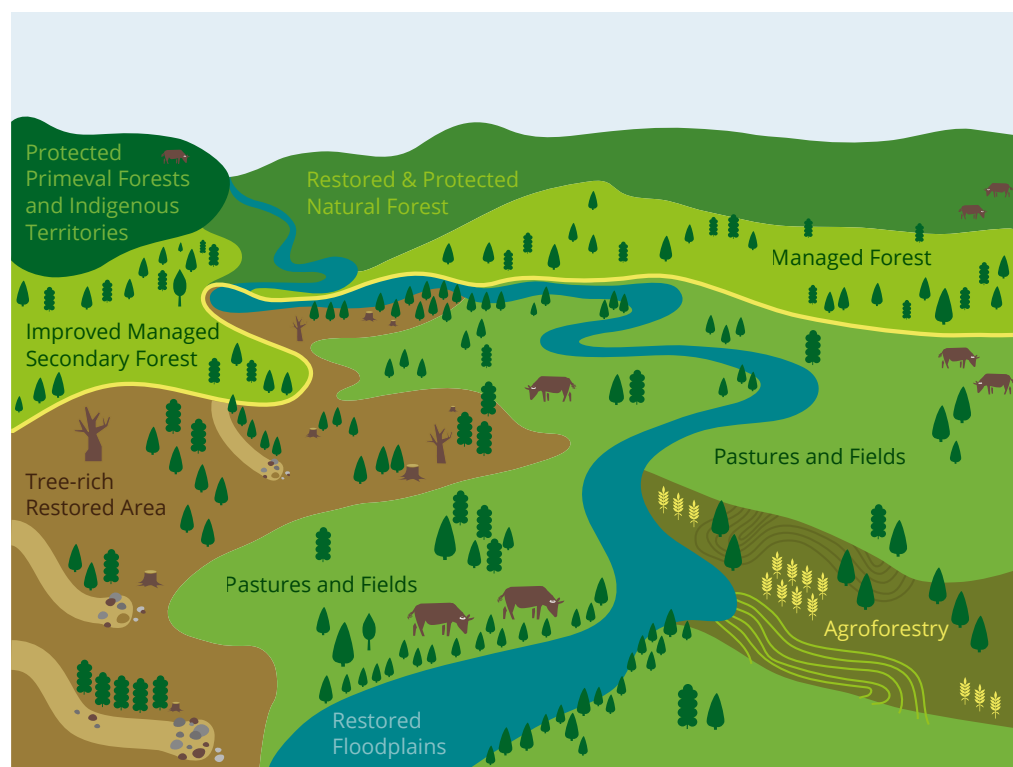


Figure 3: Wide-scale and mosaic restoration opportunities (schematic representation)

Different activities may take place within a landscape as part of the overall vision for restoring that landscape. In this respect, for example, there may be a role for some small woodlots to provide fuelwood, as long as that is not the only objective and activity. Sabogal et al. (2015) have listed, for example, seven activities that can take place within a landscape as part of an overall FLR approach. The challenge lies in optimizing the benefits to be achieved by restoring forests in the landscape. To further characterize FLR, six principles were adopted in 2018 by the Global Partnership on FLR (GPFLR)³:

Principles that characterize FLR



1. Focus on landscapes;
2. Engage stakeholders and support participatory governance;
3. Restore multiple functions for multiple benefits;
4. Maintain and enhance natural ecosystems within landscapes;
5. Tailor to the local context using a variety of approaches;
6. Manage adaptively for long-term resilience (Besseau et al., 2018).

They reflect the essence of FLR, which is an ambitious proposition.

Currently, several organizations (many of them members of the GPFLR) are engaging on different components of FLR. WWF has been involved in FLR projects since the year 2000 and has recently published the lessons learned from some of these initiatives under the series *Experiences in Forest Landscape Restoration* (e.g. Mansourian et al., 2018; 2020a; 2020b).

Scaling up forest restoration: from sites to countries

Since FLR's definition in the year 2000, there has been growing acknowledgement of the importance of scaling up restoration. Restoration is prominent in all three Rio Conventions: it is in the Aichi Targets under the CBD, in the land degradation neutrality (LDN) initiative under the UNCCD and in the Paris Agreement under the UNFCCC. Research has shown how FLR specifically can contribute to these (UNEP, 2016; UNEP, 2018; Gichuki et al., 2019) and to the SDGs (Mansourian, 2018). Some governments, such as Colombia, have developed restoration plans at the national level. Others, such as Ethiopia, Georgia and Viet Nam, have embedded afforestation/reforestation in their nationally determined contributions (NDCs) under the UNFCCC. Similarly, restoration is also prominent in the UNCCD, with several countries defining objectives to increase national forest cover in their LDN commitments. Madagascar, for example, stated that it will restore 400,000ha of landscape each year until 2025 through green infrastructure, while Niger stated that it will restore 44 per cent (4,440,500ha) of its 10,761,076ha of degraded land as of 2010. In 2019, the United Nations announced the Decade on Ecosystem Restoration 2021–2030, further underscoring the relevance and importance of restoration at a global level.

Countries define objectives to increase national forest cover in CBD, UNCCD and UNFCCC commitments.

A number of attempts have been made to guide the selection of priority restoration areas. In 2011, the World Resources Institute (WRI) mapped *A World of Opportunity*, identifying 2 billion hectares worldwide available for FLR (Minnemeyer et al., 2011), while, more recently, a study by Bastin et al. (2019) identified 0.9 billion hectares of forest that could be restored (leading to the capture and storage

³ The GPFLR regroups 30 leading international and governmental agencies working on FLR, including WWF, which was a founding member in 2003 along with IUCN and the UK Forestry Commission.

**Global
and regional
programmes
are in place to
scale up FLR.**

of 205 gigatonnes of carbon), and Brancalion et al. (2019) identified priority areas (or “hotspots”) for restoration in the tropics. To facilitate the definition of specific areas for restoration at the national (and subnational) level, IUCN and WRI (2014) have led on the development of a tool: the Restoration Opportunities Assessment Methodology (ROAM). Using this tool, national-level stakeholders co-determine priority areas for restoration based on a cost-benefit analysis that includes many variables, including social, political, economic and ecological factors (IUCN and WRI, 2014). Several national plans have been developed using these assessments; yet, in practice, implementing and scaling up restoration generally remains a challenge.

In light of this, the German government and IUCN launched the Bonn Challenge on FLR in 2011, setting a global target of 150 million hectares restored or under restoration by 2020. It was endorsed and extended to 350 million hectares (by 2030) by the New York Declaration on Forests (NYDF) at the 2014 UN Climate Summit.⁴ By June 2020, over 170 million hectares had been committed under the Bonn Challenge by 60 governments (31 from Africa, 5 from Asia/Pacific, 16 from Latin America, 7 from Europe, the Caucasus and Central Asia (ECCA), and the United States), plus nine sub-regions in Latin America, one in Europe and one in Asia, and two private initiatives (one in North America and one in Latin America). Regional initiatives have followed suit: the AFR100 for Africa, the Initiative 20x20 for Latin America and the ECCA30 for Europe, the Caucasus and Central Asia. The IUCN Bonn Barometer reported in 2019 that of the commitments, 43.7 million hectares were under “restoration transition” in the 13 countries that had reported (Dave et al., 2019). An assessment by the NYDF is less positive, reporting 26.7 million hectares under restoration since 2000 (NYDF Assessment Partners, 2019).

Challenges for scaling up forest restoration

While ecological conditions, such as insufficient knowledge of native species (e.g. FAO, 2014; Mansourian and Vallauri, 2014), can be a constraining factor to scaling up FLR, oftentimes it is social, economic and political factors that influence the ability of a country to truly scale up positive ecological and social transformational land-use efforts like FLR. For example, the lack of true stakeholder engagement or participation often leads to forest areas or areas set aside for restoration being burned (e.g. Kull, 2002). Financing may not be sufficient or may reach the central government but not the regions where restoration is to be implemented (e.g. Wiegant et al., 2020). Tenure insecurity may prevent investment in restoration and act as a disincentive for engagement in restoration or long-term continuity (e.g. Nagendra, 2007; McLain et al., 2018). Policies may be conflicting (e.g. Carmenta and Vira, 2018) and capacity lacking. Unless the underlying causes of forest loss and degradation are removed (e.g. perverse subsidies to unsustainable agricultural practices), restoration will not be useful.

Although commitments and goodwill abound, it remains to be seen how such large-scale initiatives will materialize in practice (Chazdon et al., 2017; Mansourian et al., 2017a) and which factors can encourage and support these targets or, conversely, impede them. As we enter the UN Decade on Ecosystem Restoration, the time is ripe to assess lessons and experiences taken from large-scale initiatives to restore forests.

⁴ After which, the Bonn Challenge then also added that second target to its scope.

Scope: Identifying enabling factors for forest landscape restoration

Experience to date on FLR specifically is limited (but see Mansourian et al., 2017b; Stanturf et al., 2020; the WWF series *Experiences in Forest Landscape Restoration*). Many of the large-scale tree planting initiatives seen in countries as diverse as China and Niger were initiated before FLR was defined and do not qualify under all the principles of FLR. There are, however, valuable lessons to be learned from these large-scale restoration efforts that can be considered “on the road” toward FLR. Along the same lines, the Society for Ecological Restoration (SER) recognizes a “restorative continuum” that helps to identify steps toward full ecological restoration (Gann et al., 2019). The SER acknowledges that these steps are constrained by the reality of local ecological, social and financial conditions. Similarly, understanding the conditions that may at times limit restoration and at other times facilitate it is key to improving widespread FLR implementation.

In this context, the purpose of this study is to identify enabling factors at the national or subnational scale (including specifically governance and economic factors) that have motivated the initiation of forest restoration, that have enabled its implementation at scale and that are key to sustaining it.

Enabling factors may be related to political, sociocultural, ecological, governance or economic aspects. For this study, the focus is on national and subnational enabling factors explicitly associated with governance (in particular: policies, associated policy and regulatory frameworks, institutions (formal and informal), including tenure and property rights, stakeholder engagement processes and other arrangements leading to national and subnational level decision-making on FLR) and economics (including financial incentives and measures, and market-related aspects). Enabling factors for FLR are likely to be in large part context-specific (Mansourian, 2017); however,



A preliminary discussion on FLR measures for the restoration of the Chepalungu forest, Kenya.

identifying best practices, while recognizing the context within which they occur (Berkes, 2007), can prove to be a significant source of inspiration and innovation for others.

Because there are limited experiences that truly reflect the multiple dimensions of FLR, for the purposes of this study the focus is on large-scale expansion of forest cover, although adherence to FLR principles will also be considered in the analysis. The most widely used approaches and terms – and those considered in this study – are provided in **Table 1**. The umbrella term “forest restoration” is used here to refer to any increase in tree cover (that may take place through ecological restoration, natural regeneration, afforestation, reforestation, plantation forestry or FLR).

The term “governance” is complex and has been used to signify many things (e.g. van Kersbergen and van Waarden, 2004; Mansourian and Sgard, 2019). Lemos and Agrawal (2006) have defined environmental governance as signifying interventions aiming at changes in environment-related incentives, knowledge, institutions, decision-making and behaviours, including especially the set of regulatory processes, mechanisms and organizations through which political actors influence environmental actions and outcomes. For FLR, because of its specificities (particularly its large scale, multiple actors, and long-term and transformative nature), we have defined governance as the “decision-making rules, structures and processes involved in restoring forested landscape; ... it includes the wider set of institutions and stakeholders at all levels and the ways in which they connect and interrelate over time to influence the implementation of FLR and the process of restoring a forested landscape” (Mansourian, 2017).

FLR governance involves decision-making rules, institutions and stakeholders (including their networks).

The intention of this report is not to identify a solution or recipe that can be applied everywhere, but rather to determine what have been the experiences in terms of increasing forest cover and what are the governance and economic factors that appear to contribute to an increase in forest cover. The ultimate aim is to provide some elements, directions and suggestions for countries seeking to engage in scaling up forest restoration, particularly within the framework of FLR, that are grounded in experiences to date.

The primary audience for this study is public-sector decision-makers, and public- and private-sector donors, but it should also be of relevance to project developers and implementers.

Granting secure tenure rights to local land users and rightsholders is important for successful forest restoration.



2 Methodology

In order to understand enabling factors for FLR⁵, this study divides the forest restoration process into three distinct phases (**Table 2**):

1. A “**motivational**” phase, which includes a trigger to **initiate** FLR (e.g. flooding in China, which prompted the government’s “Grain for Green” programme; in-country champions leading FLR, etc.). Associated research question: **Was there a clear trigger for initiating FLR or large-scale restoration – at international, national or local scale?**
2. The FLR **implementation** phase, during which a number of **enabling** (or constraining) factors may facilitate (or complicate) the restoration process. Associated research question: **What are the key enabling factors that supported implementation?**
3. A **sustaining** phase, where the long-term viability of the restoration effort is at stake. Associated research question: **What are key factors to sustain the restoration effort?**

Motivation, implementation and sustaining are the three phases of FLR that are analysed.

In this way, the underlying factors associated with each phase can be identified. Eight different scenarios can be envisaged as outlined in **Table 2**, representing different permutations. They highlight (in a theoretical form) the presence or absence of enabling factors in each of the three phases. The case studies analysed here generally fall under Scenario H.

This research is exploratory. The core of the analysis is based on 10 country case studies. These country case studies were selected using five criteria (not all criteria had to be met, but the first three were essential):

1. Country with large-scale (over 10,000ha) government-led forest restoration initiative or programme in place;
2. WWF presence and/or interest;
3. Geographical spread;
4. Country with one or two FLR projects that provide good examples of how these projects have influenced and shaped governance and policy processes and vice versa;
5. Country with a measurable (national-level or subnational) forest gain.

⁵ Note that since the purpose of this report is to focus on enabling factors, constraining factors are not explicitly addressed. Nevertheless, because they form two sides of the same coin, in some cases they may be more explicitly mentioned.

Scenario	Phases			Explanation
	Motivation	Implementation	Sustaining	
A				No enabling factors to motivate, implement or sustain forest restoration.
B	✓			A decision is taken to restore based on a motivating factor (e.g. loss of land productivity), but no factors support implementation or lead to sustained restoration.
C		✓		No clear motivating factor; enabling factors support implementation of restoration (e.g. PES), but there are no factors to support its long-term sustainability.
D			✓	One can envisage that with no motivating factor, or factor supporting implementation, it may be that natural regeneration takes place, and there are enabling factors (e.g. increased environmental awareness) to sustain it.
E	✓	✓		A decision is taken to restore based on a motivating factor and there are enabling factors for implementation (e.g. PES), but no factors to support sustained restoration.
F		✓	✓	No clear motivating factor, but enabling factors (e.g. PES) support restoration implementation and its long-term sustainability (e.g. policies).
G	✓		✓	A decision is taken to restore based on a motivating factor; there are no factors to support implementation, but there may be long-term sustaining factors (e.g. international commitments under environmental conventions).
H	✓	✓	✓	A decision is taken to restore based on a motivating factor, enabling factors support implementation and there are also factors in place to support long-term sustainability.

Table 2: Scenarios based on three phases of decision-making on restoration

In all cases, efforts must have been in place for at least 10 years to allow this assessment. In some cases, these enabling conditions were considered in the framework of a restoration project (e.g. Madagascar); in other cases, they were considered in the context of a national programme (e.g. Viet Nam). A “forest transition,” which identifies a significant forest gain subsequent to a significant forest loss (Mather, 1992), can be seen in some of the case studies selected (e.g. Costa Rica or Viet Nam).

A tool for data collection was designed for this study (**see Annex I**). It is adapted from four main sources: Hanson et al., 2015; Mansourian, 2016; Mansourian, 2017; and Springer et al., 2020. The data collection tool provides guiding questions to be answered through this research. It focuses on the three main phases identified above (motivation, implementation and sustaining) and assesses – where relevant – the spatial (international, national, subnational (landscape) and local) scales, as well as the temporal ones. The method and data collection tool were tested on one case (Costa Rica) and further refined following this test phase.

The literature review was used to corroborate findings.

A literature review was carried out for each case study in English, French and Spanish. The literature review was iterative, and a snowball method was used, where relevant references from one article were then also considered. Terms used to initiate the literature review were: the country name + “success” + “reforestation” or “restoration” or “afforestation” or “plantation” or “rehabilitation” or “forest landscape restoration” or “forest cover” or “forest transition”. The literature review was used to corroborate and confirm findings. Also, where available, the following official documents were systematically consulted for each case study: (intended) nationally determined contributions (INDCs/NDCs) under the UNFCCC, zero net deforestation (ZND) commitments under the UNCCD and National Biodiversity Strategies and Action Plans (NBSAPs) under the CBD, as well as any national forest strategies, national restoration plans and REDD+ strategies. Forest data was sourced from the FAO.

With a view to corroborating findings from the literature review, semi-structured interviews were carried out with two to three contact persons per country. Interviewees were selected in consultation with the WWF office in the respective countries. Selection of interviewees was based on their knowledge of and involvement in restoration-related activities in-country. Interviews were held by Skype or phone using a semi-structured format based on the data collection tool attached in **Annex I** as a guide. The full list of interviewees can be found in **Annex III**. WWF staff (or other experts) from the case study countries were also asked to review the case studies.

An external (to WWF) **peer review group** was established for this study, composed of three IUFRO scientists (one of whom also works at WWF International), one scientist from the University of Lausanne and two WWF scientists with relevant expertise. They were asked to comment on the first draft of the full report, although they were also encouraged to provide feedback at other stages in the process, including on the methodology.



**Remove inconsistencies
and contradictions in
land-use-related policies
and promote cross-
sectoral integration
for effective
forest restoration.**

Inappropriate land-use practices lead to landscape degradation.

3 Overview of case studies

3.1 Introduction to the case studies

A total of 10 case studies were reviewed (**Figure 4**, **Table 3** and **Annex II**). They cover the African, Eurasian and Latin American continents. Cases were selected to cover a range of conditions: political, social, ecological and economic. The intention was to obtain a diverse cross-section of the factors that are supporting or could support the implementation of FLR or large-scale forest restoration more generally. The detailed case studies can be found in **Annex II**.

Seven case studies represented national programmes to restore forests: Bhutan, Colombia, Costa Rica, Ethiopia, Georgia, Kenya and Viet Nam. The other cases covered a region (the Great Green Wall for the Sahara and Sahel, which includes 21 countries in the northern African region) or subregion (Espírito Santo in Brazil and Fandriana-Marolambo in Madagascar). For illustrative purposes the cases of Colombia and Georgia also use a more local case where relevant (Oriente Antioqueño in Colombia and Borjomi-Kharagauli National Park in Georgia).

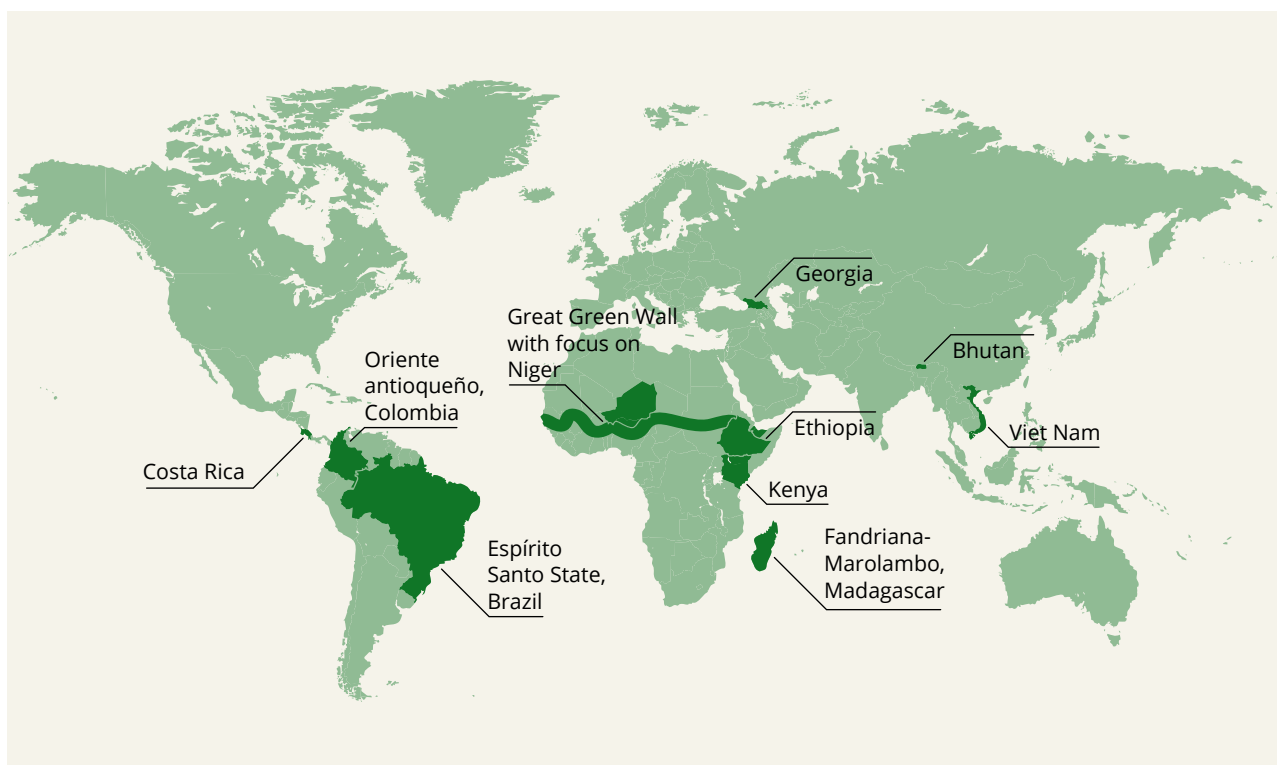
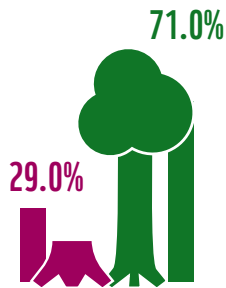


Figure 4: Map showing case study locations

3.1.1 Overview of cases

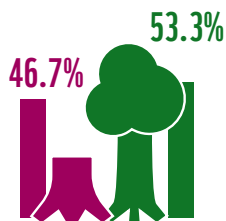
National

Bhutan



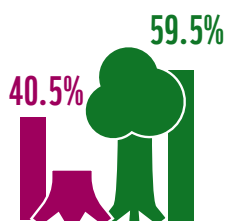
The Kingdom of Bhutan has had a relatively stable forest cover in recent years, with natural regeneration and some plantation forestry taking place. Forests currently represent 71 per cent of the territory. Inscribed in its constitution is the aim of maintaining 60 per cent forest cover. Forests are important for various ecosystem services, but especially for protecting watersheds (notably for hydropower). Community forestry is a central piece of the government’s approach to managing its forests. In 2019, the Kingdom launched a strategy for plantations and nurseries.

Colombia



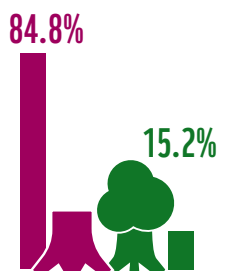
Although it is currently 53.3 per cent forested, Colombia – a megadiverse country – continues to lose forests. Climate mitigation, biodiversity conservation and water regulation are some of the main drivers for forest restoration. The government launched a national restoration plan in 2015 covering a 20-year period. Colombia is a highly decentralized country and illustrates well the role of local authorities and communities in restoration. The region of Oriente Antioqueño (part of the Andean region; an area of 827,600ha) is used for illustrative purposes since it underwent a ROAM process between 2016 and 2018.

Costa Rica



Costa Rica’s forest expansion started in the 1980s as it faced a radical drop in forest cover. Today the country has 59.5 per cent forest cover, up from 40.5 per cent in 1986. A conscious political move away from intensive land use (particularly cattle-rearing), coupled with financial incentives, has encouraged landowners to either allow their forests to regenerate or to actively plant trees. Biodiversity conservation and ecotourism have been prioritized. Payments for ecosystem services have generally been considered a highly successful tool for forest restoration in Costa Rica.

Ethiopia



Ethiopia’s forests represent 15.2 per cent of the country’s territory. Net forest cover has been decreasing since 1990, although there are differences across regions. With 80 per cent of its population rural and dependent on natural resources, loss of land productivity and erosion have been major concerns and reasons for carrying out restoration. Several tree-planting campaigns have been carried out with massive engagement by local communities. A recent expansion of participatory forest management (PFM) reflects its promise as a tool to engage communities more actively in forest management and restoration and grant them greater and more secure rights.

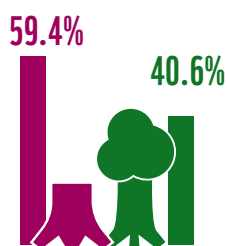
Proportion forest

■ Forest (2020)

■ Non-forest

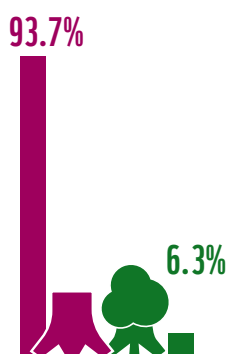
Georgia

With 40.6 per cent forest cover, Georgia is the most forest-rich country in the Caucasus, a biodiversity hotspot. The country's forests are particularly important for timber, fuelwood, mineral water and ecotourism. Although lacking a recent forest inventory, the Georgian government was prompted by concerns over forest loss to design several policies, including its 2020 Forest Code, that include reforestation or afforestation. The Borjomi-Kharagauli National Park (IUCN category II, 109,300ha) is used for illustrative purposes as it is a particularly important forest area in which some restoration after fire was carried out with WWF support.



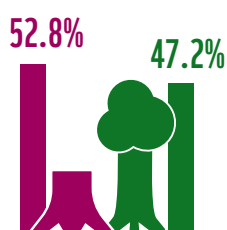
Kenya

Forests currently cover just 6.3 per cent of Kenya, although the country's 2010 constitution, acknowledging the importance of its forests and their threatened status, adopted the goal of ensuring 10 per cent forest cover. Forest cover has shown an upward trend. Forests are important to the country for their value in providing ecosystem services and revenue through ecotourism. A tree-based landscape restoration potential options map was developed as a product of the ROAM process carried out in 2016. The role of local authorities and communities has been acknowledged in recent forest policies.



Viet Nam

Following the war in Viet Nam, forest cover was significantly degraded and by 1990 had dropped to 30 per cent of the land. In a bid to return forest services, notably those associated with land productivity and water quality, the government vowed to return forest cover to 1943 levels, covering 43 per cent of the territory. Decision 327, followed by Decision 661 and the National Action Plan on Forest Protection and Development, have been implemented essentially through large-scale plantations. Today forest cover is at 47.2 per cent. Several changes in policies have taken place to support the main restoration programmes, including expanding the role of communities and increasing their rights over natural resources.



Proportion forest

- Forest (2020)
- Non-forest

Planting activities for the restoration of the Chepalungu forest, Kenya.



© WWF

Transregional

Great Green Wall for the Sahara and the Sahel (GGW)

Regional area: 8,000km stretch across Africa

In 2007, 11 African countries (later joined by another 10) in the Sahara and Sahel region committed to re-greening a large section across Africa from Senegal in the west to Djibouti in the east. By 2030, the GGW Initiative aims to have restored 100 million hectares of degraded land, sequestered 250MtC and created 10 million green jobs.

This transregional initiative raises a different set of questions and challenges related to transborder cooperation. The case study illustrated in this report focuses on the trans-regional programme but looks in more detail at one implementing country, Niger.

Niger:

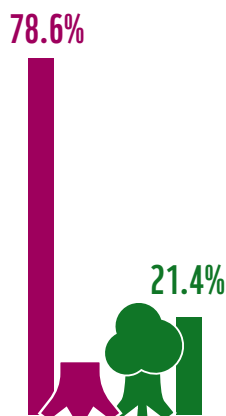
At just 0.9 per cent, forest cover in Niger is very low. As one of the first partners in the GGW, however, Niger has carried out several activities to restore its landscapes. Since 2012, the 3N Initiative – “Nigeriens nourishing Nigeriens” – has acted as an umbrella, cross-sectoral framework guiding development and includes activities under the GGW. Niger’s 2012–2021 National Forest Plan includes devolving control of forests to local authorities and communities.



Subnational

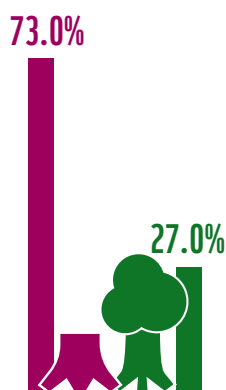
Fandriana-Marolambo landscape – Madagascar

Madagascar’s forest cover is currently at 21.4 per cent and declining, although the recent rate of decline has been lower. Furthermore, there are regional differences within the country, with some areas appearing to show an increase in forest cover. Land management arrangements that acknowledge and promote the roles of local rural communities in forest management date back to 1996 and two important laws promoting co-management. The country developed an FLR strategy in 2017. The case study focuses on an FLR project in Fandriana-Marolambo (a 203,000ha landscape), though in the context of relevant national policies. The project was initiated in 2004 by WWF with the aim of ensuring that the goods, services and authenticity of the moist forests of the landscape are restored so as to support the development of the populations and to secure the objectives of biodiversity conservation. It was carried out over four successive phases for a total of 13 years.



Espírito Santo State (Brazil)

In the Brazilian state of Espírito Santo, north of Rio, forest cover is at 27 per cent. Motivated by threats to its water supply, the state passed a policy and initiated a restoration programme through payments for ecosystem services. At the national level, Brazil’s forest law on “legal reserves” requires that a minimum area of forest be maintained (or restored). In Espírito Santo that area of legal reserve is set at 20 per cent (as it is in the Atlantic Forest) and is accompanied by a requirement to maintain riparian forest. To tackle the water crisis and comply with the law, the state of Espírito Santo has promoted payments for ecosystem services in key water provision areas, providing private landowners with an incentive to restore forest.



Proportion forest

- Forest (2020)
- Non-forest

The cases used in this report were not designed as FLR projects or programmes, and in many instances were developed well before FLR was defined. However, their similarities with FLR (see **Table 7 in section 5.1**) provide valuable lessons. For the sake of accuracy, the broad term of “forest restoration” is thus preferred in this report (unless specifically discussing FLR).

3.2 Changes in forest cover

6 of 10 cases studied showed an increase in forest cover.

Subnational trends may differ from national ones.

Bhutan, Costa Rica, Georgia, Kenya, Viet Nam and the state of Espírito Santo in Brazil showed an increase in forest cover starting at the turn of the 21st century (except for Bhutan and Viet Nam, where it had already begun in the 1990s, and Kenya, where it began in 2015). In contrast, Colombia, Ethiopia, Madagascar and Niger showed a national-level decline in forest cover. In Madagascar, the rate of decline appears to have slowed somewhat since 2010 (FAO, 2020a). Placed in context, Ethiopia’s decline in forest cover has been considered slower than that of other neighbouring countries. National-level figures, however, hide regional differences (both in those countries with an overall increase in forest cover and in those with an overall decrease). For example, while the overall national trend in Bhutan is toward an increase in forest cover, at the subnational level, in the south of the country deforestation has been increasing. In contrast, while the overall national trend in Ethiopia shows a decline in forest cover, at the subnational level there have been some positive trends, for example in Chilimo Forest Reserve, which exhibited a 7 per cent increase in forest cover between 2003 and 2012 (Cronkleton et al., 2017). It is important to understand these nuances, as there are spatial, biological and social reasons to focus on those areas suffering from higher rates of deforestation and degradation, even though national statistics may seem to imply otherwise. Local differences may be associated with numerous factors, such as foreign investment in specific forested areas of the country, local cultural norms or a subnational forest policy (e.g. Espírito Santo State in Brazil).

3.3 Case studies and forest landscape restoration commitments

The case studies trace back the evolution of forest cover change that had already been initiated before the 2011 Bonn Challenge on FLR. National or subnational commitments have been made under the Bonn Challenge by eight out of the ten cases examined here. Several countries have defined other targets in parallel that may or may not be as ambitious as those set under the Bonn Challenge (**Table 3**). The Restoration Opportunities Assessment Methodology (ROAM) designed by IUCN and WRI in 2014 to assist countries in determining priority areas for restoration has been carried out in several countries (e.g. Colombia and Kenya) and has identified several million hectares available for restoration.

	Bonn Challenge (or AFR100 or Initiative 20x20) commitment	Bonn Challenge commitment as proportion of forest area	ROAM-identified areas available for restoration
Bhutan	N/A	N/A	N/A
Colombia	1 million ha	2%	183,993 ha (in Oriente Antioqueño only) ⁶
Costa Rica	1 million ha	33%	3.1 million ha
Ethiopia	15 million ha	88%	82 million ha
Georgia	9,000 ha	0.32%	N/A
Kenya	5.1 million ha	141%	5.2 million ha
Madagascar	4 million ha	32%	35–44 million ha
Niger	3.2 million ha	296%	N/A
Viet Nam	N/A	N/A	54,000 ha (in Quang Tri province) ⁷
Espírito Santo State (Brazil)	80,000 ha	6%	42,173 ha
Great Green Wall for the Sahara and the Sahel	100 million ha	N/A	166 million ha

Table 3: Targets related to increasing forest cover

⁶ In Colombia ROAM was conducted at a regional scale rather than a national scale.

⁷ In Viet Nam ROAM was conducted at a regional scale rather than a national scale.

**Forest restoration
requires long-term
financing.**



4 Key findings

In this section we review each of the three phases (motivation, implementation and sustaining) and describe key enabling factors that emerged from the case studies reviewed.

4.1. Phase I - Motivation

A combination of factors affects the motivation for a government to instigate large-scale forest restoration and for local communities to engage in such activities.

Typology of motivations

A typology of national-level motivations can be identified (see **Table 4**), with reversing land degradation and water conservation topping the list in most cases researched. Other motivations included erosion, land degradation and loss of agricultural productivity (and, in extreme cases, associated crop failure and famine, as seen in Ethiopia and Viet Nam). Both Bhutan and Kenya reported that 100 per cent of their forests are managed for soil and water conservation (FAO, 2020b). A minimum forest cover is inscribed in the constitutions of Bhutan and Kenya. Additional motivations that have also played an important role are political, relating to international processes (such as the Bonn Challenge), commitments under multilateral environmental conventions, and international financing (e.g. under REDD+). In the case of the GGW, political will was a central driver, with President Obasanjo of Nigeria championing the initiative. At the level of local communities, while funding was a major motivation, empowerment, entitlement to land and forest, and alignment with traditional practices were also important motivational factors.

A minimum forest cover is inscribed in the constitutions of Bhutan and Kenya.



Deforestation for coffee plantations in the Central Highlands, Viet Nam.

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Main motivations	Example cases
Provision of a wide range of ecosystem services (pollination, water regulation, nutrient cycling, spiritual benefits, etc.)	Bhutan, Colombia, Kenya
Biodiversity conservation and ecotourism	Bhutan, Colombia, Costa Rica, Georgia, Kenya
Land stabilization and erosion control	Colombia, Ethiopia, Georgia, GGW, Kenya, Madagascar, Viet Nam
Increasing soil fertility and agricultural yields	Ethiopia, GGW, Madagascar, Niger, Viet Nam
Watershed protection/protection of water supply	All
Carbon sequestration (and associated financing)	Costa Rica, Ethiopia, Georgia, Viet Nam
Mitigating floods	Espírito Santo State, Georgia, Viet Nam
Mitigating droughts	Ethiopia, GGW, Kenya
Securing biomass energy	Bhutan, Colombia, Georgia, Kenya, Madagascar, Niger
Safeguarding hydroelectricity	Bhutan, Colombia, Costa Rica, Kenya, Viet Nam
Reducing vulnerability to climate change	Espírito Santo State, Georgia, Viet Nam
International environmental interests and funding	Costa Rica, Ethiopia, Georgia, GGW, Madagascar
International markets	Costa Rica
Timber security	Bhutan, Georgia, Viet Nam
International political commitments (conventions)	All

Table 4: Typology of national-level motivations

The different motivations identified indicate that in all cases several factors were responsible for prompting a focus on forest recovery. Over time, these motivations may have also evolved, as new knowledge (and new challenges) arose. For example, Ethiopia’s interest in carbon sequestration is a recent response to the growing market for carbon credits. In some cases, exogenous factors have contributed to accelerating the process of restoration. Exogenous factors may relate to environmental conditions (e.g. climate change) or to broader political or economic conditions. For example, in Costa Rica evidence suggests that a drop in the international price of beef (an exogenous factor) has had a positive effect on forest cover. In other cases, endogenous factors have been more important. For example, in Viet Nam the visible forest degradation, and its associated soil and water impacts, led the government to launch significant large-scale reforestation programmes.

4.2 Phase II – Implementation

“Carrots and sticks” are frequently needed to engage stakeholders for FLR.

A combination of factors influences how forest restoration is implemented in any given national or subnational context. Frequently, both incentives and deterrents (“carrots and sticks”) are required to engage stakeholders at the necessary scale. Countries face the need to develop and adapt a complex set of factors – agencies with a role in restoration, financial incentives and measures, policies promoting local community engagement, the recognition of rights, decentralization and devolution, cross-sectoral integration and supportive legislation – to ensure that large-scale restoration can effectively take place (**Table 5**). This often requires much fine-tuning over time, as has been seen in the cases explored in this report.

Policies and legislation

All cases discussed here included several **policies** and legislation that have in some way promoted or supported forest restoration (**Table 5**). Many have included specific quantifiable targets. For example, both Kenya and Bhutan have a set percentage of forest cover enshrined within their constitutions (10 percent and 60 per cent respectively). Viet Nam’s three consecutive reforestation programmes (Decisions 327 and 661, and the 2010 National Action Plan on Forest Protection and Development) have set ambitious area-based reforestation/restoration targets. Georgia’s Decision 241 on Rules of Forest Maintenance and Restoration was promulgated in 2010 to overcome the impact of forest fires. Specific restoration strategies were approved in Bhutan (2019), Colombia (2015) and Madagascar (2019).



The need for restoration in Madagascar: vast areas of land and trees are burned annually.

**Integration
across sectors
is essential
for FLR.**

Policies have been set to support payments for environmental services schemes in Espirito Santo State, Costa Rica and Viet Nam. These outline the mechanisms of the scheme and the payment amounts and modalities. Policies that have encouraged community co-management arrangements and/or improved tenure rights have also supported forest restoration implementation. For example, in Bhutan the national strategy for social forestry was established in 2010; in Ethiopia the 2018 Forest Proclamation recognizes the importance of participatory forest management; in Kenya the 2005 Forest Policy acknowledges the role of participatory forest management through the establishment of community forest associations; and in Madagascar a law on local management entitled GELOSE was designed in 1996 and complemented by another specifically oriented toward co-management of natural resources (the GCF). All of these measures to improve local participation, recognition and rights in forest management and restoration have been important in the implementation on the ground of restoration and reforestation.

Financial incentives for restoration through tax exemptions have been granted in Costa Rica through Forest Law no. 4475, in Ethiopia through the Forest Development, Conservation and Utilization Strategy and in Viet Nam through the Law on Investment Encouragement. In turn, disincentives have also been created in Costa Rica through Forest Law no. 4475, which prohibits forest conversion, in Ethiopia through the 2018 National Forest Proclamation, which strengthened penalties for infringement on forest resources, and in Viet Nam through a logging ban. Payments for forest restoration in the context of the ecosystem services provided have been implemented in Colombia, Costa Rica and Espirito Santo and are being trialled in Viet Nam.

Efforts toward better **integration** across sectors can be highlighted in Costa Rica through the 2016 Politica Agroambiental (agro-environmental policy), which seeks to reconcile food security and environmental priorities. In Kenya, the establishment of a multistakeholder national technical working group in 2014 supported the development of restoration priorities. Policies in the energy sector were not explored separately; however, with biomass energy and hydropower being prioritized for restoration in Bhutan, Ethiopia, Georgia, Kenya and Viet Nam, there is a clear cross-sectoral dimension to restoration. Equally, agriculture (land productivity) was a priority in many countries, and therefore agricultural policies also directly impact on forest restoration. For example, Madagascar's 2019 national restoration strategy includes a specific objective on integrated land use, which spans both forests and agriculture.

	Establishment of agency with role in restoration	Financial incentives and measures	Policy promoting local community engagement in forest management	Recognition of different rights for local communities	Decentralization and devolution	Integrated and cross-sectoral collaboration on forests	Specific legal text to increase forest cover
Bhutan	2012: establishment of the social forestry and extension division with responsibility notably for plantations		1979: social forestry introduced 2010: national strategy for community forestry established		1995: greater autonomy to private individuals in forests		2008: constitution with 60% forest cover target 2019: plantation and nursery strategy
Colombia	1961: creation of the Corporaciones Autónomas, with responsibility notably for reforestation	1994: creation of certificates (CIF) that pay for tree planting (higher payment for native species) 2017: adoption of national PES law and national PES policy document		1993: Law 70 on titling of collective lands	1961: Corporaciones Autónomas in Colombia are responsible at the regional level (municipality or group of municipalities) for implementing forest restoration		1996: Forest Policy that includes reforestation and restoration. 2015: national restoration plan
Costa Rica	1991: establishment of Fondo Nacional de Financiamiento Forestal (FONAFIFO – the “National Fund for Financing Forests”) for PES	1969: Forest Law 4475 making reforestation tax-deductible 1977: Forest Law 6184 ordering banks to grant 2% of their loans to reforestation 1986: Forest Law 7032 establishing tradable Certificates of Forestry Payments for reforestation 1996: PES Forest Law 7575 setting payments for reforestation				1991: FONAFIFO established as a cross-sectoral agency 2016: agro-environmental policy seeking integration across the landscape	
Ethiopia	1974: creation of Forest and Wildlife Conservation and Development Authority and first wave of plantations 2013: establishment of Ministry of Environment and Forests	2018: forest proclamation providing tax breaks for private individuals and communities who plant trees	2018: forest proclamation to include participatory forest management	1994: National Conservation Strategy granting use rights to local user groups 2005: rural land proclamation granting farmers certificates to productive land 2018: forest proclamation recognizing private, community, association and state forests	1980: new forest law establishing 58 National Forest Priority Areas 1995: new constitution leading to decentralization		2007: Forest Development, Conservation and Utilization Strategy promoting, notably, forest restoration 2011: Climate-Resilient Green Economy strategy guiding country’s development and aiming to rehabilitate 7 million hectares of forest

Table 5: Measures to support restoration in case studies analysed

	Establishment of agency with role in restoration	Financial incentives and measures	Policy promoting local community engagement in forest management	Recognition of different rights for local communities	Decentralization and devolution	Integrated and cross-sectoral collaboration on forests	Specific legal text to increase forest cover
Georgia	2013: National Forestry Agency established – carrying out forest inventory				2020: Forest Code emphasizing the role of municipalities in forest management, including reforestation/afforestation		1999: Forest Code has as its main goals “tending, protection and restoration of forests” 2010: Decree 241 on The Rules of Forest Maintenance and Restoration 2020: Chapter XVII of the new forest code focuses on reforestation and afforestation
Kenya	2005: establishment of Kenya Forest Service, in part to manage forests for ecosystem services 2019: creation of Resource Assessment and Planning Department (DRSRS), to coordinate surveys and mapping of forest resources for restoration	2014: new forest policy includes benefit-sharing schemes 2019: strategy to achieve 10% forest cover includes requirement by ministerial agencies to contribute 10% of their corporate social responsibility (CSR) budget to restoration; PES schemes and conservation levies (on water and tourism)	2005: first amendment to 1968 forest policy setting an increased role for communities in forest management and benefit-sharing schemes.		2012: Transition to Devolved Government Act transferring greater responsibility for land and environmental policies to the county level 2016: Forest Conservation and Management Act strengthening the role of county governments and community forest associations (CFAs)	2005: Forest Act reflected the need for the creation of an interministerial committee related to forest issues 2014: multisectoral platform National Technical Working Group set up to assess potential restoration opportunities 2019: interministerial committee set up for “10% tree cover” strategy	2010: new constitution setting a 10% minimum forest cover as a target 2014: Forest Act (to implement forest policy) includes restoration
Madagascar			1996: GELOSE law devolving management of natural resources to the local level 2001: GCF law defining co-management contracts				2015: National Development Plan includes reforesting 5,000ha as well as restoring 35,000ha by 2019. 2019: National FLR Plan developed
Niger				2004: new Forestry Code recognizing that trees on farmland belong to the landowners, not to the state	2004: forest law allowing transfer of responsibility for managing forests to local authorities and communities 2012–2023: National Forest Plan includes devolving control of forests to local authorities and communities		2011: national plan for the implementation of the GGW 2012: approval of national forest plan, which includes restoration of 270,000ha of degraded lands

Table 5: Measures to support restoration in case studies analysed

	Establishment of agency with role in restoration	Financial incentives and measures	Policy promoting local community engagement in forest management	Recognition of different rights for local communities	Decentralization and devolution	Integrated and cross-sectoral collaboration on forests	Specific legal text to increase forest cover
Viet Nam	1998: reform of state forest enterprises (Decision 187)	2011: decree on payments for forest ecosystem services		1993: first Land Law providing the basis for allocating land rights (revised in 1998, 2003 and 2013) 1988: “doi moi” introduces individual land-use rights 2003: Land Law giving communities more rights to land	1981–1985: rural development programme		1992: Decision 327 on “regreening the bare hills” 1992: partial logging ban 1998: Decision 661 on restoration and reforestation 2010: National Action Plan on Forest Protection and Development 2011: Green Growth Strategy, which includes afforestation/reforestation
Espírito Santo State (Brazil)	1988: establishment of Secretaria de Estado para Assuntos do Meio Ambiente (SEAMA) responsible, notably, for the PES scheme	2008: adoption of a water fund and PES law				1998: Espírito Santo water law promoting an integrated management of watersheds	2012: change in Brazilian forest code requiring landowners to maintain a minimum forest cover on their estate

Table 5: Measures to support restoration in case studies analysed

Stakeholders

At the national level, key **public-sector** stakeholders include the various ministries in charge of the environment, agriculture and land. In some cases, new agencies were established. For the implementation of the GGW, for example, many member states created national GGW agencies. Local-level authorities were frequently significant actors, as was the case in Colombia, Madagascar and Viet Nam. In Madagascar, for example, provincial and regional chiefs were important champions in the Fandriana-Marolambo FLR project. In Colombia, the local arm of the environment ministry – the “Corporación Autónoma – CORNARE” – was a key actor in developing FLR in the Oriente Antioqueño region. Furthermore, forest extension officers are particularly key in remote areas far from the capital and major transport hubs (e.g. Bhutan and Ethiopia), where they play an important role in supporting communities and in translating the implementation of national-level policies and strategies into action on the ground.

The choice of **agency** leading forest restoration makes a difference to both the acceptance and the effectiveness of implementation. For example, while Brazil has national legislation on forest cover, the state of Espírito Santo developed specific legislation of its own to increase forest cover, created its own governance structure and designated an agency (SEAMA) to implement the policy and the Reflorestar programme. In particular, intersectoral agencies that oversee forest restoration are more likely to be successful, as they bring together different key actors and sectors that influence land use and forest, and reduce the risk of contradictory policies and programmes. In Ethiopia, for example, the lack until recently of a dedicated forest agency has probably been a factor in the low success rate of tree-planting initiatives over the years. In contrast, in Costa Rica and Kenya, the environmental and forestry sectors, both of which are important for restoration, are grouped together under one ministry. In Madagascar, interministerial platforms are established at the regional level via the regional chief to ensure coordination around cross-sectoral issues such as restoration (UNIQUE, 2016).

External stakeholders have played – and continue to play – a significant role in forest restoration implementation. For example, in Ethiopia, NGOs (both local and international) are involved in negotiating participatory forest management contracts and supporting communities for implementation. In Georgia, WWF has been instrumental in promoting ecoregional activities, including restoration (Zazanashvili et al., 2020), while in Madagascar’s Fandriana-Marolambo landscape, WWF championed the project and supported it for 13 years before handing it over to local associations (Mansourian et al., 2018). In Viet Nam the Forest Sector Support Programme and Partnership (FSPP) brought together 25 international donors (between 2000 and 2015). Also, both Ethiopia and Viet Nam are among the top 10 recipients of overseas development aid (OECD website). In Espírito Santo State, the World Bank and NGOs partnered with the state government to develop the Reflorestar programme.

Local rural communities living in the degraded or deforested landscapes are key stakeholders in all case studies. Areas prioritized for restoration are often remote, and local communities are essential agents of change within these areas. Also, they are generally highly dependent on the land and therefore landscape level change

affects them directly. Without their full participation, changes in land management are unlikely to be sustainable. In Colombia's Oriente Antioqueño region, workshops were held at the level of the municipalities to generate information and then to validate findings. Close to three-quarters (72 per cent) of Kenya's community forest associations (CFAs) engaged in tree planting, according to a review by Mogoi et al. (2012). In Niger, farmers were essential actors in the process of farmer-managed natural regeneration. In two cases (Espírito Santo and Costa Rica), private landowners were particularly important stakeholders as recipients of payments under the PES schemes. In all the other cases, however, formal private forest ownership was very low (or non-existent). In these cases, recognition of community rights, empowerment and the provision of legal entitlements (of diverse categories) provide an incentive for these groups to engage in restoration.

Tenure

Improving access and rights to resources has been identified as an incentive for improved management and restoration of forests more generally (e.g. Nagendra, 2007; McLain et al., 2018). Tenure security and the confidence that one will be able to benefit from restoration are important incentives for local stakeholders to engage in tree planting and especially for the maintenance of the restoration effort (McLain et al., 2018). In Niger, the survival rate of about 60 million trees planted over a 12-year period was as low as 20 per cent, in part because of unclear tenure over the trees planted (Pye-Smith, 2013). The growing recognition of the importance of tenure security in the long-term sustainability of tree-planting efforts is being reflected in more recent modifications to different laws and policies in the case study countries. For example, Bhutan's 2010 national strategy for community forestry marked a significant shift toward increasing land users' rights and responsibilities. While full ownership is often not provided by law, diverse rights (e.g. rights of use, rights to inherit) can be recognized and formalized via certificates. In Ethiopia, for example, participatory forest management is regarded as a promising tool to engage communities in forest management and restoration while granting them more secure rights. In Niger, the 2004 change of forest law that granted farmers ownership over planted trees (rather than being automatically the property of the state, as had been the case) helped to encourage tree planting. Equally, the Land Law (2003) in Viet Nam has enabled households or groups of households to have greater and clearer rights (to transfer, inherit, mortgage or lease land) over forest resources, and for a period of 50 years, thus providing more of an incentive to engage in tree planting (Thuynh and Phuong, 2001).

**Local ownership
over planted trees
helps to encourage
tree planting.**

Economics

Forest restoration costs, although often difficult to fully estimate (including not only the inputs but also labour and long-term management), are generally high (with respect to local conditions). For example, in Costa Rica they have been estimated at US\$349 per hectare, while in Espírito Santo they have been estimated at more than US\$2,000 per hectare. Pistorius et al. (2017) estimated the costs in Ethiopia at US\$87 to US\$1,445 per hectare. In Madagascar the costs have been estimated at €581 (US\$680) per hectare (UNIQUE, 2016), while in Georgia reforestation costs were as high as €5,624 (US\$6,585) per hectare (KfW, 2017). In many cases, alternatives to investing in large-scale restoration (i.e. using land for other purposes) may

Fiscal measures can incentivize FLR.

appear more lucrative, at least in the short term. Recognizing this, in Costa Rica, payments for plantations (under the PES programme) in 2006 were set at US\$816 per hectare, while in Espírito Santo payments varied from US\$35 to 1,500 per hectare depending on whether there were anticipated benefits to be made (through production) or whether funding was for the opportunity cost of leaving the land as forest. Other incentives such as tax breaks or the provision of free seedlings have also been applied. For example, Costa Rica has considered the costs of forest restoration tax-deductible since as early as 1969. Tax incentives were also used in Ethiopia and Viet Nam.

ROAM analyses include a cost-benefit analysis that demonstrates the various alternative pathways that could take place in a landscape to be restored, and the cost and benefit of each. In Colombia, for example, several alternatives were calculated, including the growth of different crops in the mosaic of land use, and the value of carbon sequestration through agroforestry and ecological restoration (Isaacs Cubide et al., 2018). In Madagascar, a cost-benefit analysis was carried out that showed the value of planting trees with a short (seven-year) rotation (UNIQUE, 2016).

In sum, a complex set of **policies** over the years have supported (or not) forest restoration. Policies have evolved over time, and frequently it has been necessary to trace the origins of restoration in the country several decades back. In most cases studied, the role of local-level **communities** (farmers, households, villagers) has emerged as fundamental. In this respect, **tenure** insecurity has proven to be a stumbling block in many cases. **Economic incentives**, associated with payments for ecosystem services, or compensation or financial incentives for tree planting, have been significant drivers of restoration in countries such as Brazil (Espírito Santo), Colombia and Costa Rica.



Aerial view of Amazon forest canopy, Colombia.

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4.3 Phase III – Sustaining

Due to change over time and little truly long-term experience in forest restoration, it is difficult to identify key factors that have sustained restored areas in the cases studied. Furthermore, there is limited rigorous monitoring that can allow this retrospective analysis over time. Yet it is important to understand sustaining factors, as they serve to ensure that what has been initiated is maintained over the long term (Scenario H in **Table 2**). Thus, sustaining factors refer essentially to policies, agencies and financing that enable the long-term implementation, management and follow-up necessary in forest restoration. Most countries demonstrated some clear policies and legislation – and, in particular, a policy evolution – that provide opportunities for restoration, as seen in policies supporting payments for restoration in Espírito Santo and Costa Rica, for example, or policies that provide greater recognition of rights to communities, as in seen Ethiopia and Viet Nam. All cases also included restoration, to some extent, in at least two out of their three Rio Convention commitments (**see Table 6**). While funding was partly provided by governments in many of the national-level cases, additional donor funding was also usually required. Increasingly, alternative sources of “blended funding” (mixing public and private sources of funding, as well as grants and loans, for example) are being explored for restoration (Löwquist and Ghazoul, 2019).

Embedding forest restoration in long-term institutions

A confluence of supportive policies, as exhibited for example in Costa Rica or Viet Nam, is particularly conducive to long-term restoration (**see Table 5**). Viet Nam’s major forest targets, introduced in 1992, provided a strong impetus to the process in that country. The establishment of agencies that have a role in supporting restoration or reforestation is also important, as was the case in Bhutan with the establishment in 2012 of the social forestry and extension division, whose responsibilities include plantations. All of the cases had associated policies and reflected restoration or reforestation commitments in their contributions to the three main Rio conventions. For example, Brazil refers to the 12 million hectare restoration target under its commitments to both the UNCCD and the UNFCCC; Kenya refers to afforestation and reforestation in its commitments to both the UNCCD and UNFCCC, while it refers to restoration aligned with its constitutional commitment of 10 per cent forest cover under its National Biodiversity Strategy and Action Plan (NBSAP) for the CBD. Commitments and plans under the three Rio Conventions (**Table 6**) are important, as they set the road map for countries for a number of years (often between five and fifteen years), regardless of shorter-term government changes. Furthermore, much bilateral and multilateral funding (e.g. from the GEF) is set by these plans.

All country cases had associated policies and commitments linked to the three main Rio Conventions.

	Convention (plan)	Commitments associated with forest restoration
Brazil	CBD (NBSAP)	“Target 3.5. Reforest riparian areas ... National Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced through conservation and restoration actions, including restoration of at least 15% of degraded ecosystems, prioritizing the most degraded biomes, ... thereby contributing to climate change mitigation and adaptation and to combatting desertification”
	UNCCD (LDN)	N/A
	UNFCCC (NDC/INDC)	“Restoring and reforesting 12 million hectares of forests by 2030, for multiple purposes”
Bhutan	CBD (NBSAP)	“Action 15.2.4: Explore and implement relevant rehabilitation measures such as plantation (afforestation and reforestation), agro-forestry, reclamation and application of codes of best practices.”
	UNCCD (LDN)	“By 2035, reforestation with native species in open areas will be realized on 25.00 km ² .”
	UNFCCC (NDC/INDC)	“Forest fire management and rehabilitation of degraded and barren forest lands”
Colombia	CBD (NBSAP)	“By 2020, the country will have 210,000 ha in a restoration process in ... areas defined by the National Plan of Ecological Restoration, Rehabilitation and Recovery of Disturbed Area; by 2025, the country will reach 500,000 ha in a restoration process ... by 2030, the country will reach 1,000,000 ha in a restoration process”
	UNCCD (LDN)	“At the subnational level: By 2030 at least 9,000 ha of pasture cover will be restored in forests in the Caribbean region ... By 2030, the productivity of at least 2,000 ha of soils with crops and/or pastures will be improved, with agroforestry production systems in the Caribbean and Andean regions ... By 2030, some 3,200 ha of dry forest will be restored in the Guajira region; Restoration of at least 100,000 hectares of degraded land at the national level within the framework of the national goal of Colombia under the LAC20x20 initiative”
	UNFCCC (NDC/INDC)	“Colombia reaffirms its commitment to reduce deforestation in the country”
Costa Rica	CBD (NBSAP)	“By 2025, improve protection and restoration of terrestrial ecosystems” “By 2020, will have recovered 1 million ha of forest cover (focusing on connectivity, climate refugia, natural remnants, dry forests)”
	UNCCD (LDN)	N/A
	UNFCCC (NDC/INDC)	“... set landscape natural restoration/regeneration objectives as an integral part of mitigation practice, while recognizing the adaptation co-benefits it may create.”
Ethiopia	CBD (NBSAP)	“Target 10: By 2020, the contribution of biodiversity and ecosystem services, including climate change adaptation and mitigation, is improved through increasing forest cover (from 15% to 20% of the countries ... and doubling the area of restored degraded lands.”
	UNCCD (LDN)	“Target 1: By 2031, promote the implementation of community based forest management, Forest Landscape Restoration with indigenous species, ... and ensure the restoration of 427,730 ha of forest land lost between 2000 and 2010.” “Target 2: By 2036, ensure the rehabilitation and improvement of the productivity of 21,359,490 ha of forest land by stopping uncompensated conversion of forest area, especially in slopes” “Target 7: ... promoting plantation of indigenous tree species, and improve the productivity of 33,452 ha of artificial areas by 2026”
	UNFCCC (NDC/INDC)	“Ethiopia intends to increase its ambition by expanding its forest cover, beyond the initial target for the afforestation and reforestation of 7 million ha with continued involvement from local communities ... Protecting and re-establishing forests for their economic and ecosystem services, ... sequestering ... carbon dioxide ... Improve and diversify economic opportunities from agroforestry and sustainable afforestation of degraded forest areas; Rehabilitation of degraded lands/forests will ... increase resilience of communities, infrastructures and ecosystems to droughts & floods.”

Table 6: Commitments under the three Rio Conventions

	Convention (plan)	Commitments associated with forest restoration
Georgia	CBD (NBSAP)	“Vision: By 2030, the people of Georgia will be living in a harmonious relationship with nature, whereby biodiversity is valued, conserved, restored and wisely used ... Adopt relevant forest regulations and standards, in a participatory way, that promote sustainable use of non-wood products, the restoration of natural forest landscape and adaptation to and mitigation of climate change”
	UNCCD (LDN)	“By 2030, about 1500 ha of degraded forest will be afforested, about 7,500 ha will be reforested”
	UNFCCC (NDC/INDC)	“Conduct afforestation/reforestation and assist natural regeneration; Implement afforestation/reforestation activities on already identified 1,500 ha of degraded lands by 2030; In case of external financial and technical support, the country commits itself to afforest/reforest up to a total of 35,000 hectares, as well as supporting relevant activities to assist natural regeneration in identified areas needing afforestation/reforestation until 2030;”
Kenya	CBD (NBSAP)	“Target 21: By 2030, ecosystems that provide essential services, ... are restored ... taking into account the needs of women, indigenous and local communities, and the poor and vulnerable; Target 22: By 2030, ecosystem resilience ... has been enhanced, through ... restoration, including restoration of at least 30% of degraded ecosystems, including 10% of tree/vegetal cover, ... contributing to climate change mitigation and adaptation; Target 33: By 2025, PES schemes and frameworks ... facilitate restoration for water catchments, carbon stocks & biodiversity”
	UNCCD (LDN)	N/A
	UNFCCC (NDC/INDC)	“Kenya is operationalising these policies and plans through the implementation of climate change actions in various areas such as afforestation and reforestation”
Madagascar	CBD (NBSAP)	“Stabilisation and rehabilitation of habitats and ecosystems; Develop and implement rational reforestation programmes; Protection and restoration of mangroves”
	UNCCD (LDN)	“Strategy 2: Technical measures must include avoiding land degradation, reducing the process of degradation underway, through best practices and the restoration of degraded landscapes; Strategy 3: mobilisation of financial incentives ... better inclusion of the private sector to scale up restoration of degraded lands ... “restore 400,000 ha of landscape each year till 2025 through green infrastructures”
	UNFCCC (NDC/INDC)	“Increasing the total areas under forest cover, with an indigenous species reforestation program of 270,000 ha; Large-scale reforestation for sustainable timber production and indigenous species for conservation; Large-scale adoption of agroforestry; Impacts before 2020: Restoration of 35,000 hectares of primary forest areas and mangroves; Impacts between 2020-2030: Restoration of natural habitats (forests and mangroves: 45,000 ha; Impacts by 2030: Environmental amenities and ecosystem services associated with the restoration of 55,000 ha of forests and mangroves”
Niger	CBD (NBSAP)	“Vision 2035: the citizens of Niger ... value, conserve and restore biodiversity ... restore natural forests and degraded areas”
	UNCCD (LDN)	“Achieving LDN by 2030 and reducing the area of degraded land from 9% to 5% (...) with the aim of increasing vegetation cover from 17% to 19% (...) More specifically, necessary actions will be taken to: Restore 44% (4,440,500 ha) of the 10,761,076 ha of degraded land in 2010”
	UNFCCC (NDC/INDC)	“Restoration of agricultural/forestry/pastoral lands: 1,030,000 ha; Assisted natural regeneration: 1,100,000 ha; Planting of multiuse species: 750,000 ha; Planting of Moringa oleifera: 125 000 ha”
Viet Nam	CBD (NBSAP)	“Vision to 2030: By 2030, 25% of degraded ecosystems of national and international significance will be restored; restoration of 15% of degraded critical ecosystems; promote the use of native species for forest enrichment and restoration in the framework of REDD+”
	UNCCD (LDN)	“Natural forest restoration in 160,000 ha in the North West, Highland, South Central; Afforestation in 275,000 ha in the North West, Highland, South Central; Forest plantation with large timber species in 80,000 ha in the: North West, South Central. With international support: ... Afforestation in 100,000 ha in the North West, Highland, South Central; Natural forest restoration in 250,000 ha in the North West, Highland, South Central; Forest plantation with large timber species in 100,000 ha in the North West, South Central.”
	UNFCCC (NDC/INDC)	“Increase of forest coverage to 42%–42.5%; increase of the area of coastal protection forests; protecting, restoring and planting mangrove and coastal protection forests aiming to exceed over 30% of the plan to 2020; Planting and developing forests, prioritising production forests, large timber forests and coastal forests; restoring protection forests and special-use forests; Defining areas for restoring natural forests, promoting forest regeneration and enrichment planting in areas planned for forestry; improving forest carbon stock quality and volume; and developing agroforestry models to enhance carbon stocks and conserve land.”

Table 6: Commitments under the three Rio Conventions

Sustainable and alternative funding

Globally, it has been estimated that between US\$36 billion and US\$49 billion is required per year if the Bonn Challenge FLR targets are to be met (FAO and Global Mechanism to the UNCCD, 2015). As seen in **Table 6**, other targets also exist, often even more ambitious than those under the Bonn Challenge. Because forest restoration is a long-term process, continuity is particularly important. Short-term project funding is insufficient to achieve such long-term goals.

The case from Madagascar demonstrated the constraints of having to raise funds four times to secure what ended up being a 13-year project. Without long-term engagement, there is also a risk of local populations losing faith in the purpose of such schemes. The challenge of reliance on donor funding is evident in the case of the GGW (UNCCD, 2020). Nevertheless, it has also shown the value of alternative income-generating activities that contribute to restoration – such as in agroforestry production – which have generated jobs and brought in additional local revenue of about US\$90 million across the 11 member countries since 2007 (Ibid.).

Long-term payments are needed for setting forest aside, allowing it to regenerate, or planting trees.

Payments for ecosystem services (PES) have been lauded as a significant tool that enables the long-term self-financing of restoration. Such schemes were applied in Colombia, Costa Rica and Espírito Santo and are being developed in Viet Nam. Kenya's 2019 strategy to achieve 10 per cent forest cover includes a requirement by ministerial agencies to contribute 10 per cent of their corporate social responsibility (CSR) budget to restoration. In Espírito Santo, the variable rates and durations of funding acknowledges the difference between restoration of species that can provide a return on investment (e.g. agroforestry systems) versus the opportunity cost of either setting aside forest areas or planting longer-lived species. Thus, payments to acquire inputs for investments in agroforestry or silvopastoral schemes can be received in the short term, while longer-term payments are available for setting forest aside, allowing it to regenerate or planting trees. In Viet Nam, revenue from PES was anticipated to reach US\$900 million by 2015, rising to US\$2 billion by 2020 (Cochard et al., 2020). Long-term funding mechanisms such as the Bhutan Trust Fund for conservation (not currently used for restoration, however) may prove useful. Similarly, the Eco-Corridors Fund for the Caucasus provides financial support in the Southern Caucasus through contractual nature conservation (ECF website). Alternative funding mechanisms are also being explored for restoration. For example, Terra Match was created by the WRI to provide a platform that matches donors and project implementers, while 1t.org was established by the World Economic Forum to achieve similar objectives. Private companies (at times working through their foundation – e.g. Yves Rocher Foundation in France) are also increasingly engaging in tree-planting initiatives and may prove to be a source of long-term funding (Mansourian and Vallauri, 2020). In this context, seeking projects that are attractive to investors – or “bankable projects” – may also be a way of transforming the long-term financing of forest restoration.

Engaging and empowering stakeholders

Different stakeholders, operating at different scales, play different roles in restoration. For example, international donors and financial institutions (both private and public) may provide funding; forestry agencies may provide technical support; and landowners may play a role in implementing restoration activities on their land. Long-term engagement of stakeholders is a challenge. At the international level, project funding often tends to be short-term. Trends such as FLR (or REDD+) may also come and go. Local-level engagement is much more stable and long-term. For example, in Madagascar, WWF worked closely with local associations to engage local villagers in FLR. In recognition of the long-term role of local-level rural communities and local authorities, governments have gradually started to empower local-level stakeholders in restoration in countries as diverse as Bhutan, Ethiopia, Madagascar and Viet Nam. In the context of FLR, stakeholder engagement has been a fundamental principle since its inception 20 years ago. It is also one of the ten principles of good governance in the natural resource governance framework, as is devolution (Springer et al., 2020). Yet stakeholder engagement (particularly of local-level communities) often stops at a superficial consultation process.

Devolution of authority is important for restoration success.

Devolution of authority to the local level has also demonstrated its effectiveness, as local-level authorities are closer to the landscape where restoration is implemented and to the communities engaging in restoration. For example, in Kenya, the role of county governments was strengthened in the early 2000s via the transitional implementation plans. Colombia, which is highly decentralized, has regional agencies of the environment ministry that are responsible for the implementation of the national restoration plan within their jurisdiction. In Georgia, while legislation is in place for the establishment of local bodies to implement the forest strategy at the municipal level, capacity and financial constraints have hampered their creation.

In sum, diverse policies contribute to sustaining restoration. Engagement through the international environmental governance process provides a good basis for sustained restoration interventions. Empowerment of local communities and devolution to local authorities are also paramount to the long-term sustainability of restoration, as is alternative financing.



In 2018, 30 delegates met in Brazil for the third international high-level roundtable on the Bonn Challenge.



Forest loss and degradation continue to afflict our planet.

Deforestation in the transition area between Cerrado and Pantanal Mato Grosso do Sul, Brazil.

5 Scaling up

The case studies demonstrate, to differing degrees, the intention and application of large-scale forest restoration. They illustrate a rich diversity of experience in attempting to scale up forest restoration. In this section, we first explore how this scaling up may be compared with FLR and to what extent these cases may be aligned with all, or some, of the FLR principles. Second, we determine the implications of these experiences for scaling up forest restoration.

5.1 Alignment with forest landscape restoration principles

In 2018, in a bid to improve the practice of FLR, the partners of the GPFLR defined six principles intended to describe the dimensions of FLR (Besseau et al., 2018). Importantly, these principles serve to describe what FLR is and what sets it apart from other forms of forest restoration.

Overall, most of the cases reviewed demonstrated some but not full alignment with the FLR principles outlined in Besseau et al. (2018), even though in most cases the activities carried out either predated the definition of FLR as an approach, or were not called FLR explicitly (see **Table 7**). However, some cases demonstrated more substantial alignment than others. For example, most cases reflected the importance of multiple benefits (e.g. soil and water conservation as well as timber supply in Viet Nam and Ethiopia). Biodiversity as a benefit, however, was rarely prominent. While Bhutan, Costa Rica and Kenya prioritized biodiversity conservation more generally, it was not the main factor guiding any forest restoration efforts in these countries. At the same time, other principles, such as engaging stakeholders and supporting participatory governance, were still generally in their infancy. The promotion of community management or co-management as an approach in Bhutan, Ethiopia, Madagascar and Viet Nam reflected some promising progress on this principle.

The alignment exercise confirms that while many principles are well covered in most cases, there are still some gaps and weaknesses.

Principle	Extent of application in case studies (-, -/+, +, ++) ⁸	Assessment across cases
1. Focus on landscapes	++	This principle highlights the scale (“entire landscapes, not individual sites”), which emphasizes the importance of mosaics of different land uses and management practices, as well as the diversity of tenure and governance systems. Overall, all the cases looked at restoration over a large territory – be it a landscape (e.g. Madagascar) or the entire country (e.g. Viet Nam) or several countries (e.g. GGW).
2. Engage stakeholders and support participatory governance	+/-	This principle emphasizes the engagement of “stakeholders at different scales, including vulnerable groups” at several stages of the FLR process. In the cases where payments for ecosystem services were being implemented (e.g. Costa Rica and Espírito Santo), private landowners were engaged via those payment schemes. In other cases (e.g. Bhutan, Ethiopia, Kenya, Madagascar), local communities were increasingly being engaged through co-management (Madagascar), participatory management (Ethiopia), or social forestry (Bhutan). Nevertheless, the extent of real engagement in decision-making is difficult to assess and has been queried by researchers (e.g. Kagombe et al., 2017; Cochrane and Legault, 2020).
3. Restore multiple functions for multiple benefits	++	This principle underscores the importance of restoring “multiple ecological, social and economic functions across a landscape” that can provide several ecosystem goods and services to multiple stakeholders. In all cases, more than one benefit or function was sought for multiple stakeholders. Biodiversity was a benefit sought in Bhutan, Colombia, Costa Rica, Kenya and Madagascar; water protection was a major function sought in most of the case studies; soil and land protection were sought in Bhutan, Espírito Santo, Costa Rica, Ethiopia, Georgia, GGW, Kenya, Niger and Viet Nam; energy (both biomass and hydropower) was a priority in Bhutan, Colombia, Georgia, Kenya, Niger and Viet Nam; mitigation of both droughts and floods was a preoccupation for Espírito Santo, Ethiopia, Georgia, GGW, Kenya, Niger and Viet Nam.
4. Maintain and enhance natural ecosystems within landscapes	-/+	This principle emphasizes that “FLR does not lead to the conversion or destruction of natural forests or other ecosystems.” While there is limited information on exact locations of restoration actions, the activity was reported to be generally carried out on degraded land, though there have been some instances of forest conversion.
5. Tailor to the local context using a variety of approaches	-	This principle suggests the need to use methods that take into account “local social, cultural, economic and ecological values, needs, and landscape history”. In most cases, this was not prevalent. Many tree-planting activities have used exotic, fast-growing species rather than local species (e.g. Ethiopia, Viet Nam). Although these were often for fuelwood needs of the local rural populations (e.g. Kenya, Madagascar), that represents only one dimension of this principle. In many cases, the local socio-economic context was not well understood, leading to some opposition to tree planting and limited success. Nevertheless, a historical review demonstrates improvements over time (e.g. in Viet Nam).
6. Manage adaptively for long-term resilience	-	This principle seeks to ensure that approaches to restoration enhance species and genetic diversity and are adjusted over time to reflect “changes in climate and other environmental conditions, knowledge, capacities, stakeholder needs, and societal values”. Generally speaking, species and genetic diversity have not been central to the approaches carried out in the cases examined. Costa Rica and Espírito Santo are notable exceptions because of the emphasis on natural regeneration. Resilience (particularly to the effect of droughts, land degradation, soil erosion and famine) has often been prioritized (e.g. Bhutan, Ethiopia, GGW, Kenya, Madagascar, Niger, Viet Nam). Nevertheless, choice of species has not supported this. Limited monitoring and stakeholder engagement have signified that ongoing restoration efforts are not necessarily best suited for social and ecological resilience.

Table 7: FLR principles (Besseau et al., 2018) and their application in the case studies

⁸ Key: - = not much; +/- somewhat; + = reasonably; ++ = very much

5.2 Implications for policymakers and practitioners

Of the possible scenarios highlighted in the introduction, Scenario H is the one that recognizes the long-term nature of forest restoration and the one that is preferable if restoration efforts are to be sustainable. In this context, it is important to understand the enabling factors for each of the three phases that can facilitate and support forest restoration and enable its upscaling.

The findings in the previous section emerging from 10 case studies that have taken different approaches to large-scale forest restoration/reforestation yield useful implications for policy and practice. These implications are summarized below according to the three phases.

5.2.1 Phase I – Motivation

A. There are multiple social, ecological, political and economic factors that motivate the initiation of forest restoration

At any one time, as seen from the cases in this report, a diversity of factors may have coalesced to ensure that forest restoration was initiated (**Table 4**). The forest transition model defined by Mather (1992) demonstrates how a reduction in reliance on the land and forest sectors leads to an eventual increase in forest cover. This transition from forest loss to forest gain may be the result of many influences, including the international environmental governance framework (e.g. the role of forests in climate change mitigation and adaptation), national policies or market forces, among others (Kull, 2017). Of the cases explored in this report, for example, both Costa Rica and Viet Nam showed a significant reduction in their reliance on forests for GDP. While forests contributed to 8.57 per cent of Viet Nam's GDP in 1990, this figure had dropped to below 2 per cent by 2000, although it has grown once again, reaching 4 per cent of GDP in 2017 (World Bank, 2019). Policy measures were also a significant driver of the forest transition in both countries.

B. The trigger that motivates engagement in forest restoration might not always be self-evident

There may be reasons that are outside the reach of a government but that represent an opportunity and might motivate a country to engage in restoration. The Bonn Challenge “movement” and associated international interest and donor funding may be considered such a factor. There may be other reasons that are within the remit of a government but may also not be so evident, such as linkages between downstream impacts and upstream deforestation. The distinction between exogenous and endogenous factors has a bearing on the definition of relevant policies: exogenous factors suggest less direct influence but the possibility of seizing an opportunity (as was the case in Costa Rica), while endogenous factors (such as pressure on land from agricultural practices) requires a national response such as a change in policy, legislation or regulatory enforcement.

C. Engaging local-level stakeholders in forest restoration requires sound measures that are locally appropriate and proven

Restoration initiatives are costly and long-term and need to be grounded in evidence if stakeholders are to see their value and if they are to be successfully engaged. Demonstrating explicitly how restoration can be a solution (or part of one) for several environmental (e.g. drought, habitat loss, soil erosion) and human (e.g. loss in agricultural productivity, loss in water quality) problems is fundamental to its acceptance. Local extension officers play an important role in promoting approaches and demonstrating restoration benefits and techniques. Traditional authorities also play an important role, as was seen for example in Niger, where village chiefs rather than distant officials were encouraged to develop rules for managing natural regeneration. Starting with, and learning from, smaller-scale initiatives that demonstrate results may be a good option. It is essential to consider local needs and practices and adapt to them in the drive to be locally relevant.

Recommendation 1. *Decisions to initiate forest restoration should be grounded in a sound understanding of the context (including local expertise, traditional knowledge and practices), the drivers of forest loss and degradation, and a clear identification of the leverage points so as to increase the chances of long-term success.*

5.2.2 Phase II – Implementation

D. A package of different governance measures can support forest restoration

Findings revealed that, unsurprisingly, there was no single measure that supported implementation across all cases leading to the same results. For example, while significant overseas funding for tree planting led to visible results in Viet Nam, similarly large amounts of funding in Ethiopia did not have the same impact. Overall, the analysis of the cases demonstrates that a complex set of governance measures over the years has supported large-scale forest restoration implementation.

Measures to support restoration implementation include policies, tax breaks, financial incentives and tenure security, among others. No single measure will achieve the transformative change necessary for large-scale restoration. Instead, a package of measures that may include any of the above should be considered in order to create an enabling environment for restoration implementation. The cases reviewed have identified some examples of measures, such as payments of different amounts and duration (e.g. the water fund in Espírito Santo); policies that provide guidance (e.g. the restoration plan in Colombia) or sanctions (e.g. in Ethiopia the process of granting rights to communities is accompanied by sanctions for breaking the agreed-upon contracts); funding (e.g. the FSSP in Viet Nam); and international pressure (e.g. the Bonn Challenge and commitments made under it by countries such as Colombia or Ethiopia). Over time, the package of measures will need to evolve. For example, carbon funding has recently begun being explored in Ethiopia as a method of sustaining its plantations.

Institutional aspects	<ul style="list-style-type: none"> • Co-management arrangements granting rural communities more rights and responsibilities (e.g. Madagascar) • Improved tenure and property rights (e.g. Ethiopia, Niger, Viet Nam) • Policies setting forest restoration targets (e.g. Espírito Santo, Bhutan, Kenya) • Decentralization and devolution (e.g. Colombia, Georgia, Madagascar, Niger) • Integrated and cross-sectoral collaboration (e.g. Costa Rica, GGW, Kenya)
Financial aspects	<ul style="list-style-type: none"> • PES schemes (e.g. Colombia, Costa Rica, Espírito Santo) • Tax breaks (e.g. Costa Rica) • Tax levies on specific industries (e.g. Espírito Santo, Costa Rica, Kenya) • Market conditions (e.g. drop in price of beef in Costa Rica; rise in ecotourism)
Role of key stakeholders	<ul style="list-style-type: none"> • Public-sector agencies responsible for forests, including restoration (e.g. reform of state forest enterprises in Viet Nam) • Local-level authorities providing local extension services and support (e.g. forest rangers in Bhutan; Corporaciones Autónomas in Colombia) • Foreign donors providing funds (e.g. 25 donors in Viet Nam) • Local rural communities living in the landscape engaging in restoration (e.g. farmers in Niger) • NGOs providing technical assistance (e.g. WWF in Madagascar)

Table 8: A package of governance measures to support implementation

Recommendation 2. *A package of locally adapted governance measures is necessary for effective large-scale forest restoration; and it may need to evolve and adapt over time in view of the changing national or local, or even international, context.*

E. Accurate monitoring is needed to know which governance measures work

Establishing clear baselines and measuring progress is a fundamental step to inform current and future forest restoration (and, indeed, FLR) policies, strategies and implementation. Measuring cause and effect between different policy tools and forest change is important. Understanding the impact of a governance measure, or package of measures, is complex, as multiple variables are likely to be in operation at the same time. Yet, a clear theory of change and clear indicators can help to save valuable time and resources by helping to determine cause and effect (Stephenson, 2019) and allow for adaptive management (CMP, 2020). The case of Georgia, for example, highlights the challenges to assess any progress without an adequate and recent national forest inventory.

With appropriate monitoring and feedback loops, individual measures may need to be adapted. Indeed, in all the cases reviewed, some fine-tuning has been necessary and continues to be necessary. The frequency of such adaptations needs to be carefully considered since if changes appear too frequently, without sufficient justification, there may be a risk that land users and landowners will lose faith in such interventions.

Recommendation 3. *Data collection and monitoring must be improved so that governance measures can be informed by solid data.*

F. Learning and building from positive experiences advances forest restoration

An effective way of not only testing interventions but also engaging and mobilizing stakeholders is to test such interventions on a smaller (project) scale in order to identify key issues and demonstrate potential impact. For example, in Ethiopia, initiatives on a small scale demonstrated the value of engaging communities. The Georgian NBSAP recommends the development of pilot projects to demonstrate practical examples of low-impact, sustainable livestock grazing systems and their effect on forest recovery (MENRP, 2014). Close cooperation between the ministry of agriculture and livestock farmers is also essential. Equally, the 13-year experience in Fandriana-Marolambo provides a good test case for the government's larger 4 million hectare FLR target. It also serves to identify lessons and stimulate necessary changes based on a subnational-level intervention. Rigorous monitoring and lesson-learning in these sites is critical, however, if they are to be used for this purpose.

Recommendation 4. *It is useful to build on pilot initiatives that include rigorous monitoring where evidence can be collected and lessons learned on a smaller scale before scaling up to the country level.*

G. Integration across ministries helps to reduce conflicting land-use interventions

Landscapes are affected by numerous sectors – e.g. mining, energy, agriculture – and often different sectors, ministries and agencies may introduce contradictory policies. Integration across sectors and ministries is a valuable way of ensuring that efforts to increase forest cover in a landscape can contribute to several sectors, and that interventions in the landscape are carried out in a coherent fashion (e.g. Mansourian and Parrotta, 2018). For example, in Kenya, intersectoral collaboration has been promoted around climate change mitigation strategies that also include restoration. Indeed, policy fragmentation and contradictions frequently play out in degraded landscapes and impact on the implementation of large-scale restoration interventions such as FLR. The role of intersectoral or cross-ministerial agencies is important in this respect. This happened with Costa Rica's FONAFIFO, which is a cross-sectoral agency involving representatives from the Ministry of the Environment and Energy, the Ministry of Agriculture and Livestock, the National Banking System, and representatives from the private sector and the timber industry. Sharing a common vision and objectives provides a solid framework for collaboration. Cooperation can also be energized through collaboration to implement commitments under the Rio Conventions. Mobilization around climate change, for example, provides an umbrella for cooperation, as seen in Ethiopia's climate-resilient green economy (CRGE) strategy or in the intersectoral commission on climate change in Colombia. Nevertheless, this is a challenging way of operating and became a stumbling block for many countries under the GGW (UNCCD, 2020).

Recommendation 5. *Remove inconsistencies and contradictions in land-use-related policies and promote cross-sectoral integration for effective forest restoration.*

H. Devolved and decentralized government and extension officers are key facilitators in forest restoration

The cases analysed here have highlighted the importance of officers and agents at the local level, for example forest rangers in Bhutan or local authorities in Colombia or Madagascar. Indeed, devolution is one of the ten principles in the natural resource governance framework developed by IUCN (Springer et al., 2020). Many of the contexts in which restoration is needed are remote and inaccessible (Nagendra, 2010; Mansourian et al., 2019), thus the role of decentralized or devolved authorities is all the more critical. At the same time, they need to be given the training, authority, funding and guidance to perform their job.

Recommendation 6. *Devolve responsibility for restoration to local authority wherever feasible and give them the necessary means to carry out restoration.*

I. Secure tenure and property rights promote better forest management and restoration

Tenure insecurity is generally incompatible with sustainable land management and restoration (Nagendra, 2007). Rural communities relying on land-based livelihoods have often failed to engage in land-based interventions promoted by external governments or donor-driven interventions, such as FLR, because of insecure tenure rights. In contrast, improvements in tenure security have demonstrated positive results in forest restoration initiatives, as seen in the Ethiopia and Viet Nam case studies. In Costa Rica and Espírito Santo State, private ownership facilitated implementation of the payments for ecosystem services schemes. In Niger, a change in the forest code in 2004 allowing land users to benefit from the trees they planted helped to encourage forest expansion.

Recommendation 7. *Granting secure tenure rights to local land users and rightsholders is important for successful forest restoration.*

J. Financial incentives and measures can accelerate forest restoration

Financial incentives, associated with payments for ecosystem services – generally through state-run initiatives – or compensation or other financial incentives for tree planting (e.g. provision of food), have been significant drivers of restoration in countries such as Brazil, Costa Rica and Ethiopia. For an effective implementation, however, payments must be more attractive than the alternative (deforestation or degradation) and require some infrastructure (e.g. an established fund, contracts, extension support, etc.). Furthermore, payments tend to function better when property rights are clear (Kemkes et al., 2010). The risk that such incentives may lead to the commodification of nature, which may lead to the loss of one biodiversity-rich area being “replaced” with another area elsewhere, is a concern (Apostolopoulou and Adams, 2017).

Financial incentives for restoration can take many forms. They may be payments for ecosystem services, but they may also be tax incentives, other forms of grants, soft loans or micro-credit schemes, or other market-based mechanisms (e.g. associated with certified products generated from a restored landscape). They often also go hand-in-hand with regulatory constraints. It is important to emphasize that forest restoration often represents an opportunity cost for some land users and this needs to be acknowledged. Trade-offs in practice signify that there will be some winners and some losers, and appropriate compensation is necessary for those likely to lose. Innovative and sustainable financing schemes still need to be developed in many cases.

Recommendation 8. *Acknowledge the opportunity cost of forest restoration for private landowners and rightsholders by providing well-designed financial incentives and measures.*

5.2.3 Phase III – Sustaining

K. Forest restoration requires long-term financing

Long-term financing arrangements, both from domestic budgets and international finance for aid, biodiversity or climate, are necessary for restoration to be sustainable. Donor funding may be necessary to initiate large-scale efforts, but other more sustainable forms of funding will need to be explored and implemented, including from private-sector sources. The funds for the PES schemes established in both Costa Rica and Espírito Santo State have been collected from a tax levy on the energy sector, which is an effective means of providing a long-term source of funding. Viet Nam’s payments for forest ecosystem services programme is based on small fees charged on electricity and water bills for users (industries, households, etc) of hydropower/water under the programme. Kenya is seeking to apply a similar levy on water and tourism.

The economics of forest restoration are complex due to the time lag inherent in forest growth. Also, any financial compensation or payments have to take into account this lack of profitability in the short term. Thus, a blending of funding measures may be required that includes both short-term and long-term funding, as well as public and private financing (FAO and Global Mechanism of the UNCCD, 2015). In that respect, seeking to develop “bankable projects” may also attract long-term private-sector financing.

Recommendation 9. *Schemes to financially support forest restoration need to be designed for the long term, and alternative and blended financing arrangements should be explored.*

L. Fair access, distribution and benefit-sharing arrangements need to be in place

Forest restoration can exacerbate inequalities, notably through land expropriation (Barr and Sayer, 2012; Mansourian et al., 2020c). Benefits and costs from forest restoration may not be fairly distributed, and elite capture can be a challenge, as reported, for example, in Viet Nam with respect to the complexity of procedures for land allocation (Phuc et al., 2013). Those paying the cost of restoration in the short term may not be the ones benefiting from it in the long term. International funding for tree planting, for example, may not always reach those directly involved in forest restoration.

Recommendation 10. *Mechanisms should be in place to ensure that benefits and costs of forest restoration can be fairly distributed.*

M. The role of local communities as custodians of the land and forests is paramount

The role of those local or rural communities living closest to the forest and land has emerged as a fundamental one in most cases studied (particularly in Bhutan, Colombia, Ethiopia, Kenya, Madagascar, Niger and Viet Nam). In many locations, local communities have suffered from numerous interventions that have affected their livelihoods without engaging them in the process and have subsequently failed to understand or experience the long-term benefits of such interventions. For example, in Ethiopia the recent emphasis on local community engagement in forest restoration is the result of an acknowledgement of their fundamental role in forest and land management. In Madagascar, several community members were initially reluctant to engage in the project; these members were wary of external interventions and local-level facilitators had to be hired to fully engage with them (Mansourian et al., 2018).

Any forest restoration intervention has to strengthen the role of local communities as key agents of change. They are the ones suffering from poor landscape management, and the ones with the most to lose from land degradation. They are also the main land users and managers. In the long term, they are the ones likely to gain from improved forest cover. It is therefore essential to truly engage with them as active agents in the process of change. For FLR to succeed, local communities have to trust that the measures being implemented will be for the long term and that their engagement will be consequently rewarded over such long time frames. Also, there is insufficient recognition of the importance of local land-use practices in many cases; as a result, local communities may be alienated (e.g. Ethiopia or Madagascar). This remains a challenge but tried-and-tested local knowledge can provide a necessary complement to new and modern technologies, as was seen in the GGW.

Recommendation 11. *Acknowledge, empower and engage local communities in forest restoration.*

Recommendation 12. *Take into account and engage with local and traditional land-use practices that support forest restoration.*

N. Long-term political engagement is required for forest restoration

Governments and donors engaging in FLR will need to do so for the long term. One avenue may be through multilateral environmental agreements that create a long-term framework within which governments can develop their related programmes. Inscribing restoration (or a minimum forest cover) within the constitution as Bhutan and Kenya have done is another way of maintaining that long-term goal. The clear definition of ecosystem services provided by forests that are valued (e.g. water), quantified and marketed may be another important avenue for future restoration interventions (as demonstrated by the Brazil and Costa Rica cases). The process of restoring a forest landscape requires time, and long-term commitment and engagement is a way of securing the stable political and governance context necessary over such time frames.

Recommendation 13. *Governments should engage for the long term in forest restoration, and establish long-term and stable measures and agencies that reflect the extended nature of the engagement.*

A large, ornate conference room with a chandelier and people seated at long tables during a meeting. The room features high ceilings with decorative moldings and a large, multi-tiered chandelier. People are seated at long tables covered with white cloths, equipped with microphones and monitors. The atmosphere is professional and formal.

Long-term political
engagement is required
for forest restoration.

6 Outstanding issues and areas for further research in upscaling to forest landscape restoration

Scaling up from smaller forest restoration interventions to FLR that meets multiple objectives is a challenging proposition but one that a growing number of governments are embracing. The time is right therefore to begin to better identify what the enabling factors are that can indeed make that transformational shift from small-scale or single-objective tree planting to truly multipurpose, large-scale restoration as exemplified by FLR.

The cases reviewed here demonstrated differing levels of compatibility with FLR as defined in 2000 and further developed through six principles in 2018. Indeed, none of the cases could be said to fully align with the FLR principles. While that is not surprising given that, other than the Fandriana-Marolambo project in Madagascar, most of the cases were not explicitly set up as FLR programmes, there are clear opportunities for improving current practices to better align with these FLR principles.

Some outstanding issues noted here are placed in the context of FLR (and the Bonn Challenge and associated commitments).

Forest quality is key for long-term social and ecological benefits, thus it can't be sacrificed for forest quantity.

First, when upscaling, there are challenges concerning **forest quality versus forest quantity**. FLR is defined with respect to both social and ecological dimensions, and while trade-offs are implicit between these two dimensions, quality should not be sacrificed in either. While Costa Rica demonstrated that natural regeneration can be an important contributor to restoration, more often than not, restoration is achieved through plantations. And scaling up all too often signifies fast-growing, monoculture plantations of non-native species. In this respect, although there is value in global hectare-based targets, these may place weight on quantity over quality.

Second, and following on from the first point, **how is success defined in FLR?** What is success? Is it more forest or is it better quality forest (Mansourian et al., 2017a)? And how is it measured? For many countries (and companies as well), success in tree planting is measured by the number of seeds or trees planted. This does not mean that several years down the line there is a forest where those seeds or trees were planted. Indeed, in many cases there isn't. Short-term objectives set via projects (rather than long-term programmes) may also use simplistic measures such as the number of tree nurseries established or the number of jobs generated. Thus, other more sophisticated measures may be needed (that measure both social and ecological impacts) and these should also be applied in the long term. These indicators

should reflect both the social (e.g. benefits of forests to people) and the ecological (e.g. habitat creation for endangered species) dimensions of restoring a forested landscape.

Data quality is a challenge.

Third, it is legitimate to ask, “**how much scaling up is feasible?**” In different contexts, scaling up may not mean across the nation, but rather focusing on a few priority landscapes. Alternatively, as seen with the GGW, scaling up may extend across borders. However, ambition needs to match feasibility. The low success rate to date of the GGW (4 per cent of its goal halfway through the programme, measured in terms of hectares – UNCCD, 2020) suggests that the ambitious targets may need to be revisited. Indeed, there may be a need to “downscale” ambition and expectations.

Fourth, **data quality is a challenge**. Securing accurate data on forest cover is still far from obvious. That is in part due to ongoing challenges of defining forests, for example (Chazdon et al., 2016). All key data for this study were obtained from the FAO’s Forest Resources Assessment (FRA) – which, in turn, obtained its data from governments. Depending on the country’s capacity, this data may be more or less accurate. Recently released 2020 assessments in some cases demonstrated significant differences with data from the 2015 FRA reports. Furthermore, as seen before, subtle changes may be present at a subnational level, and these are often not captured in national-level data. Yet measuring progress and determining which interventions work necessitates accurate baselines and sound long-term data tracking.

Finally, **attributions of cause and effect** are tricky, especially when accurate data is lacking and/or when monitoring specifically for such factors has not been carried out. Furthermore, time frames with forests and restoration are particularly long, signifying that long-term monitoring is required if one is to determine causal factors effectively, to assess if restoration outcomes are being achieved and to take remedial actions.



Annual meeting of the regional African FLR initiative (AFR100) in Niger, 2017.

© Horst Freiberg/BWU

A close-up photograph of a man with short dark hair, wearing a white polo shirt, looking down at a green plant branch he is holding. The background is blurred, showing more of the same plant and a natural outdoor setting. The text is overlaid on the left side of the image.

Restoration progress
toward 2030:
greater ambition
is needed.

7 Conclusions

The twin crises of biodiversity extinction and climate change signify that forest restoration is no longer an option but rather a necessity. Better understanding what factors can enable and support large-scale forest restoration is a means to accelerate implementation.

Yet, there is no silver bullet when it comes to forest restoration. Each situation is unique, as demonstrated across our universe of case studies. There is no single reason to restore, no single measure that enables, supports and sustains restoration over time. The emerging findings from this study point to several areas that are useful along the road to FLR.

Payments for ecosystem services can support FLR.

This study has identified some examples and general trends of selected key enabling factors for forest restoration and their role in scaling up to FLR. The analysis has highlighted the importance of a conducive policy environment, the relevance of tenure and the need to engage and empower communities. It has also highlighted the importance of considering economic measures such as payments for ecosystem services to support FLR and tree planting in the long term. A set of recommendations has been proposed.

Ultimately, no single solution exists to facilitate upscaling forest restoration. Context matters. Yet, learning from practice, this study provides some valuable avenues and tools for decision-makers and donors, project developers and implementers to design future restoration and FLR programmes in light of the Bonn Challenge, other global targets, and the upcoming UN Decade on Ecosystem Restoration.



A seedling in the tree nursery of the WWF reforestation programme at Chepalungu Forest Reserve, Kenya.

© Frederick Wisah/WWF-Kenya

The twin crises of biodiversity extinction and climate change signify that forest restoration is no longer an option but rather a necessity.



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An aerial photograph of a lush green forest restoration site. A dirt path winds through the dense vegetation. In the lower-left quadrant, a large bundle of young saplings is secured with black straps and sits on the path. The text is overlaid in the upper-left area of the image.

Ultimately, no single solution exists to facilitate upscaling of forest restoration. Context matters.

Annex I – Data collection tool

Adapted from Hanson et al., 2015; Mansourian, 2016;
Mansourian, 2017; Springer et al., 2020

I. Motivation Phase

Was there a clear trigger for initiating FLR or large-scale restoration? (At international, national or local scale?)

Environmental	
Dimensions/ levels	International, national, local
Research questions	Checklist: <ul style="list-style-type: none">• Natural catastrophe?• Loss of ecosystem services?

Sociopolitical	
Dimensions/ levels	International, national, subnational, individual
Research questions	Checklist: <ul style="list-style-type: none">• Global agreement?• Political decision?• Economic factors?• Social movement?• Competitiveness?• Leadership? Champion?• Improved understanding/knowledge?

II. Implementation Phase

What are the key enabling factors that supported implementation?

Policies, policy and legislative frameworks	
Dimensions/ levels	International, national
Research questions	<i>What policies and legislation support (or do not support) FLR/ large-scale restoration?</i>
	Checklist: <ul style="list-style-type: none"> • Supportive/harmful policies? • In different sectors? • How do different sectors relate to each other when it comes to restoration? • Cross-sectoral collaboration, including with other forest-related frameworks and platforms, such as REDD+, FLEGT, climate, agriculture, etc.? • Cross-sectoral conflict? • Multisectoral platforms? • Enforcement? • Incentives/disincentives? (forest restoration/clearing)
Economic aspects (funding)	
Dimensions/ levels	International, national, subnational, local
Research questions	<i>Who is funding large-scale restoration?</i>
	Checklist: <ul style="list-style-type: none"> • Through what mechanisms? • Do we have figures? • Why are such funds being disbursed?

Category	Economic aspects (benefits/costs)
Dimensions/ levels	International, national, subnational, local
Research questions	<p><i>Have there been clear beneficiaries from the restoration? Have there been losers? Has there been compensation for losers?</i></p> <p>Checklist:</p> <ul style="list-style-type: none"> • Who wins/who loses? • Compensation? • Distribution? • Power issues related to funding? • Sustainability?

Category	Stakeholder engagement
Dimensions/ levels	Temporal, spatial (international, national, landscape/subnational, local)
Research questions	<p><i>Who are key stakeholders in FLR/large-scale restoration and why? Have stakeholders all been engaged in the restoration process (how and at which stage)?</i></p> <p>Checklist:</p> <ul style="list-style-type: none"> • Who is in? Who is out? • Participation mechanisms? • Consultation process? • Ethnic minorities? • Roles/responsibilities? (private sector, IPLCs, govt, NGOs, etc.) • Relationships? • Partnerships? (new/existing) • Power relations? • Constraints? (on different groups) • Motivations? • Empowerment? • Coordination? • Different knowledge systems? • Negotiation processes? • Conflict resolution mechanisms? • Informal/formal platforms? • Political commitment?

Category	Institutions (formal and informal)
Dimensions/ levels	International, national, landscape/subnational, local, formal/informal
Research questions	<p><i>Which institutions influence FLR/large-scale restoration in your country? How?</i></p> <p>Checklist:</p> <ul style="list-style-type: none"> • Leadership on FLR? • Commitment? • Partnerships? • Devolution? • Multistakeholder participation

Category	Institutions (tenure and property rights)
Dimensions/ levels	National, land, forest, tree, goods and services
Research questions	<p><i>What sorts of issues around tenure (of land, forest, trees, goods and services from trees) influenced choices on restoration?</i></p> <p>Checklist:</p> <ul style="list-style-type: none"> • Formal/informal/traditional? • Ancestral? (including IPLCs) • Conflicts? • Types of rights? (use, management, etc.) • How are they respected? (effective and adequate grievance mechanisms) • Historical claims?

III. Sustaining

What are key factors to sustain the restoration effort?

Economics (funding)	
Dimensions/ levels	Temporal, spatial (external/internal), equity (across groups)
Research questions	<i>What are the long-term funding engagements for FLR?</i>
	Checklist: <ul style="list-style-type: none"> • Is there long-term funding? • Source and origin? (public – national, international/private – climate finance, ODA, biodiversity finance, agriculture, etc.) • Which ministry/sector? • Economic incentives? (tax incentives, subsidies, etc.) • Platforms to sustain FLR? • Integrated funding in government? • Donor demands? • Innovative funding mechanisms? • Benefits? • Distribution? • Private-sector role?
National policy framework	
Research questions	<i>Is FLR integrated/mainstreamed in national priorities?</i>
	Checklist: <ul style="list-style-type: none"> • Are there long-term plans/policies incorporating FLR?

Annex II – Case studies

Case study 1:	Bhutan	78
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Case study 1:

Bhutan

Dense forest in wildlife corridor eight, Central Bhutan.

1.1 Overview

Bhutan is a unique country, in more ways than one. In 2015, a team of 100 volunteers established a Guinness World Record by planting 49,672 trees in one hour! In 2016 people across the country planted 108,000 trees to honour and celebrate the birth of the crown prince. Every household member planted one tree.

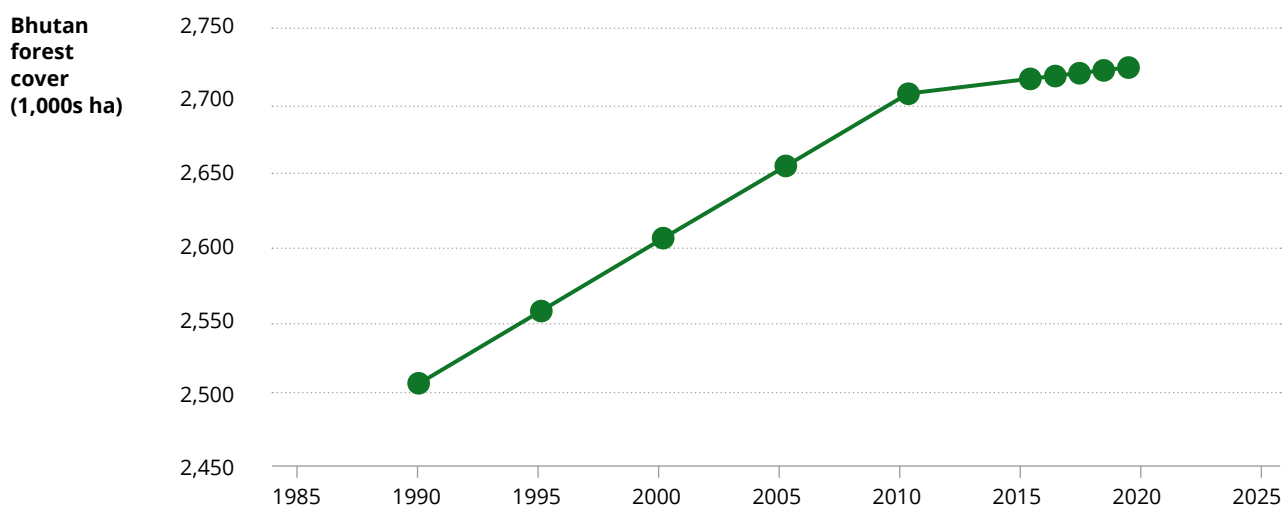
Bhutan has seen a relatively steady forest cover over the last few decades, and forest conservation is at the core of its forest policy. Although restoration, afforestation and plantations are not central to Bhutan's forest policy, they nevertheless represent a component of the country's forest management strategy. This case study presents an interesting example of what is the ultimate objective of FLR: achieving a sustainable, forested landscape.

Total country area (million ha)	3.84		
Bonn Challenge commitment	N/A		
ROAM-identified potential for restoration	N/A		
Area afforested/year* (2015–2020)	200 ha		
Area naturally regenerating/year (2015–2020)	2,210 ha		
	2010	2015	2020
Forest area, including plantations (million ha)	2.705	2.717	2.725
% forest cover	70.46%	71%	71%

Source: FAO, 2020

Table 1.1: Overview profile Bhutan

* No area reported as being under restoration



Source: FAO, 2020

Figure 1.1.: Forest cover change

Deforestation has been slowly increasing in some parts of the country, mainly in the south, while afforestation, occurring mostly in the central part (Reddy et al., 2016), has compensated for it (FAO, 2020). Most of the forest planted in Bhutan is through afforestation of harvested areas that are degraded. Nevertheless, according to data reported to the FAO (2020), both forests and other wooded lands have increased in Bhutan in the last 30 years. The area classified as primary forest represents 50 per cent of the area under protection (Ibid.). The majority of forests (62 per cent – FAO, 2014) are broadleaves, with subtropical broadleaved hill forest being predominant on 34.1 per cent of the territory, followed by dry temperate (20.9 per cent), montane wet temperate (18.9 per cent), moist temperate (10 per cent), and moist sal (8.1 per cent) in 2014 (Reddy et al., 2016). Mixed conifers account for 23 per cent of land cover (FAO, 2014 – data from 2010). The forest types that have been most affected by deforestation in the last four decades are subtropical broadleaved hill forest (64,500ha) and moist sal forest (9,900ha) (Reddy et al., 2016). Many deforested areas have been converted into agricultural land (Ibid.).

All of Bhutan’s forests are reported as being intended for both soil and water conservation, and other ecosystem services. Central to the high rate of forest cover in Bhutan is Article 5 in the Constitution, which states that at least 60 per cent of the country shall be under forest cover to conserve the country’s natural resources and prevent degradation (Kingdom of Bhutan, 2008).

Principle	Translation to Bhutan
1. Focus on landscapes	At a national level, Bhutan has identified forest areas for protection (especially in the framework of soil and water conservation), production and plantations.
2. Engage stakeholders and support participatory governance	The constitution states that forests are for the people; through increased community forestry, the government is engaging local stakeholders.
3. Restore multiple functions for multiple benefits	The two main functions identified for forests are soil and water conservation, but include also spiritual and cultural well-being, as well as biodiversity conservation.
4. Maintain and enhance natural ecosystems within landscapes	About half of the country’s forests are under protection, and an emphasis is placed on maintaining at least 60 per cent forest cover. Restoration is taking place within this context.
5. Tailor to the local context using a variety of approaches	Community forestry has undergone several iterations and has been adapted to suit the local social and ecological context.
6. Manage adaptively for long-term resilience	Given the rugged terrain, forests play an important role in the country’s resilience to climate change, and forest policies emphasize resilience.

Table 1.2: Link between implementation in Bhutan and the FLR principles

1.2 Motivation

The context in Bhutan is distinct, as the country's maintenance of a relatively stable forest cover over the last few decades means that there is no single major factor driving restoration or reforestation efforts. Nevertheless, the question is: what motivated Bhutan to maintain this forest cover rather than follow the paths others have (many of whom first lost significant forest cover before deciding to restore it)? Bhutan is a small but rugged country where people's livelihoods are closely intertwined with ecosystems. The forests provide food; timber; fibres; medicines; a wide range of ecosystem services (e.g. water regulation and purification, pollination, soil formation, nutrient recycling and climate regulation); and recreational, aesthetic, and spiritual benefits (Wangdi et al., 2013). Forests are also critical to protecting watersheds, which in turn provide hydroelectricity for the country. New opportunities for restoration also opened up with a reduction in yak herding, partly resulting from the nationalization of rangelands but also from a reduction in the price of wool. The nation's close reliance on its natural resources is further strengthened by the Buddhist tradition that gave rise to the Gross National Happiness concept (Lambin and Meyfroidt, 2010). Thus, maintaining and restoring forest cover is vital for both utilitarian and cultural reasons.

As forests provide a wide range of ecosystem services, the government takes a cross-sectoral approach to its forests.

1.3 Implementation

Sectors

Forests are particularly valuable to Bhutan for the multiple functions they serve, including the protection of soil and water, hydropower production and the provision of various goods. Thus the government takes a cross-sectoral approach to its forests, as seen in its recent (2019) plantation strategy, which states that forests “contribute to the biodiversity conservation and management, carbon sequestration, rehabilitation of critical and degraded watersheds and strengthen social and economic benefits” (Royal Government of Bhutan, 2019).

The economic development of Bhutan relies to a large extent on hydroelectricity, which in turn is dependent on forest cover (Brugemann et al., 2016). With respect to watersheds, the Forest and Nature Conservation Rules and Regulations of Bhutan contains an article on watershed management plans, stating that they will be “prepared in accordance with the forest management code and technical guidelines. The Division shall prepare the management plan and submit for approval. Such plans should have the primary focus of returning degraded or critical watersheds to normal or pristine condition (to the extent possible) by addressing degrading influences. The Management Plan shall clearly highlight the implementation arrangement, including interventions to be carried out and the agency responsible for each activity.” (Royal Government of Bhutan, 2017).

With a large proportion of the population being rural, agriculture is important for the country's economic development. Traditional agricultural systems combine subsistence swidden with livestock. Forests are essential to this sector as they harbour grazing land for cattle and yaks.

Bhutan applies a Gross National Happiness index.

Policy and legislative framework

The small Kingdom of Bhutan is recognized for its pursuit of happiness, via the Gross National Happiness (GNH) index. The origin of the GNH can be traced back to the 1729 legal code of Bhutan. One of the four pillars of the GNH index is environmental conservation (Centre for Bhutan Studies & GNH Research, 2016).

Prior to the 1960s, customary practices determined rangeland management in Bhutan. In the early 1960s, however, the government introduced a requirement to register grazing land and imposed a new grazing tax law. Fire is part of rangeland management, which has caused some conflict with the forest department. As of 1981, fire is allowed for rangeland management in alpine regions, but it must be carried out under the supervision of a technician from the forest department.

The 1969 Forest Act nationalized all forests – as well as grazing rangelands – and required a permit for the extraction of certain species, although it allowed for some flexibility when it came to non-timber forest products for personal use such as dried fuelwood or leaf litter (Dorji et al., 2006). In contrast, all trees were protected and required a permit for extraction (Ibid.). Bhutan adopted its first formal forest policy – the National Forest Policy – in 1974 (Kingdom of Bhutan, 2010). It establishes guidance under five areas: forest conservation, afforestation, resource survey, utilization and wildlife conservation (Ibid.). It also first established the goal of maintaining at least 60 per cent forest cover, which was later enshrined in the constitution of 2008 (Wangdi et al., 2013). This policy created a framework for the scientific management of forests, and for the first time explicitly acknowledged the need to restore degraded land (Ibid.).



Agricultural landscape in rural Bhutan.

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The 1969 Forest Act was replaced with the Forest and Nature Conservation Act of Bhutan in 1995 (Royal Government of Bhutan, 2010). Through this act, greater autonomy over forest resources is granted once again to private individuals and communities. It recognizes the traditional and cultural rights of local people to access and use forest resources and lays the foundation for community forestry. Importantly, it takes place in a broader context of decentralization.

In 1979, the concept of “social forestry” was first introduced in Bhutan via a royal decree. Initially, this meant essentially the distribution of free tree seedlings. However, since all trees planted were considered government property, the programme showed limited success (Wolf, 2001).

The 2007 Land Law, which was not to be implemented for another 10 years, was intended to change rangeland management significantly. Under this law, the government nationalized all rangeland and leased the land back to yak herders. The intention behind this law was to distribute rangeland resources more equitably among yak herders (Tshering et al., 2016). During the 10-year time lag between publication and enactment of the law, the government was to prepare technical plans to support herders as well as look at compensation mechanisms where necessary.

A national strategy for community forestry was formally established in 2010 that empowers rural communities to manage their own community forests sustainably.

A national strategy for community forestry was formally established in 2010 under the leadership of the Social Forestry Division (SFD) of the Department of Forests and Park Services (Royal Government of Bhutan, 2010). The goal of the strategy was the production of: “Rural communities empowered to manage their own community forests sustainably to meet the majority of their timber demands and other forest goods and services, derive economic benefits from the sale of forest products and services, and contribute to a reduction in rural poverty” (Ibid.). This marks a return to community empowerment after a period of central control over forests. Community forests are limited to between three and five hectares per household, depending on the type of forest, under the Forest and Nature Conservation Rules (2017 version, revised from 2000, 2003 and 2006 versions). A minimum of five households are needed to make up one community forest management group (Royal Government of Bhutan, 2017). In concert with the forest department, this group then needs to develop a management plan and elect a management committee (CFMG) that is responsible for the implementation of the plan. Community management plans are valid for 10 years (Dorji and Schmidt, 2014). Community forest certificates are issued to the group, and all forest produce specified in the management plan is the property of the CFMG (Royal Government of Bhutan, 2017). Typical management activities under the plan include patrolling the forest, nursery development, tree planting in degraded areas, thinning and tending operations, and creation of fire breaks. The community is entitled to harvest a certain amount of wood for firewood, fence posts, flagpoles and NWFPs such as bamboo, cane, wild vegetables and medicinal plants. Forests transferred to the community are required to be in reasonable condition so that communities can rapidly draw benefits from them. Extension staff are an important component of the programme (Bufum, 2012). As testimony to their success, in 2014, one-third of all rural households in Bhutan were estimated to be members of a CFMG (Dorji and Schmidt, 2014). To encourage communities to engage in restoration or plantation activities, the government provides assistance to establish nurseries and may provide free seedlings (Kingdom of Bhutan, 2010).

Bhutan's plantation and nursery strategy contributes to reversing forest degradation.

Acknowledging that the restoration and improvement of degraded and barren forest lands are an important component of the National Forest Policy (NFP), Bhutan designed a plantation and nursery strategy in 2019, updating the previous one of 2010 (Royal Government of Bhutan, 2019). The strategy is intended to contribute to the reversal of forest degradation by turning barren and degraded land into forest and carrying out reforestation in areas where forests have been cleared or logged. Furthermore, the programme is seen as an important component of the country's objective of maintaining forest cover at 60 per cent. The vision for the programme is to "enhance the plantation programmes to contribute in ensuring 60 per cent forest cover for all times to come and support sustainable forest management for socio-economic, ecological benefits and to contribute to climate change mitigation and adaptation". This strategy has seven objectives: 1. to re-stock and enrich degraded forests to safeguard ecosystem services through plantations; 2. to enhance the production and protection capacity of ecosystems through plantations; 3. to contribute toward the conservation of indigenous species and reduce pressure on biodiversity; 4. to increase timber resources to meet industrial and local demands through plantations; 5. to ensure sufficient and appropriate supply of seedlings through nursery development and management; 6. to rehabilitate watershed/catchment areas to sustain the flow of water or perennial water sources; and 7. to improve the socio-economic status of communities through community and private plantation programmes. Two broad categories of plantations have been described: afforestation plantations, which require suitable species and are carried out on barren, degraded or wasteland sites; and rehabilitation plantations, which are carried out on critically degraded sites, such as eroded, fire-burned, landslide-affected and mining areas, using fast-growing and soil-binding species. Furthermore, 11 different categories of plantation are recognized in the 2017 forest rules: 1. afforestation; 2. reforestation; 3. enrichment plantations; 4. industrial plantations; 5. institutional plantations; 6. community plantations; 7. private plantations; 8. urban/avenue plantations; 9. landscape plantations; 10. seed bank plantations; and 11. compensatory plantations.



Children planting trees as part of the Earth Hour Celebration in Bhutan in 2019.

Logging is practised on less than 5 per cent of the forest estate through forest management units (FMU) in forests with well-developed forest management plans (Wolf, 2001). Among the requirements for state reserve forests, the government is expected to pursue plantations using “appropriate vegetation composition” and offset any logging with new plantations in any given year.

Decentralization, which began in the early 1990s, brought about real change for social forestry (which in turn had begun over a decade earlier). Yet, some issues related to inequities, elite capture and distributional challenges were reported in initial social forestry programmes, with an evaluation in 2014 (Dorji and Schmidt, 2014) providing some recommendations for improvements.

Tenure

The constitution of the Kingdom of Bhutan states that “the rights over mineral resources, rivers, lakes and forests shall vest in the State and are the properties of the State, which shall be regulated by law” (Kingdom of Bhutan, 2008). Before nationalization in 1969, forests were managed under communal and private tenure (Moktan et al., 2016). Informal forest-related institutions regulated forest access and the extraction of different products (Buffum, 2012).

The majority of forest is government-owned (FAO, 2020). Nevertheless, community forests exist that are Government Reserved Forests designated for management by a local community. A small amount of private forests have been registered accordingly (470ha – FAO, 2020). The country’s drive to expand community forests has become one of the top priorities for the Department of Forests and Park Services (Wangdi et al., 2013)

Stakeholders

In the **public sector**, the Department of Forests and Park Services under the Ministry of Agriculture and Forests is the main agency responsible for implementing Bhutan’s forest policies (Ibid.). Various functional divisions exist within this department. Established in 2012, the Social Forestry and Extension Division – known previously as the Social Forestry Division – focuses on agroforestry, community forestry, non-wood forest products and plantations. The division aims to facilitate and strengthen the capacity of communities to sustainably manage forest resources by promoting participatory forest management and ensuring effective management of these community forests (DoFPS website). Overall, forest services are highly decentralized, with 14 field territorial divisions and 10 protected area field offices (Ibid.).

For years, forestry extension officers represented an important cornerstone of the social forestry approach developed in Bhutan (Kingdom of Bhutan, 2010). Today, forest rangers that are situated within the territorial forest divisions perform this role.

The Green Bhutan Corporation Limited was established in 2017 as a state-owned enterprise. Its key mandates include carrying out afforestation programmes at large scale across the country, landscape development and greening activities, all within the framework of the constitutional goal of maintaining 60 per cent of the country under forest (GBC website).

The Social Forestry and Extension Division, established in 2012, focuses on agroforestry, community forestry, non-wood forest products and plantations.

Private

Communities are important stakeholders in the government's forestry programme, especially since the formalization of the community forestry programme in 2010. There is a high dependence on forest goods and services and thus an intricate connection between local communities and forest resources. Fuelwood, traditional medicines and spiritual values are among the many goods and services rural Bhutanese derive from their forests (Lambin and Meyfroidt, 2010).

The sedentarization of herders through the 2007 Land Policy is beginning to lead to an erosion of indigenous knowledge related to rangeland management and yak management, as well as potential conflict between different stakeholders. Restricting movements of herders also increased pressure through overgrazing.

Economic aspects

Funding for tree planting has been a concern. The new (2019) strategy for plantations and nurseries includes a specific objective to formulate a resource mobilization framework to increase funding for the plantation and nursery programme. Although it has not funded any restoration programmes to date, the Bhutan Trust Fund for Environmental Conservation (BT FEC), created in 1992, represents one of the first environmental trust funds. It was established by the Royal Government of Bhutan, with the help of the United Nations Development Programme and WWF, with an endowment of US\$20 million. Each year it disburses its annual investment income of US\$1.5-1.8 million to finance field programmes for biodiversity/environmental conservation (Ministry of Agriculture and Forests, 2014b; Bhutan Trust Fund website).



Landscape view of wildlife corridor eight, Central Bhutan.

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1.4 Sustaining factors

There is an intricate link between forests and human well-being.

The Forest and Nature Conservation Rules of 2017 explicitly state the need for payments for environmental services in order to fund various conservation activities that ensure sustainable protection of watershed areas (Royal Government of Bhutan, 2017). Under the CBD, Bhutan developed its National Biodiversity Strategy and Action Plan in 2014 to include the implementation of rehabilitation measures such as plantation forestry through afforestation and reforestation, as well as agroforestry and reclamation (Ministry of Agriculture and Forests, 2014b).

Forests are central to Bhutan's intended nationally determined contribution (INDC) of 2015 under the UNFCCC, which prioritizes "forest fire management and rehabilitation of degraded and barren forest lands" (Royal Government of Bhutan, 2015). In 2009, Bhutan announced that it would remain carbon-neutral, relying on its forests to do so. The National Action Plan developed by Bhutan under the UNCCD in 2014 notes the need to "re-afforest prioritized degraded and barren forest lands using species and methods that are environmentally appropriate to local conditions" (Ministry of Agriculture and Forests, 2014).

1.5 Key findings and lessons

The experience in Bhutan provides interesting perspectives on maintaining forest cover (once it has already been restored):

1. While social or community forestry provided a vital impetus to empowering communities, it did not take off until decentralization was also implemented.
2. Embedding a minimum forest cover (60 per cent) within the constitution provides a long-term objective that can guide restoration.
3. In Bhutan, there is an intricate link between human well-being and forests that extends beyond economic interests.

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Case study 2:

Colombia

Bosque De Palma De Cera La Samaria near San Felix near Salamina Caldas, Colombia.

2.1 Overview

Colombia is a megadiverse country, with 53 per cent of its territory covered in forests (FAO, 2020). It has also suffered one of the longest-standing conflicts in recent history, with a 50-year civil war that ended with the peace agreement of 2016.

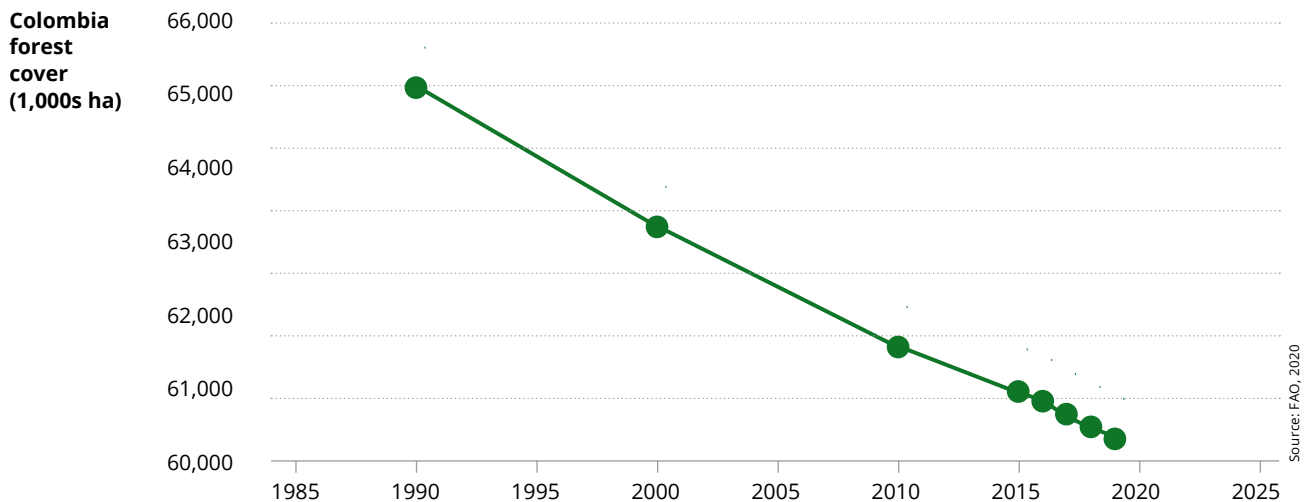
At the national level forest cover has been going down, although this obscures regional differences.

Colombia committed 1 million hectares to both the Bonn Challenge and the 20x20 Initiative.

Total country area (million ha)	110.95		
Bonn Challenge commitment (million ha)	1		
ROAM-identified potential for restoration (million ha)	22		
Potential economic benefit (Infoflr website)	US\$314 million		
	2010	2015	2020
Forest area, including plantations (million ha)	60.82	60.14	59.14
% forest cover	56.54%	54.20%	53.30%

Source: FAO, 2020

Table 2.1: Overview profile Colombia



Source: FAO, 2020

Figure 2.1.: Forest cover change

The ROAM process was carried out between 2016 and 2018 in the Oriente Antioqueño region (part of the Andean region), an area of 827,600ha. This zone was particularly affected by the 50-year civil conflict, with many people being kidnapped, killed or displaced. The department of Antioquia alone represents 20 per cent of the displaced (over 1 million people) (Buitrago and Valencia, 2013). Priority areas identified for restoration were ecological corridors between protected areas, where a mosaic of land use can be accommodated, including more forest. Although this case study focuses on the national level, the Oriente Antioqueño region is used for illustrative purposes where relevant.

Principle	Translation to Colombia
1. Focus on landscapes	The national restoration plan spans the whole country. Within Oriente Antioqueño, the priorities identified are corridors spread across the territory.
2. Engage stakeholders and support participatory governance	A study by Murcia et al. (2016) found that only about 2 per cent of restoration projects in Colombia engaged local communities. While stakeholders are central to the restoration work in Oriente Antioqueño, in practice there are issues related to tenure and post-conflict resettlement that signify that it is not easy to contact and collaborate with all key local stakeholders.
3. Restore multiple functions for multiple benefits	Priority goods and services include climate mitigation, biodiversity preservation and water regulation.
4. Maintain and enhance natural ecosystems within landscapes	The focus of restoration is on degraded and deforested areas.
5. Tailor to the local context using a variety of approaches	The decentralized approach taken in Colombia suggests that local context is integrated in approaches to restoration.
6. Manage adaptively for long-term resilience	Resilience to climate change is one of the challenges facing Colombia's forests and an intersectoral committee has been established to coordinate actions in this direction.

Table 2.2: Link between implementation in Colombia and the FLR principles

Conservation is a major motivation for restoration in Colombia.

2.2 Motivation

Given its biological importance as a megadiverse country and biodiversity hotspot that straddles several ecoregions, biodiversity conservation (and the restoration of ecosystem processes more widely) is a major motivation for restoration in Colombia. Watershed protection and water services were also identified as primary reasons for restoration by Murcia et al. (2016). Since the peace accord of 2016, the idea of “peace forests” has been promoted as a way of regenerating not only nature but also relations between communities, and between communities themselves and nature.

More recently, carbon sequestration, notably through REDD+ programmes, has created an additional motivation for restoration.

Decree 1076 (2015) highlights the role of planted forests as a source of renewable energy and raw material as well as in maintaining ecological processes, generating employment and contributing to national socio-economic development.

2.3 Implementation

Land Law 388 of 1997 confirmed the social and ecological importance of land.

Policy and legislative framework

Forests are seen to be of strategic importance in Colombia, and their sustainable management is the joint responsibility of the state, the community and the private sector (Decree 1076 of 2015). The legal framework for restoration dates back to the 1950s (Murcia et al., 2016). The first forest policy was promulgated in 1996 (CONPES No. 2834 – MinAmbiente website). One central objective of this policy is to incentivize reforestation, recovery and conservation of forests in order to rehabilitate watersheds, restore degraded forest ecosystems and recover soils. In 1998, the environment ministry developed the first national forest recovery and restoration plan (MinAmbiente, 1998 in Murcia et al., 2016). An important milestone was the development in 1997 of a land law (No. 388) that confirmed the importance of the social and ecological functions of land (MinAmbiente website). Importantly, and with a view to improving land titling (and reducing related conflicts), the government of Colombia has defined a comprehensive land administration policy, including a cadastre (World Bank, 2017).

The 2015 national restoration plan was established for a 20-year period (2015–2035), comprising three phases of 3, 5 and 12 years respectively (MinAmbiente, 2015). Forest management plans are to be developed at the regional level by the respective Corporación Autónoma (decentralized branches of the environment ministry). This plan promotes the restoration of degraded ecosystems and recognizes traditional uses of land and forests. The plan lists three priorities: 1. ecological restoration, 2. rehabilitation and 3. reclamation, and within each there are priority actions, objectives and indicators.

Several laws that were drafted to provide a framework for restoration were declared unenforceable (e.g. Law 1021 of 2006, Law 1377 of 2010), leaving a legal gap in this area (Merle et al., 2018).

Ownership (1,000s ha)	1990	2000	2010	2015
Private	21,395	19,919	18,760	18,294
Public	41,485	40,785	40,137	39,667
Unknown	2,078	2,031	1,910	2,173
Total	64,958	62,735	60,807	60,134

Source: FAO, 2020

Table 2.3.: Forest tenure

The area of forests under public ownership was approximately 66 per cent in 2015 (FAO, 2020). Tenure has been a fundamental issue in Colombia, dating back to a failed series of agrarian reforms starting in 1936 (Colombia Reports website). Land concentration has been a major challenge (Oxfam, 2016) and conflicts that have afflicted the country for 50 years can be traced back to failed land reforms (El Hawary, 2007).

In the Oriente Antioqueño, where ROAM was carried out, there was a majority of private (individual) landowners. However, an estimated 80 per cent of the population had been displaced due to the years of conflict. In turn, other settlers had moved in on disused lands. More generally, only about a third (320 out of 1,102) of municipalities have an updated cadastral system (World Bank, 2017).

In 1993, Law 70 on the titling of collective lands was promulgated to promote collective titling (through a “community council”), particularly of the Afro-Colombian communities. By 1996, the first title covering over half a million hectares was issued to the indigenous peasant organization COCOMACIA (Velez et al., 2020). Since then, a total of 6 million hectares have been granted to 170 community councils (Velez et al., 2020). With the granting of such titles, community forest management can contribute to improving forest management and restoration, especially when coupled with financial incentives (World Bank, 2017).



Oriente Antioqueño landscape with nursery, Colombia.

© CORNARE

In the Oriente Antioqueño region, the ROAM process was co-led by IUCN, CORNARE, the Humboldt Institute and the Catholic University of Colombia.

Community groups and private farmers engage in restoration.

Stakeholders

The government of Colombia has been a strong advocate of restoration (Murcia et al., 2016). Several agencies make up the national environment system (SINA): the Ministry of Environment and Sustainable Development, the Corporaciones Autónomas Regionales, the Territorial Entities, the research institutes affiliated with the ministry (e.g. Humboldt Institute), the university sector, NGOs, civil society and trade bodies (Government of Colombia, 2013). Generally speaking, Colombia's government is highly decentralized, with around 40 per cent of government spending distributed via subnational governments (Yale Forest Atlas website). At the local level, the Corporaciones Autónomas Regionales (CARs) are responsible for managing natural resources, including granting forest concessions for timber harvesting and working with local communities to support restoration activities.

At the regional level, the CARs have carried out a number of restoration projects, particularly at the level of watersheds (WWF-Colombia, 2018).

In the Oriente Antioqueño region, the ROAM process was co-led by IUCN, CORNARE (the regional CAR), the Humboldt Institute and the Catholic University of Colombia.

External stakeholders

Colombia's wealth of biodiversity has led several international environmental organizations to become active in the country, among them WWF, The Nature Conservancy (TNC) and Conservation International (CI). The Dutch organization Tropenbos International, for example, is carrying out a project on the sustainable management, preservation and restoration of the Solano landscape, with special attention to the cultural, social and economic aspects of indigenous groups, peasants, women and youth (Tropenbos website).

Private

Community groups that receive group titling have engaged in restoration, as have private farmers, particularly through incentives. A number of corporations have also engaged in forest restoration in the context of their climate strategies. For example, the hydroelectricity company EPM has its own native tree nurseries and programmes for restoring land associated with its business, as well as mandatory compensation for damages to the environment that result from its activities. It has also contributed to restoration efforts through donations to the BanCO₂ fund (see below).

With respect to the Oriente Antioqueño region specifically, local communities were represented in the ROAM process through a community-level committee ("junta de acción comunal") as well as youth groups, women's groups, local farmer associations and NGOs.

Restoration is implemented mainly in environmentally sensitive areas such as slopes and along rivers.

Economic aspects

Forests have been estimated to contribute 0.6–0.79 per cent of Colombia’s total GDP (WB, 2017; Merle et al., 2018). They generate 0.2 per cent of jobs in Colombia (World Bank, 2017).

Law 139 of 1994 established the Certificates for Forest Incentives (CIF – “Certificado de Incentivo Forestal”) as a way of acknowledging the opportunity cost of reforestation. Under this system, different payments are made to landowners for planting trees, with a higher payment for the use of native species. The CIF only covers the first five years of plantation maintenance. Thanks to this initiative, an estimated 258,075ha of forests were reforested between 1995 and 2015 (Merle et al., 2018).

A further PES law (Law No. 870) was promulgated in 2017 within the framework of the peace agreements with the FARC guerrilla movement (Moros et al., 2020). The BanCO₂ programme is one such scheme under the law; it promotes restoration and is funded by private firms, citizens’ donations and public funds. It pays monthly amounts of US\$100–250 per hectare (Moros et al, 2020). BanCO₂ was established in 2015 as an environmental trust fund that links buyers and sellers of ecosystem services (Rodriguez-de-Francisco et al., 2019). Corporaciones Autónomas act as intermediaries in this scheme, and CORNARE in the Oriente Antioqueño was a particularly active intermediary.

Nevertheless, public funding remains an important component of restoration. In a review of 108 restoration projects, Murcia et al. (2016) found that the government had contributed either all of part of the funding to 50 per cent of private restoration initiatives in Colombia (Murcia et al., 2016).

Economic incentives to restore larger forest areas within private properties are lacking, and the return on investment for agriculture or livestock activities remains higher than forest products and also accrues more rapidly. With respect to forest products, their competitiveness when compared to illegally or informally obtained products is also a major challenge.

**Higher payments
are made to
landowners for
planting native
tree species.**

Peasants in the Colombian Andes participate in training for various agricultural techniques.



© WWF-Colombia

2.4 Sustaining factors

Local authorities play an important role in restoration in a decentralized context.

Colombia's National Development Plan 2018–2022 (Law 1955) is the master plan guiding the development of the country (Government of Colombia, 2019). This plan includes ecosystem restoration. Collaboration under the umbrella of REDD+, which Colombia has been actively working on since 2009, has been ongoing. A cross-sectoral platform (roundtable) was established with the support of international NGOs working in Colombia (WWF, CI and TNC), in collaboration with USAID and one local NGO/consulting firm (Corporación Ecoveresa) (Aguilar-Stoen, 2015). An inter-sectoral commission on climate change was created in Colombia in 2018 (through Law 1931) as a way of bringing together different sectors around this cross-sectoral challenge.

Plans and strategies under the three Rio Conventions all refer to restoration. The NBSAP for the period 2016–2030 expects to have 210,000ha under restoration as per the national plan on Ecological Restoration, Rehabilitation and Recovery of Disturbed Area. It also expects this figure to reach half a million hectares by 2025 and the target of 1 million hectares by 2030. The UNCCD submission on land degradation neutrality also refers to the commitment under the 20x20 Initiative and refers to the restoration of at least 100,000ha of degraded land nationally. In its INDC under the UNFCCC, Colombia refers to its commitment to reduce deforestation.

2.5 Key findings and lessons

Its large indigenous community and its 50-year conflict make the Colombian case study unique.

Two aspects of the Colombia case study stand out and make it unique: its large indigenous community and its 50-year conflict. In this context, some key findings and lessons of relevance are:

1. In a decentralized context, local authorities play an essential role in supporting restoration.
2. Restoration may play an important role as a way of rebuilding the relationship to the land and nature in a society torn apart by 50 years of conflict.
3. Land titling is important to engage communities and landowners in sustainable forest management, including restoration.
4. Different schemes that offer payments to communities and landowners to encourage them to reforest provide incentives for restoration.

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*Deforested area
now used for
coffee plantations,
Colombian Andes.*



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Case study 3:

Costa Rica

Deep in lush rainforest, La Fortuna, Costa Rica.

3.1 Overview

Costa Rica's forest expansion began well before its commitment to the Bonn Challenge, or even the formal definition of the FLR approach. Yet because of its spatial scale and duration, the Costa Rican case has been the subject of much research and offers many interesting findings that are of direct value to the FLR process and the Bonn Challenge.

By 1986, only 40.5 per cent of Costa Rica was forested, down from 58.9 per cent in 1960 (Calvo-Alvarado et al., 2009). Given its status as a biodiversity hotspot, Costa Rica's forest loss was a cause for concern, both nationally and internationally, and a drive toward restoration was initiated in the 1980s. By 2013, 52.4 per cent (República de Costa Rica, 2015) of Costa Rica was covered in forests, for a total of 2,677,400ha (FAO, 2015).

Total country area (million ha)	5.1		
Bonn Challenge commitment (million ha)	1		
ROAM-identified potential for restoration (million ha)*	3.1		
Area under restoration (2014–2018)	355,000 ha		
	2010	2015	2020
Forest area (million ha)	2.87	2.95	3.03
% forest cover	56.3%	57.9%	59.5%

Source: FAO, 2020

Table 3.1: Overview profile Costa Rica

* IUCN, 2016

Costa Rica committed to restoring 1 million hectares of forest under the Bonn Challenge in 2012.

Costa Rica committed to restoring 1 million hectares of forest under the Bonn Challenge in 2012. According to the Ministry of Environment and Energy, a total of 355,000ha were under restoration between 2014 and 2018, of which 80 per cent was achieved thanks to the payment for ecosystem services scheme. The total cost of this has been estimated at US\$124 million (Canet Brenes, 2018). Loss of natural forest was also reduced, from 1.43 per cent per year before the introduction of the PES programme to 0.10 per cent per year after its launch (Daniels et al., 2010).

The ROAM assessment carried out by IUCN in Costa Rica identified 3.1 million hectares available for potential restoration in the form of 10 different land uses (including, for example, shade coffee and secondary forests outside protected areas) (IUCN, 2016).

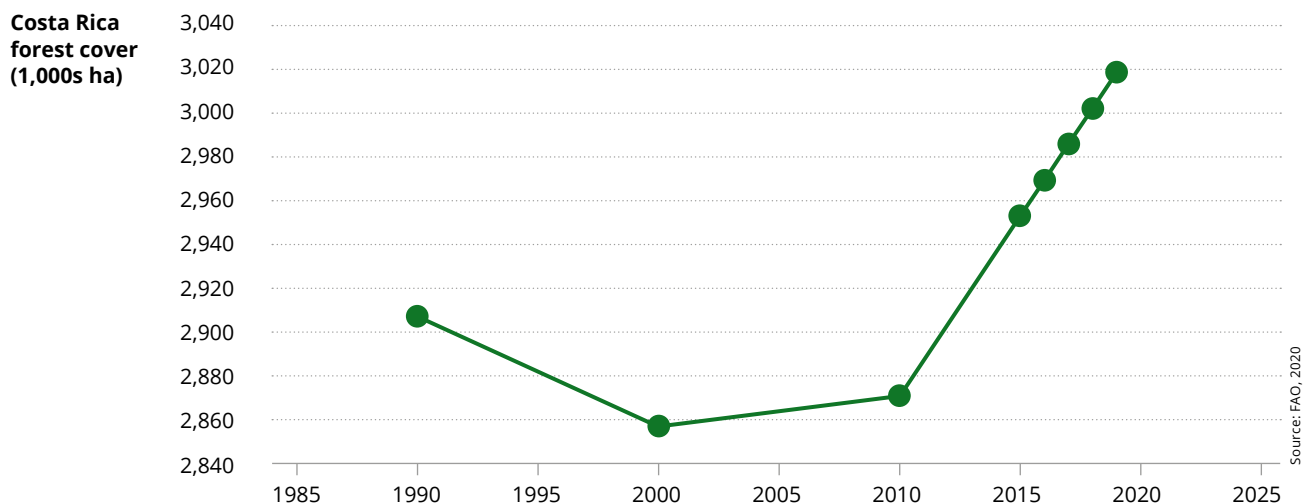


Figure 3.1. Forest cover change

Principle	Translation to Costa Rica
1. Focus on landscapes	Large-scale natural regeneration with connectivity in the landscape.
2. Engage stakeholders and support participatory governance	Landowners are engaged via PES schemes; REDD+ strategy also looking at engaging other stakeholder groups.
3. Restore multiple functions for multiple benefits	Several ecosystem services have been identified and paid for, including carbon, water, biodiversity and ecotourism.
4. Maintain and enhance natural ecosystems within landscapes	Combination of protection, management and restoration within the landscape, including an emphasis on connectivity and natural regeneration and diversified land use.
5. Tailor to the local context using a variety of approaches	Much of the restoration is through natural regeneration. A high number of private landowners helps implementation of PES schemes.
6. Manage adaptively for long-term resilience	Forest policies have evolved, recognizing the need to adapt. Natural regeneration has been promoted, favouring ecological resilience.

Table 3.2: Link between implementation in Costa Rica and the FLR principles

Most of the increase in forest area is due to natural regeneration.

According to government data submitted to the FAO for the 2020 Forest Resources Assessment (FRA), active reforestation has gradually decreased, dropping from an annual average of 4,770ha in the 1990–2000 period down to 2,110ha per year in the 2015–2020 period. This suggests that the majority of the increase in forest area in the country is due to natural regeneration (or passive restoration). Agroforestry, which is largely excluded from forest cover statistics, was probably also a large contributor, with an average estimate of 492,000 trees planted per year on farms between 2003 and 2013 (de Camino Velozo et al., 2015).

A conscious move away from intensive land use has been identified as fundamental to the forest transition seen in Costa Rica.

3.2 Motivation

A shift in the production landscape deeply affected land use in Costa Rica. A conscious move away from intensive land use (through commodities, particularly cattle farming) has been identified as fundamental to the forest transition seen in Costa Rica (Kull et al., 2007; Buckingham and Hanson, 2015). This change in land use was precipitated by the expected financial reward – or lack thereof – for beef. Intensive crop and cattle production (which took off in 1957 with exports of beef to the US – Arroyo-Mora et al., 2005) resulted in the loss of 18.4 per cent of Costa Rica’s forest cover between 1960 and 1986 (Calvo-Alvarado et al., 2009). The fall in the international price of beef – from US\$2.37/kg in the 1969–1979 period to US\$1.36/kg in the 1985–1999 period – led to significant reductions in this activity, as well as migration to urban areas (Ibid.). Furthermore, the termination of subsidies, as per the conditions of the structural adjustment programme from the World Bank, led to the sector losing its appeal. Cattle production declined from 2.1 million heads in 1989 to 1.4 million by 2000 (Calvo-Alvarado et al. 2009; Buckingham and Hanson, 2015). This prompted large-scale natural regeneration. Foreign investment in the country, both from environmental NGOs and from expatriate property developers, has also promoted a “greener” environment (Kull et al., 2007). In parallel, a rise in ecotourism generated value from standing forests associated with wildlife viewing. Significant public investment in the services sector also contributed to steering away from land exploitation.

Thus, international macroeconomic factors (a drop in the price of beef and a rise in ecotourism), national financial incentives (loss of subsidies for beef production, combined with payments for ecosystem services and public investment in services) and international environmental interests combined to create the conditions for a forest transition in Costa Rica.

3.3 Implementation

The trade liberalization of the 1980s and 1990s led to a reduction in subsidies for activities supporting widespread forest conversion and a move away from land-based income toward manufacturing and services, as well as a migration to urban areas (and the abandonment of land). Concomitantly, greater value was placed on wildlife through payments for ecosystem services and ecotourism. Free-trade zones led to more foreign investment in industrial goods for export. A tax-exemption regime also promoted exports and attracted foreign investment (Granoff et al., 2015)

Policy and legislative framework

Costa Rica’s political constitution of 1994 grants the right of every citizen to a clean environment. **Sectors** that have had an influence (whether positive or negative) on forest cover are the beef sector (along with other commodities), the tourism sector and the government-supported manufacturing and services sector.

In the **environment and forest sectors**, a number of specific laws supported the transition from forest loss to forest gain in Costa Rica. The first, Forest Law No. 4475 of 1969, promoted restoration by making the costs of reforestation tax-deductible. Forest Law No. 6184, passed in 1977, required banks to allocate at least 2 per cent of their loans to reforestation projects. Forest Law Nos 7032 and 7174 of 1986 and 1990 respectively established Certificates of Forestry Payments for landowners who reforested their properties. They could trade these certificates for cash or use them to pay taxes and fees (this scheme, however, was terminated in 1995 following the World Bank's third structural adjustment loan, which cancelled many subsidies). The renowned payment for environmental services law was developed through Forest Law No. 7575 of 1996. Under this law, a payment of up to US\$816 per hectare over 10 years was reserved for landowners who were reforesting their land (Daniels et al., 2010). This law also prohibits converting forest to other land uses (Granoff et al., 2015).

The costs of reforestation are tax-deductible.

The recent (2016) Política Agroambiental (agro-environmental policy) seeks to operate in a more integrated fashion, at a larger (landscape) scale that supports the reconciliation of both food security and environmental priorities (Wallbott et al., 2019).

As Costa Rica's "green" reputation grew, **ecotourism** became a major driving force behind the expansion of protected areas (covering 26 per cent of the country in 2014 and encompassing 1,354,488ha of public land and 82,205ha of private land – MINAE et al., 2016b) and of forest cover. Annual tourists increased from just 49,000 in 1962 to over 3 million in 2019 (Buckingham and Hanson, 2015; Instituto Costarricense de Turismo website).



With project support, the Women's Association of Cedral established a nursery with native plant species from the area. The plants are sold in other communities farther away. Montes de Oro in the Aranjuez River Basin of Costa Rica's Central Pacific region.

Indigenous territories have participated in the PES schemes, receiving about 20% of all payments, mainly for forest protection, but also for allowing natural regeneration.

Tenure

Close to 50 per cent of forests are privately owned in Costa Rica, a high percentage compared to most countries, and also an important prerequisite for large-scale implementation of the nation’s payment for ecosystem services scheme. This incentive-based approach rewards forest owners for their participation in securing ecosystem services.

In turn, the landowner sells her or his ownership of the ecosystem service (e.g. carbon) to FONAFIFO, a government agency (Corbera et al., 2011). This particular dimension of tenure (tenure over a forest service) could have repercussions in the context of carbon and the growing interest of international companies in carbon trading.

Indigenous territories have participated in the PES schemes, receiving about 20 per cent of all payments, mainly for forest protection, but also for allowing natural regeneration (Molina-Murillo et al., 2014).

Category of tenure	1,000s ha
Private	1,402.93 (of which 284.4 is the property of indigenous, tribal and local communities)
Public	1,265.7
Unknown	284.4
Total	2,953.03

Source: Submission to FAO-FRA 2020 (Data for 2015)

Table 3.3: Forest tenure

Stakeholders

The **public sector** has played a substantial role in forest conservation and restoration in Costa Rica (Aguilar-Støen, 2015). Several public-sector agencies have collaborated on the PES scheme. A special government agency – the National Fund for Financing Forests (FONAFIFO – Fondo Nacional de Financiamiento Forestal) – was established in 1991 by the Ministry of Environment and Energy (MINAE). As a cross-sectoral agency, it involves representatives from the MINAE, the Ministry of Agriculture and Livestock, the National Banking System, and representatives from the private sector and the timber industry (Wallbott et al., 2019). FONAFIFO’s role is twofold: first to collect the tax (and other income) to fund the scheme, and then to disburse it. Forestry agencies (including FUNDECOR, along with independent forestry engineers) act as intermediaries between the private landowners and FONAFIFO to assess the ecosystem services and ensure that landowners qualify for payments (Wallbott et al., 2019). This intermediary function is essential to the PES system and is a requirement before any transaction can take place. Also, 1998 saw the creation of a joint body, the National System of Conservation Areas (SINAC – Sistema Nacional de Áreas de Conservación), which resulted from the merging of three agencies (wildlife, national parks, and the forest service) under the Ministry

The public sector has played a substantial role in forest conservation and restoration.

of the Environment, thereby promoting improved collaboration across these sectors (Buckingham and Hanson, 2015). This was seen as particularly important as the nation becomes increasingly focused on ecotourism. Income from tourism has risen from US\$1.4 billion in 2000 to US\$4 billion in 2019 (ICT website).

Private landowners are key stakeholders and agents in the process, as they are the ones carrying out much of the restoration work. They are beneficiaries of payments but also are responsible for ensuring that the ecosystem service generated is secured through forest maintenance.

There are contradictory claims about whether the PES scheme has benefited smallholders and more marginalized communities.

There are contradictory claims about whether the PES scheme has benefited smallholders and more marginalized communities (Corbera et al., 2011). Indeed, smallholders (under 50ha) are excluded from the PES schemes (Wallbott et al., 2019). Furthermore, while the board of FONAFIFO does include private landowners (as well as the timber industry), it does not include indigenous groups. They have, however, been involved in preparations for REDD-readiness through the Integral Indigenous Development Associations (Asociación de Desarrollo Indígena Integral). There are eight **indigenous** groups in Costa Rica, representing about 2 per cent of the population (Molina Murillo et al., 2014). In 1977, their territories were finally recognized by law as protected reserves.

The commodification of forests through the PES scheme has many critics and creates what may be considered an artificial and frail relationship between the national population, tourists and nature/forests (e.g. King and Stewart, 1996; Liverman, 2004; Apostolopoulou and Adams, 2017). The relationship that indigenous peoples (and others) have to their natural environment is undoubtedly of greater value than that quantified through any payments for ecosystem services system. While Costa Rica's example is much praised, these issues are fundamental and have social implications as well as potential effects on long-term sustainability.

Good coffee-growing practices include the use of shade in established coffee plantations, including species such as legumes, fruit trees, timber species and musaceas such as plantain and banana. Montes de Oro in the Aranjuez River Basin of Costa Rica's Central Pacific region.



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Economic aspects

Forest restoration has been part of a broader “green development” for Costa Rica. This comprehensive approach sought not only to reward landowners who reforested or restored their land but also to make standing forests more attractive (both by diversifying the economy and by increasing ecotourism). Indeed, it has been noted that the “country’s biggest successes – biodiversity and tourism services – have been engines of economic growth.” (Granoff et al., 2015). The shift from financial aid to the neoliberal discourse of paying for a service provided was also key to ensuring that Costa Rica continued to qualify for World Bank and IMF loans under their structural adjustment programme (Garvin et al., 2015).

Costa Rica’s **payments for environmental services** scheme has been widely publicized. It began in 1997 and is supported by a tax on water and fossil fuels (equivalent to 3.5 per cent of the country’s fossil fuel tax), international funds, and other donations to forest owners providing ecosystem services (Corbera et al., 2011). Payments are distributed for the maintenance and restoration of forest cover (de Camino Velozo et al., 2015). The ecosystem services identified under Costa Rica’s forest laws are: 1. mitigation of greenhouse gas emissions; 2. hydrological services, including the provision of water for human consumption, irrigation and energy production; 3. biodiversity conservation; and 4. provision of scenic beauty for recreation and ecotourism (Malavasi and Kellenberg, 2002). Such a scheme has contributed to the channelling of funds to landowners controlling approximately 20 per cent of Costa Rica’s territory (Wallbott et al., 2019). An estimated US\$48 million was invested over the 15-year span between 1998 and 2013, with a much higher investment of US\$320 million for the first seven years of the scheme (de Camino Velozo et al., 2015). The ultimate aims of the scheme are to protect the primary forest, allow the secondary forest to regenerate and promote forest plantations. As noted above, the success of the scheme was due in large part to secure tenure and the large proportion of private ownership in Costa Rica.

Garvin et al. (2015) highlight some key factors that were critical to the success of PES in Costa Rica: a high level of education, strong institutions built over a long period, a long democratic tradition, political stability (which attracted donors) and a high level of development.

Costa Rica’s payments for ecosystem services are funded by a tax on fossil fuels.

3.4 Sustaining factors

To this day, government policy favours forest protection, an effect of the significant income generated by ecotourism (McGinley and Cabbage, 2011). The reduction in reliance on land-based economic activity has enabled much natural regeneration to take place (Norden et al., 2009).

Reports and plans by Costa Rica under all three Rio Conventions refer to forest restoration. The 2016–2025 National Biodiversity Strategy and Action Plan under the **CBD** (MINAE et al., 2016b) lists as one of its seven themes: “to restore and reduce the loss and/or degradation of important elements of biodiversity: terrestrial ecosystems ...”. It also sets a target date of 2025, by which time improvements will have been made to the protection and restoration of terrestrial ecosystems, with a

Reports and plans by Costa Rica under all three Rio Conventions refer to forest restoration.

specific objective to have restored 1 million hectares of forest cover by 2020 (with an emphasis on connectivity, climatic refugia, remaining natural forests and restoration of dry forests, among others). Furthermore, it states that by 2020 it will have restored ecosystems in the indigenous territories that are of particular relevance for culture and gender. The UNFCCC's nationally determined contribution (MINAE, 2016) makes reference to the role of forest restoration in climate mitigation and adaptation. It also acknowledges the importance of defining rights to forests and their ecosystem services (such as carbon sequestration).

The 2004 programme of action under the UNCCD refers to reforestation, natural regeneration and community tree nurseries as methods of combating land degradation (Republica de Costa Rica, 2004).

Because of its experience with PES schemes, Costa Rica demonstrated a strong interest in REDD+ (actually co-sponsoring its presentation at the UNFCCC COP in Montreal in 2005) and developed a strategy to that effect in 2017 (MINAE, 2017). The strategy highlights that one of the challenges to REDD+ implementation is a lack of clear institutional responsibilities and coordination.

These long-term plans reflect the perspective taken at a political level and the choices made to maintain restoration in the country's long-term strategic approach.

3.5 Key findings and lessons

The long-term experience in Costa Rica highlights some lessons for upscaling restoration:

1. The trigger for investing in ecosystem services was the country's dramatic rate of deforestation, leaving this biologically rich nation with only 25 per cent forest cover. The question raised is whether it takes such a massive loss in forest cover to initiate the forest transition and generate investments in restoration (as has been seen in many European countries, for example).
2. Investment in other (non-environment) sectors, such as microelectronics, can encourage a shift away from a reliance on land-based exports, enabling land, forests and biodiversity to recover.
3. Combined investment in the protection and restoration of natural resources, including forests, was responsible for safeguarding the biodiversity that has attracted ecotourists to Costa Rica; restoration alone would probably not have been sufficient to make the ecotourism sector a cornerstone of Costa Rica's development.
4. The role of natural regeneration in restoration is substantial, given the right starting conditions and bioclimatic features.
5. Private ownership and clarity of tenure are important for an efficient and functioning PES scheme.

Combined investment in the protection and restoration of natural resources has attracted ecotourists to Costa Rica.

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Case study 4:

Ethiopia

Simien Mountains in Simien Mountains National Park, North Gondar Zone of the Amhara Region, Ethiopia

4.1 Overview

Ethiopia’s net forest cover has been decreasing. At the same time, however, large-scale reforestation efforts have been carried out over the past few decades, with many more currently underway. Ethiopia boasts “one of the largest afforestation and reforestation programmes in the world” (Federal Democratic Republic of Ethiopia, 2011). Regional variations exist across the country, but accurate data at that level is difficult to obtain (Homeier, 2011). Most reforestation programmes are implemented in the highlands, encompassing Amhara, Oromia, Southern Nations Nationalities and Peoples’ Region, and Tigray. Belay et al. (2015) have suggested that as of the end of the 20th century, a progressive forest transition is observable in the eastern Tigray region that can be attributed to exclosures, plantations for fuelwood and food aid.

This case study seeks to understand how these large-scale restoration/reforestation efforts are framed, what some of the challenges have been and what could be improved to ensure long-term success in forest cover change. As such, it differs from most of the other case studies.

Total country area (million ha)	111.97		
Bonn Challenge commitment (million ha)	15		
ROAM-identified potential for restoration (million ha)	82		
Area planted/year (2015–2020)	19,000 ha		
	2010	2015	2020
Forest area, including plantations (1,000s ha)	17,799	17,434	17,069
% forest cover	15.9%	15.6%	15.2%

Source: FAO, 2020

Table 4.1: Overview profile Ethiopia

Ethiopia has committed to restoring 15 million hectares by 2030 and reaching 20% forest by 2020.

Ethiopia has not only set an ambitious target under the Bonn Challenge and AFR100 (to restore 15 million hectares by 2030) but it has also set a national target of 20 per cent forest cover by 2020. As part of the analysis carried out by the Ministry of Environment and WRI to identify restoration priorities, Ethiopia identified the following activities as core elements of its strategy to restore forested landscapes: 1. the restoration of secondary forests; 2. restocking degraded natural forests; 3. agroforestry (including agri-silviculture and agro-silvo-pastoralism, and the potential for silvo-pastoralism); 4. woodlots and home gardens; 5. industrial roundwood plantations; 6. commercial plantations for products other than industrial roundwood; 7. buffer plantations around protected areas and national forest priority areas; and 8. tree-based buffer zones along rivers, lakes and reservoirs (MEFCC, 2018).

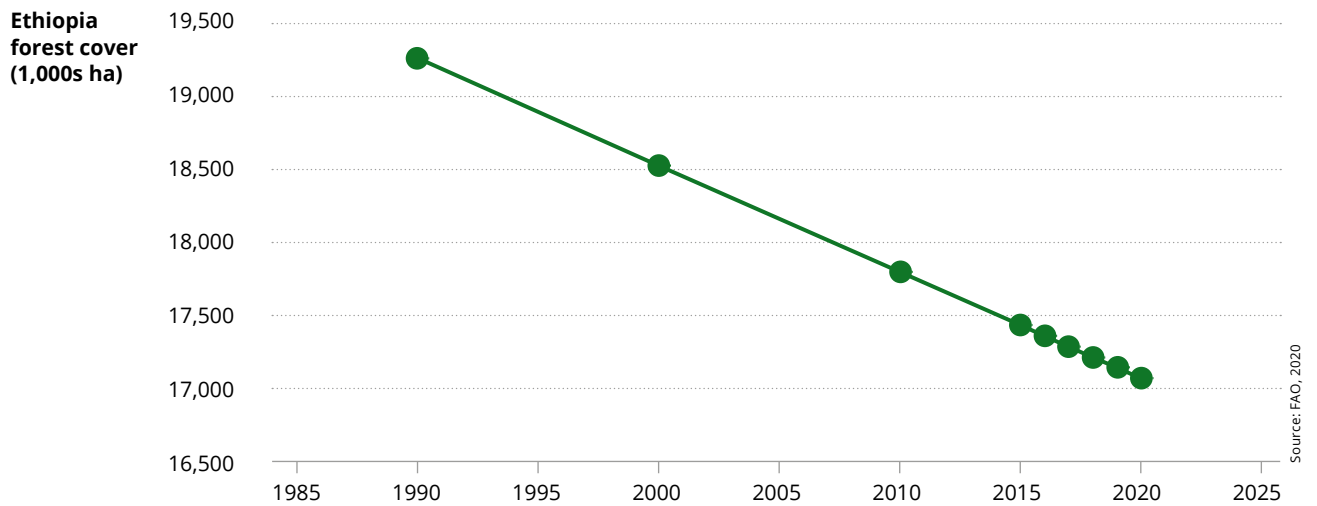


Figure 4.1. Forest cover change

Principle	Translation to Ethiopia
1. Focus on landscapes	At a national level, Ethiopia has been planning at the scale of watersheds of 30,000–40,000ha, which would correspond to landscapes.
2. Engage stakeholders and support participatory governance	Communities have been engaged in tree-planting campaigns under a “food for work” programme. Increasingly, their role has expanded with the implementation of participatory forest management (PFM) in Ethiopia.
3. Restore multiple functions for multiple benefits	The Climate-Resilient Green Economy strategy acknowledges the multiple functions of forests, including for soil and water conservation and as carbon sinks. PFM initiatives aim to both reduce deforestation and alleviate poverty. Nevertheless, the predominant focus has been on livelihoods rather than biodiversity-related priorities.
4. Maintain and enhance natural ecosystems within landscapes	Much of the restoration has taken place on degraded land.
5. Tailor to the local context using a variety of approaches	More could be done, as exotic eucalyptus trees have been widely used rather than local species.
6. Manage adaptively for long-term resilience	There is limited species and genetic diversity.

Table 4.2: Link between implementation in Ethiopia and the FLR principles

**350 million trees
were planted
in one day
in 2019.**

4.2 Motivation

Ethiopia is a mostly rural country, with about 80 per cent of its population classified as such. Consequently, it is highly vulnerable to environmental shocks, including the dramatic droughts and subsequent famines that plagued the country in the 1970s, 1980s and again in the early 2000s. The provision of ecosystem services associated with agriculture, such as soil and water conservation, erosion control, and land stabilization, is an essential consideration in tree-planting efforts. Furthermore, as the world faced a global fuel crisis in the 1970s and 1980s, tree planting became an important activity in Ethiopia as a means of securing energy (Ayana et al., 2013). The 1980s therefore saw the first mass tree-planting campaign, which mobilized the population and led to 400,000ha being afforested (Assefa and Bork, 2014). Most of these forests were composed of exotic eucalyptus species (Ayana et al., 2013).

More recently, carbon sequestration has been added to the list of ecosystem services, with the country's national forest sector development programme noting that land use is the largest emitter of greenhouse gases, at 88 per cent. Donor attention in the context of potential REDD+ programmes has likely also contributed to this.

Following the overthrow of Emperor Haile Selassie in 1974, the Marxist Derg regime abolished the feudal land management system and nationalized all the land with the intention of redistributing it. This marked the beginning of several land redistribution attempts, which led to land insecurity and in turn a lack of long-term management of the land. Because this generated further degradation, the government's response was to accelerate tree-planting campaigns, which gained strength at the beginning of the Ethiopian millennium (13 years ago). This legacy has endured, with over 350 million trees planted in one day during the latest campaign in 2019 (UNEP website).

Overall, a lack of local engagement, coupled with the ongoing need for agricultural land and insecure land tenure, has caused many of these massive tree-planting schemes to yield disappointing long-term results, as highlighted by the declining national forest cover trend (Assefa and Bork, 2014).

**Tree-planting
campaigns began
in the mid-2000s.**

4.3 Implementation

Over the years, there have been many attempts at large-scale afforestation in Ethiopia, for fuelwood plantations as well as for soil and water conservation measures. The first recorded plantations in Ethiopia date back to the mid-1890s, when Emperor Menilik ordered the planting of rapidly growing exotic eucalyptus to provide firewood and construction wood. Annual tree-planting campaigns began in the mid-2000s (Kassa et al., 2017).



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A landscape under restoration in Tigray, Ethiopia.

The Climate Resilient Green Economy strategy aims to afforest 2 million hectares and reforest 1 million hectares.

Since 2011, Ethiopia has been guided by the Climate-Resilient Green Economy (CRGE) strategy, which was designed to become a key development document linking several sectors, including forests. Its focus is on building a middle-income country with zero net emissions of greenhouse gases by 2030 (from a 2010 baseline), and the role of forests is prominent, as it is one of the four pillars of the strategy. It aims explicitly to afforest 2 million hectares and reforest 1 million hectares (Federal Democratic Republic of Ethiopia, 2011). Much emphasis – and hope – has been placed on the forest sector as a way to create green jobs, support the bio-economy and foster climate-change resilience. The country’s 2016–2020 five-year development plan, known as the second Growth and Transformation Plan (GTP II), is guided by the CRGE strategy and has set a target of 20 per cent forest cover by 2020. It includes participatory forest management (for 2 million hectares) and afforestation and reforestation (Kassa et al. 2017).

Sectors

The agricultural sector is particularly strong in this rural nation, accounting for about 42 per cent of its GDP and employing more than 80 per cent of the population (Ayana et al., 2013). Ethiopia was without a formal environment or forest ministry until 2013, before which its ministry of agriculture was the lead on forest issues, with a specific department dedicated to forestry.

Policy and legislative framework

Ayana et al. 2013 highlight that, in contrast to other colonized nations, Ethiopia's short colonial occupation (by the Italians from 1936 to 1941) was not sufficient to significantly affect its forest sector. Nevertheless, a brief historical overview of the forest sector and its associated land-use issues is warranted in order to understand the conditions that led to the limited success of tree-planting schemes.

Over more than five decades, several forest laws and policies have been passed in Ethiopia.

The first forest law was enacted in 1965, although it was not given much importance (Ayana et al. 2013). After the removal of the emperor by the Marxist Derg regime in 1974, the first autonomous forestry institution – the Forest and Wildlife Conservation and Development Authority (FAWCDA) – was created and the first wave of plantations occurred (Ibid.). This period also marked the first attempts at land redistribution through resettlement programmes.

A new forest law was passed in 1980 that led to the establishment of 58 National Forest Priority Areas (NFPAs) that cover an area of about 4.8 million hectares and are administered by the FAWCDA (Ibid.). This agency's 10-year plan (1984–1993) also sought to increase forest cover to 24 per cent (Ibid.).

A milestone was reached in 1995 with the approval of a new constitution that set the foundation for decentralization of authority to the Regional State level, including with respect to the forest sector (Ibid.). The 1994 National Conservation Strategy also confirmed the right of relevant regional authorities to grant use rights over forests to local user groups (Cronkleton et al., 2017).

The 1994 National Conservation Strategy confirmed the right of relevant regional authorities to grant use rights over forests to local user groups.

In 2007, the government issued the Forest Development, Conservation and Utilization Strategy, which promoted, among other activities, forest restoration (Ibid.). Of particular note was its promise of tax deductions for tree planting (Kassa et al., 2017). Nevertheless, the emphasis of the 2007 law was on private and state forests, with no recognition of community forests, signifying that any restoration effort by communities would be for the benefit of the state, which could then reallocate this newly valuable land as it saw fit, creating a disincentive for restoration (CIFOR website). Indeed, without clarity on the rights generated by the planting of trees, farmers were not incentivized to plant (or tend) trees, creating conflict and mistrust between rural communities and the state (Ayana et al., 2013).

The 2018–2027 National Forest Sector Development Programme (NFSDP) provides guidance for the forest sector, as well as other relevant sectors and ministries. In addition, the NFSDP contributes to mobilizing funding and coordinating support.

The government provides tax breaks for forest activities by private individuals and communities.

A quick succession of changes to the 2007 forest law occurred in 2015 and 2018. Of the changes contained in the 2018 national forest proclamation, the following are most relevant to tree planting:

- A recognition of participatory forest management as a vehicle through which to enhance the engagement of communities;
- An increase in incentives for private forest developers through mechanisms such as lease-free land, better access to land use and forest ownership certificates, and tax holidays;
- Strengthening of penalties for infringement on forest resources (CIFOR website).

According to the 2018 forest proclamation, the government provides tax breaks for forest activities by private individuals (for the first year) and communities (for the first two years).

The expansion of participatory forest management reflects its promise as a tool for engaging communities in forest management and restoration and granting them secure rights.

The recent expansion of participatory forest management (PFM) in Ethiopia reflects its promise as a tool not only for engaging communities more actively in forest management and restoration and granting them secure rights, but also for securing long-term results on the ground. The approach was first tested in the late 1990s in two sites (Oromia and Southern Nations Nationalities and Peoples' Region) with positive results. In Chilimo Forest Reserve, a 7 per cent increase in forest cover was reported over the 2003–2012 period following implementation of PFM (Cronkleton et al., 2017). PFM also led to improved forest conditions in five additional cases that were studied, with these improvements maintained even three years after external support was terminated (Ameha et al., 2014). The approach of PFM in Ethiopia is generally assisted by international NGOs (e.g. Farm Africa and SOS Sahel), which support the negotiated agreement between communities and the authorities, as well as provide technical assistance (Cronkleton et al., 2017). Communities are able to derive and secure benefits from forests. The agreement consists of a management plan and contracts before a formal handing over to a forest user group (FUG). Each FUG consists of between 28 and 1,000 members (depending on the size of the forest), all from the same “kebele” (lowest administrative unit) (Ameha et al., 2014). The PFM model has provided not only stability but also a greater incentive for communities to engage positively in forest management and restoration. It has recently been estimated that 1.5 million hectares of forest are currently under the direction of PFM institutions (Kassa et al., 2017).

Tenure

Over the years, land has been redistributed several times, notably in 1992, 1993 and 1997, which has created much uncertainty (Homeier, 2011) and a disincentive to tend restored forest areas. In practice, and since the land proclamation of 1975, all forest land areas of 8oha or larger belong to the state. Usufruct rights are granted to communities, but over the years they have encouraged forest conversion as a means of demonstrating use in order to acquire usufruct rights (Lavers, 2018). Indeed, the rural land proclamation of 2005 states that farmers engaged in agriculture will be given a certificate to the rural land indicating the size of the area under production (Federal Negarit Gazette, 2005; Mekonnen and Bluffstone, 2008).

The government has defined four types of forest ownership in its forest proclamation.

More recently, in 2018, the government described four types of forest ownership in its forest proclamation: 1. private forest, 2. community forest, 3. association forest, and 4. state forest. State forests, in turn, are categorized as either production forest, protection forest (which provides various ecosystem services and is utilized according to a forest management plan developed by the responsible body), or preserved forest (which is strictly protected and is free from human and domestic animal intervention, preserved for conservation of biological diversity and research). Under productive state forests, for example, the state has the duty to: “Formulate forest development, conservation and utilization plans to allow the participation of local communities in the development and conservation and also in the sharing of benefits” (Federal Negarit Gazette, 2018). In turn, for protected forests the government has the duty to: “Rehabilitate and protect or develop plans as per the approved development plans on forest lands designated as protected forests and which are without or with less plant coverage; Establish fast-growing tree species plantation along the periphery of the forests to indicate demarcation of the forest and to be used by the local community for firewood and construction” (Federal Negarit Gazette, 2018).

It is noteworthy that private ownership entitles the owner to carbon funding, while the same does not apply to community ownership. Furthermore, within the private ownership category, we find large-scale land deals with foreign ownership titles for 50 years, totalling close to 2 million hectares (Cochrane and Legault, 2020).

Stakeholders

The 1991 change of regime (to the coalition of the Ethiopian People’s Revolutionary Democratic Front, which was subsequently replaced in 2019 by the Prosperity Party) initiated a decentralization of power and its redistribution to the nine regional governments and two federally administered city-states, in what became in 1994 an “ethnic federations” whereby political rights and representation were based on ethnicity (over 80 ethnic groups are found within Ethiopia).

It was only in 2013 that the Ministry of Environment and Forests (now the Environment, Forest and Climate Change Commission) came into existence. Before that, the primary ministry tackling forests was the Federal Ministry of Agriculture (MoA). Other agencies involved in the sector include the Federal Environmental Protection Authority and the Federal Ministry of Water Irrigation and Energy. The Ethiopian Environment and Forest Research Institute deals with forestry research. Within the MoA, the Forest, Land Use and Soils Development and Conservation Department deals with forest development, conservation and utilization, including afforestation and reforestation.

Rural communities are active participants in forest management and restoration in Ethiopia.

External stakeholders

According to OECD data, Ethiopia ranks as one of the top recipients of overseas aid (OECD website). Over the last few decades, several foreign agencies have played an important role in Ethiopia's land and forest sectors. The World Food Programme played an important role in supporting "food for work" programmes starting in the 1980s. The Swiss-funded Ethiopian Highland Reclamation Study was also an important large-scale programme that emphasized food for work. Significant funds provided by western nations for famine relief were thus also targeted at local-level initiatives – effectively circumventing the Marxist government (Ayana et al., 2013). As of the 1980s, large multilateral agencies such as the FAO and UNDP, and bilateral aid such as Swedish aid (SIDA) and Norwegian aid (Norad) began also investing substantial amounts in the sector (Ayana et al., 2013).

Private

Rural communities are active participants in forest management and restoration in Ethiopia. In particular, they provide their labour for tree-planting schemes (campaigns) carried out by the state. In many instances, communities are required to provide up to 30 days a year of free labour for tree planting in exchange for transport and food (Kassa et al., 2017). Although communities have been key participants in tree planting, their active engagement has been limited (Ibid.).

Massive resettlements of people have taken place in Ethiopia over the years, starting under the Derg regime (Rahmato, 2003). Pastoralists have been settled, which has subsequently had impacts on land use, as their traditional methods that allowed for natural regeneration were replaced with settlements that had longer-term impacts on land and forests (Ibid.). Also, these schemes have led to further insecurity over rights to land and forests and acted as a disincentive to maintain forest or restored areas.



Upland deforestation for fuelwood and construction needs, Ethiopia.

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The 2018 forest proclamation explicitly states: “Government shall facilitate conditions whereby inhabitants within state forests and state forest land shall continue living in the forest, while participating in the development and conservation of the forest, in a manner that shall not obstruct forest development; or based on a study and in consultation with the appropriate body, they shall evacuate the forest area and settle in other areas suitable for living” (Federal Negarit Gazette, 2018).

Large-scale land acquisitions (referred to more negatively as “land grabs”) were prevalent in Ethiopia and may account for some of the displacement, as well as the deforestation in parts of the country (Cochrane, 2011). An estimated 1.4 million hectares of “land deals” have been concluded, 0.5 million hectares are intended and 0.4 million hectares have failed (Cochrane and Legault, 2020).

Forests contribute 4% to Ethiopia’s GDP, while agriculture contributes 42%.

Economic aspects

Forests have been estimated to contribute 4 per cent to Ethiopia’s GDP, as opposed to agriculture, which contributes an estimated 42 per cent to the GDP and employs more than 80 per cent of the population (Federal Democratic Republic of Ethiopia, 2011; Ayana et al. 2013). Unsurprisingly, the forestry sector also received a small share of the total agriculture budget, estimated at less than 10 per cent of the overall budgets allocated to the Ministry of Agriculture, both at the federal and regional levels (Ayana et al. 2013).

At the same time, forests have been estimated to contribute a larger amount to individual households. For example, a case study in southeastern Ethiopia found that the contribution of forests to average total annual household incomes amounted to between 23 per cent and 53 per cent (Yemiru et al. 2010 in Ameha et al., 2014).

The economic model that has been applied in Ethiopia, initiated by large-scale donor programmes such as those of the World Food Programme, is “food for work”. In these programmes, local farmers are engaged in tree-planting campaigns as a source of labour in exchange for food (Cronkleton et al., 2017). In essence, this signifies that communities bear a significant portion of the costs of tree planting (Kassa et al., 2017). However, there have been limited other incentives (Ibid.).

4.4 Sustaining factors

Results to date from participatory forest management provide hope for lasting success in the preservation and restoration of existing (degraded) forests. Nevertheless, they are still relatively recent.

Ethiopia’s INDC is built around six sectors: agriculture (which includes livestock and soil), forestry, transport, electric power, industry (including mining) and buildings (including waste and green cities). It intends to mitigate climate change through four pillars, one of which is protecting and re-establishing forests as per the CRGE (Federal Republic of Ethiopia, 2015).

Protecting and restoring forests is one of four strategies to mitigate climate change.

Ethiopia wants to double the area of degraded land under restoration and increase forest cover to 20% between 2015 and 2020.

The ambitious National Biodiversity Strategy and Action Plan (NBSAP) for the period 2015–2020 aimed to double the area of degraded land under restoration and increase forest cover from 15 per cent to 20 per cent (Government of the Federal Republic of Ethiopia, 2015). The first target of the land degradation neutrality report under the UNCCD acknowledges the importance of forest landscape restoration. It states its target by 2031 is to “promote the implementation of community-based forest management, Forest Landscape Restoration with indigenous species, avoiding overgrazing, area closure and, alternative livelihood systems, and ensure the restoration of 427,730 ha of forest land lost between 2000 and 2010” (Federal Democratic Republic of Ethiopia).

Funding for Ethiopia’s restoration work is likely to remain largely donor-driven in the coming years, with REDD+ potentially providing a major source of financing.

The landscape in Ethiopia has changed from closed forest to mosaic landscape.

4.5 Key findings and lessons

Although overall Ethiopia has experienced a net forest loss, in comparison to other countries in the region and Africa more generally, its rate of loss is relatively low, possibly in part due to the large-scale replanting schemes that have been carried out (Homeier, 2011). Furthermore, the country’s landscape has changed from closed forest to mosaic landscapes with dotted forests in the landscape, which reflects the high population growth rate and the needs of the communities, which are predominantly rural. The experience in Ethiopia provides interesting perspectives on the link between afforestation and actual forest cover:

1. While large-scale tree-planting initiatives have been carried out in Ethiopia, the ongoing deforestation trend suggests a lack of maintenance and long-term management of those forests.
2. Associated with the previous point, forests and tree planting have been a political tool in Ethiopia, and their destruction has also been a form of political opposition by rural communities.
3. Large-scale resettlement programmes as well as land redistribution programmes over the years have created uncertainty and thus a disincentive for tree planting and restoration.
4. The lack of a national land-use plan and official definition of forest and forestlands has been cited as a limitation to carrying out restoration and FLR work successfully.
5. Participatory forest management has provided the most powerful tool yet in Ethiopia to ensure not only the implementation of large-scale tree planting but also the ongoing maintenance necessary for real long-term forest restoration.

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Case study 5:

Georgia

*Mountains of the Borjomi-Kharagauli
National Park in the Lesser Caucasus, Borjomi, Georgia.*

5.1 Overview

The Caucasus region is considered one of the Global 200 ecoregions and one of the world's biodiversity hotspots.

Situated at the crossroads of continents, the Caucasus region – encompassing Armenia, Azerbaijan and Georgia – is particularly important for its biodiversity. It is considered one of the Global 200 ecoregions and one of the world's biodiversity hotspots (Zazanashvili et al., 2020). It is characterized by a high rate of endemism (Akhalkatsi, 2015) and has a long history of folk medicine based on plants (Akhalkatsi et al., 2018).

Although precise numbers for forest cover are unavailable since the last inventory was carried out before independence (pre-1990), Georgia is by far the most forested of the three countries in the region (UNECE, 2019). Evidence suggests that forest cover is increasing in rural areas, largely because of rural outmigration (FAO, 2020).

Before independence from the Soviet Union, Georgia's forests were managed essentially for their protection and recreation value, while timber was imported from the ex-USSR (Akhalkatsi, 2015). Until 1990, forests that had been cleared were converted to agriculture; since independence, however, this has no longer been the case, thus making a large area potentially available for restoration (UNECE, 2019). After independence, Georgia began to harvest its own forest estate for timber. In addition, non-timber forest products were harvested in an unregulated fashion (UNEP and WWF, 2013).

A national forest inventory is currently underway in Georgia.

A major challenge for managing Georgia's valuable forests is the lack of information on the current situation. A national forest inventory has not been carried out since the 1990s, although some forest inventories in certain forest districts have been resumed since 2014. Currently, a 2019–2020 national forest inventory is underway, which will provide Georgia with comprehensive data on forests that will serve as a basis for strategic and political decision-making in the sector. Excessive harvesting of timber has led to the loss of an estimated 200,000ha of forests (UNECE, 2019). This area has been identified as having the potential for restoration.

Total country area (million ha)	6.949		
Bonn Challenge commitment	9,000 ha		
Restoration potential*	At least 200,000 ha		
	2000	2015	2020
Forest area, including plantations (million ha)	2.76	2.82	2.82
% forest cover	39.73%	40.62%	40.62%

Source: FAO, 2020

Table 5.1: Overview profile Georgia

* UNECE, 2019

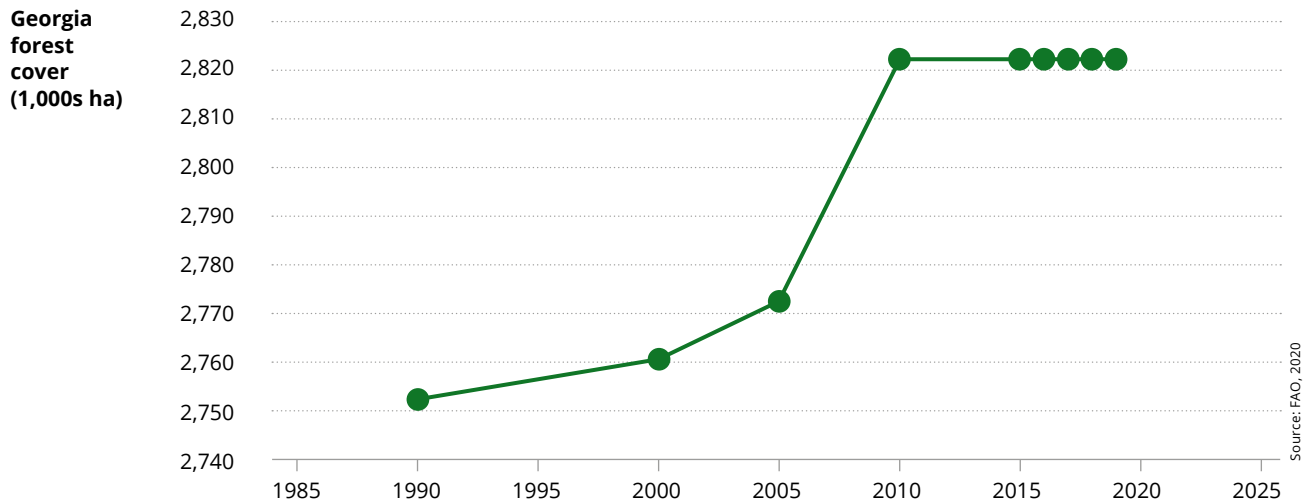


Figure 5.1. Forest cover change

The region is of strategic geopolitical importance, as it is situated on the edge of Russia with a major oil pipeline (the Baku-Tbilisi-Ceyhan) crossing through it. The pipeline, built in the early 2000s to carry oil from Baku to western Europe, was especially controversial because it runs through the Borjomi watershed, a major source of mineral water.

The Borjomi-Kharagauli National Park (IUCN category II; 109,300ha – protected-planet.net) in central Georgia is used for illustrative purposes in this case study.



Traditional agriculture and land use, Adjara Forests, Colkhети, Georgia.

Principle	Translation to Georgia
1. Focus on landscapes	While legislation includes restoration at the national level, most restoration efforts have been quite localized and project-based.
2. Engage stakeholders and support participatory governance	Article 17 of the new forest code acknowledges the importance of public participation in forest management. However, this appears to be limited in practice.
3. Restore multiple functions for multiple benefits	Forests are restored in Georgia for the mitigation of climate change impacts (e.g. droughts and floods), slope retention, combating erosion, maintaining water quality, and for timber, fuelwood and NTFPs.
4. Maintain and enhance natural ecosystems within landscapes	To date, most afforestation or reforestation has taken place in degraded or deforested areas.
5. Tailor to the local context using a variety of approaches	The forestry sector remains highly centralized in Georgia, with limited attention paid to local needs, despite an ongoing intention to devolve to local municipalities (KfW, 2017) and the “All Forests Are Local” principle set out in the National Forest Concept of 2013. Decree 241 (among other legal texts) emphasizes the importance of using native species.
6. Manage adaptively for long-term resilience	Increasing resilience to natural disasters (particularly in the context of climate change) is a major preoccupation of the Georgian government.

Table 5.2: Link between implementation in Georgia and the FLR principles

Forest restoration was motivated by Georgia’s desire to comply with international obligations.

5.2 Motivation

Forest restoration was motivated by Georgia’s desire to comply with international obligations. The forest estate is of great importance to Georgia, which is the country in the Caucasus region with the largest forest area (Patarkalashvili, 2016; UNECE, 2019; Zazanashvili et al., 2020). Georgia is a rugged and mountainous country, with fragile ecosystems that are highly vulnerable to climate change. Forests can be found essentially on the mountainous slopes, where they provide several ecosystem goods and services: water regulation, soil protection, climate regulation, recreational services, hydropower, timber, medicines and fuelwood, among others (Ministry of Environment and Natural Resources Protection and National Forestry Agency of Georgia, 2014; Patarkalashvili, 2016). Article 6 of the new forest code explicitly recognizes that forests facilitate soil protection as well as water and climate regulation.

After an initial industrial exploitation of forests during the Soviet era (1930–1950), erosion and a loss of ecosystem services prompted a change in approach, with most timber imported from Russia after 1950 until independence in 1991 (Akhaltatsi, 2015). Georgia’s forests became protected in 1950, allowing a certain amount of natural regeneration to take place.

Since independence, poor management and low levels of enforcement have led to rampant illegal activity. Today, illegal logging, uncontrolled fuelwood exploitation and overgrazing are three of the main drivers of forest loss and degradation (UNEP and WWF, 2013). As a result, it is estimated that over a third (about 35 per cent) of agricultural lands are degraded (GEF, 2014). The impacts of climate change are a real concern in this mountainous area, where most of the forest is on hillslopes and the potential human cost downstream caused by loss of forests is significant (Government of Georgia, 2015).

Borjomi National Park is situated on a major mineral water spring that was discovered by Tsarist Russia in the late 19th century, and that may be the key to the preservation of the forest even today. Indeed, the value of its natural springs is illustrated by the fact that in 1854 Borjomi was exporting 1,350 bottles of water, and by the 1980s it was exporting 400 million bottles (Bussmann et al., 2017).

Tourism is also a major source of employment and income for the country, and particularly for Borjomi Municipality through visitors to the national park (Sulkhanishvili, 2017). Indeed tourism (ecotourism and health-based tourism) has been a cornerstone of the economy since the 19th century, providing further rationale for the protection and restoration of the country's forests (Khomeriki and Meladze, 2015).

**The impacts
of climate change
are a real concern
for forests.**

5.3 Implementation

Sectors

Georgians rely on their forests for numerous reasons. The timber industry has been particularly important since the 1990s, when imports from the ex-USSR were suspended (UNECE, 2019). Nevertheless, the forestry sector represented only 0.3 per cent of GDP in 2014 (Government of Georgia, 2014). Fuelwood is a major source of heating for many Georgians (Garforth et al., 2016). In acknowledgement of this, and to reduce illegal harvest, the government defined “social cuts” in 1998 that allow rural households to harvest 7–15m³ of wood per year for their fuelwood needs (Sulkhanishvili, 2017). The practice also took place in the traditional use zone of the Borjomi-Kharagauli National Park.

The area around the Borjomi National Park is famous for its water and spas, and its bottling plant is a major source of revenue for the region and the country. The natural gas sector is also relevant, as the park lies within the path of the Baku-Tbilisi-Ceyhan pipeline.

Ecotourism is a major source of revenue for the Borjomi National Park. Indeed, tourism is central to the development plan of Borjomi Municipality (Sulkhanishvili, 2017). While this has been a growing source of revenue over the years, it is a fragile sector, as demonstrated by the radical drop in numbers in 2020 due to the coronavirus pandemic. From an approximate €7 million (US\$8 million) in anticipated revenue as based on 2019 figures, the expected figure for 2020 has dropped to €4 million (US\$4.6 million – CNF website).

The effects of these different sectors play out in Georgia's forests, on the one hand contributing to the use of the forest and its potential degradation, but on the other hand providing incentives for its restoration. In 2014, in an effort to improve integration across sectors, the GEF approved a project on integrated land management that would look at harmonizing legislation related to land.

The 1999 Forest Code prioritized assisted natural regeneration over tree planting.

Policy and legislative framework

The first Forest Code of Georgia was adopted in 1999 (Akhalkatsi, 2015). It dedicates a specific section (chapter XXVIII) to forest restoration.

In 2013, a National Forest Concept (Parliament of Georgia, 2014) was developed as an interim measure before the revision of the forest code (in 2020) that would set strategic directions for the sector. Its goal was to improve the quantitative and qualitative characteristics of Georgian forests. A major challenge to these assessments, however, is the fact that Georgia's last forest inventory dates back to the 20th century. In seeking to reverse forest degradation, Georgia has identified the need to identify priority areas for restoration and to engage in restoration and afforestation.

Article 6 of the 1999 Forest Code outlined the reasons for dividing Georgia's forests into categories and stated the need to facilitate the preservation and restoration of forests (Forest Code 1999). Furthermore, the code also noted, in the context of commercial timber harvesting, the importance of natural regeneration. Wherever possible, assisted natural regeneration is prioritized in the forest code over tree planting.

Stemming from an increase in forest fires that were a result of conflicts (particularly the 2008 war with Russia and the self-proclaimed republics of South Ossetia and Abkhazia), as well as climate change, Decision 241 of the Georgian government, On the Rules of Forest Maintenance and Restoration, was promulgated in 2010. This document contains: 1. general requirements for protection from fires; 2. detailed precautionary measures; and 3. measures to combat forest fires and their consequences (Government of Georgia, 2014). This decree clearly specifies that preference should be given to native species.

The new forest code from 2020 seeks to stop degradation through reforestation and afforestation.

In May 2020, the new forest code was approved by the parliament. The new forest code includes an article on the design of "special forest surveys" that can be undertaken to draft a project for the reforestation and afforestation of a specific area, as well as in the cases where a district-level forest inventory has not been carried out. Although not explicitly mentioned, this suggests in particular carbon sequestration projects. The role of forest plantations in stopping erosion and landslides, increasing the energy potential of forests and obtaining wood resources without damaging natural forest is highlighted in the new forest code.

Furthermore, chapter XVII of the new forest code focuses on reforestation and afforestation (while chapter XXVIII of the 1999 forest code focused specifically on "restoration"). Within this new forest code, Article 76 states that to stop degradation and to prevent further damage to forest areas, reforestation and afforestation measures are to be carried out within a maximum of three calendar years "after sparse

and/or open forest areas are formed as a result of natural or anthropogenic processes” (Forest Code, 2020; Art. 76).

One challenge that forests have faced is the process of devolution of forest management to local authorities. In 2007, with Government Decree No. 609 (19 October 2007), the government confirmed its intention to transfer local forests to municipalities, but this has been a slow process (Sulkhanishvili, 2017).

Tenure

All of Georgia’s forests belong to the state (FAO, 2020). However, according to the new 2020 Forest Code, forests may be legally owned by either the state, municipalities or private entities. Before occupation by Tsarist Russia, in the 19th century, forests belonged to the state, private landowners, villages, churches or monasteries (Garforth et al., 2016).

While the 1999 Forest Code promoted the management of forests by local self-governing bodies, this was always a contentious issue, with no transfers actually taking place (Matcharashvili, 2008 in WWF and UNEP, 2013). In reality, without sufficient funding, capacity and experience, local self-governing bodies were not ready to take over responsibility for forest management (UNEP and WWF, 2013).

The new forest code (2020) also refers explicitly to transferring forests to local municipalities, as well as allowing private forests on areas previously used for agricultural purposes that were left untouched and where natural regeneration has taken over.



*Adzarisckali valley,
with well-managed agri-
culture, the Lesser
Caucasus, Georgia.*

© Hartmut Jungius/WWF

The Forest Policy Service in the Ministry of Environment acts as an advisory body to the National Forestry Agency.

Stakeholders

Two entities at the state level are responsible for forest management: the National Forestry Agency (part of the Ministry of Environmental Protection and Agriculture of Georgia) and the Agency of Protected Areas (under the Ministry of Environment and Natural Resources Protection). The former administers 1.8 million hectares of forests, while the latter administers half a million hectares of forests within protected areas (UNECE, 2019). Furthermore, the Forest Policy Service in the Ministry of Environment and Natural Resources Protection acts as an advisory body to the National Forestry Agency (UNECE, 2019). Around 200,000ha of forests within the boundaries of the Autonomous Republic of Ajara are managed by the Ajara Forestry Agency. Management of forests in the Tusheti Protected Landscapes is exercised by the Akhmeta municipality. Following the new law, the municipality of Tbilisi now also manages forests within the administrative boundaries of the capital of Georgia. Furthermore, the Forest Policy and Biodiversity Department in the Ministry of Environmental Protection and Agriculture of Georgia acts as a structural unit that sets strategic directions and greater policy-making in the sector (MEPA website).

The 1999 Forest Code contains the category of “local forests”, which are to be managed by bodies established by the local municipalities. Forest restoration and fire-fighting actions were included within the management requirements for these local bodies (Forest Code, 1999, Art. 13). In practice, however, such local-level entities have not been initiated, due to a lack of legislation and resources to translate this part of the code into local-level action. Similarly, in the 2020 Forest Code, municipalities are encouraged to set up municipal forest management bodies responsible for developing and implementing measures that include reforestation and afforestation.

External agencies

Due to its geopolitical importance, as well as the extent of its forest within a biodiversity hotspot, Georgia has been the recipient of much outside attention. Major agencies include bilateral donors such as BMU/KfW, BMZ/GIZ, the Austrian Development Cooperation and USAID, as well as multilateral agencies like the World Bank.

After the 2008 war, several donors provided financial support to Georgia, notably to restore forest areas damaged by the war (e.g. 1,000ha in Borjomi National Park). Together with WWF, the German government (BMZ funding channelled through the KfW) has been investing heavily in the Caucasus’s protected areas, with the provision of basic annual funding since 2009 covering operational costs for a total of 20 protected areas in Georgia (CNF website). The German Ministry for the Environment, Nature Conservation and Nuclear Security (BMU) has funded restoration activities.

WWF has been a major partner in forest conservation and restoration in Georgia.

WWF has been a major partner in forest conservation and restoration in Georgia. For example, it was involved in a regional forest restoration project alongside the KfW between 2008 and 2011. It aimed to address forest degradation through FLR, developing guidelines for FLR in the region (KfW, 2017). It has led on the development of an updated ecoregional plan for the region in 2020 that recognizes the importance of restoration in creating corridors between protected areas (Zazanashvili et al., 2020).

Since the 2008 war, private-sector interest in forest restoration has been increasing dramatically.

In 2020, the Green Climate Fund approved a major project of US\$38 million for forest sector reform that includes restoration.

Private

Article 17 of the new forest code acknowledges the importance of public participation in forest management. The Eco-Corridors Fund (ECF) recognizes the role of local communities in the mosaic landscape that connects protected areas. It provides funding via contractual arrangements with local communities to manage areas not only for their social needs but also for biodiversity (ECF website).

Although in principle local communities are supposed to be involved in forest management, in practice this has been limited thus far. Agreements with local stakeholders, including shepherds, are an important way of managing the areas between protected areas in a sustainable manner (Zazanashvili et al., 2020).

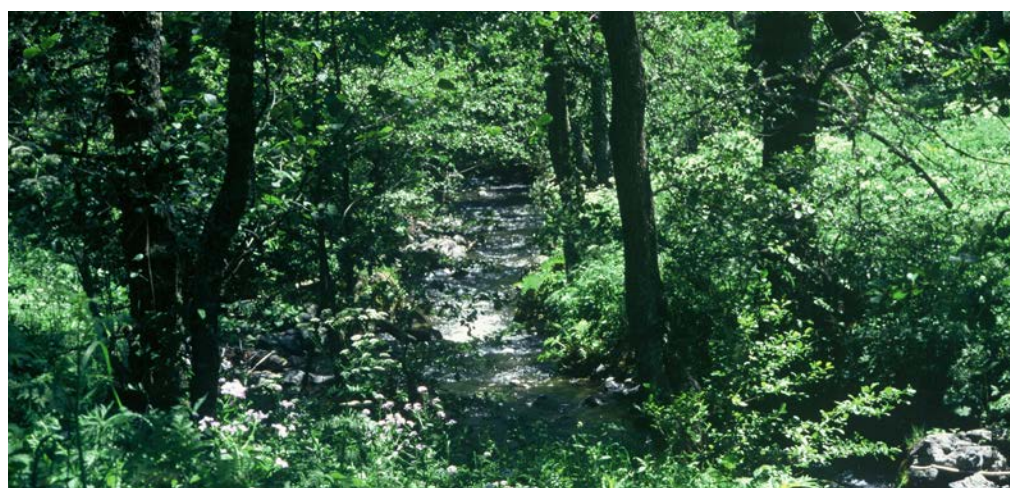
Since the 2008 war, private-sector interest in forest restoration has been increasing dramatically, in terms of both financial and technical support.

Economic aspects

Significant funding for Georgia's protected areas system comes from the German government. Between 2009 and 2019 a total of €10 million (US\$11.7 million) was provided, and in November 2019, the KfW signed an agreement with the Caucasus Nature Fund for further funding of €16.4 million (US\$19 million – CNF website).

In 2020, the Green Climate Fund approved a major project (US\$38 million, plus co-funding of about US\$170 million) for forest sector reform (GCF website). Although not exclusively focused on restoration, it includes restoration (particularly natural regeneration) as part of the desired improvements to the forest estate within the context of climate mitigation (GCF website). The World Bank provided support to the Georgian Forestry Development Programme in the amount of US\$20 million between 2000 and 2007 (Akhalkatsi, 2015).

In the case of tree planting, some of it has been paid for by the National Forest Agency with state budget (Freer Smith et al., 2019). WWF has been involved in restoration in the Borjomi National Park, while UNDP also channelled funding for restoration in the park after the forest fires of 2008.



*Riverine alder forest,
Borjomi-Kharagauli
National Park, Georgia.*

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5.4 Sustaining factors

In the framework of long-term maintenance, much of the effort has been directed at capacity building, including the development of locally adapted FLR guidelines, which represents a long-term investment. The FLR implementation guide produced by WWF was incorporated into Georgian Directive 241, thus contributing to ensuring the long-term sustainability of restoration efforts (KfW, 2017).

Forests are an important component of Georgia's intended nationally determined contribution (INDC) under the UNFCCC, which not only prioritizes sustainable forest management but also acknowledges the role of afforestation and reforestation. The Borjomi-Bakuriani Forest district has been prioritized in the INDC in part because it is the "only forest district where carbon emissions have been quantified" (Government of Georgia, 2015). Similarly, Georgia's contribution to the UNCCD for land degradation neutrality highlights that a total of 9,000ha will be either reforested or afforested (in line with the Bonn Challenge commitment). Restoration is central to the NBSAP, whose vision of 2030 is that "the people of Georgia will be living in a harmonious relationship with nature, whereby biodiversity is valued, conserved, restored and wisely used, ecosystem processes and services are maintained, a healthy environment is sustained and benefits essential for the society are delivered" (Government of Georgia, 2014). The NBSAP also acknowledges the role of forest plantations to meet the national demand in timber; it highlights the importance of using native species for these and planting them in already open areas.

Forests are an important component in Georgia's climate targets (INDC).

5.5 Key findings and lessons

Georgia's situation is distinct, as it faces a lack of basic forest data. At the same time, it has ample legislation to support restoration and is poised to increase efforts in that direction. Major lessons and findings emerging from this case study include:

- 1.** The lack of clear data on forests, and particularly an up-to-date national forest inventory, is a substantial stumbling block for large-scale restoration (and sustainable forest management more generally).
- 2.** Areas restored or in need of restoration appear to be relatively small; however, the desire to engage in restoration can be traced back to the country's reliance on several ecosystem goods and services, notably mineral water from Borjomi, and the importance of land stabilization in a mountainous country.
- 3.** In part because of the above, much of the effort has been directed toward capacity building, including the development of locally adapted FLR guidelines, which is in itself a long-term investment.
- 4.** Restoration, reforestation and afforestation appear centrally in legislative text, even if, in practice, their implementation has been limited to date due to a lack of technical and financial capacity.

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CNF: caucasus-naturefund.org

ECF: ecfcaucasus.org/about

GCF: greenclimate.fund

MEPA: mepa.gov.ge/En

Protected Planet: protectedplanet.net/61588

Case Study 6:

Kenya



6.1 Overview

According to its report to the FAO, Kenya's net forest cover has been gradually increasing since the year 2000 (see **Table 6.1**). Yet, forest cover currently represents about 6.34 per cent of land cover (down from approximately 30 per cent in the pre-colonial period (Wamicha and Mwanje, 2000), which has prompted the government to include in its 2010 constitution the need to ensure a minimum of 10 per cent forest cover by 2030 and to achieve land degradation neutrality by that same year.

Forest loss in Kenya can be traced back to the colonial era (the late 19th century), with European settlers clearing forest for construction, firewood and other purposes (Kogo et al., 2019). Although efforts were made then to reforest, exotic species such as pine, cypress and eucalyptus were favoured due to their rapid growth rates (Republic of Kenya, 2020).

Even after independence, however, deforestation and forest degradation continued, often with the support of government incentive programmes to use the land productively (Klopp, 2012).

Nationwide figures for deforestation and reforestation obscure differences between specific biomes. Montane dense forests, for example, are stable and increasing (at 35 per cent of the forested land), while dryland forests (45.2 per cent of forested land) have seen the most fluctuation and overall reductions (MEF, 2019). Other key forest types include coastal forests (both mixed indigenous forests and mangrove forests) and western rainforest (Kakamega and Nandi forests) (MEF, 2020).

Total country area (million ha)	56.914		
Bonn Challenge commitment (million ha)	5.1 (of degraded land, incl. 1 million ha of forestlands)		
ROAM-identified potential for restoration of forestland (million ha)	5.2		
	2010	2015	2020
Total forest area (million ha)	3.616	3.522	3.611
% forest cover	6.35%	6.19%	6.34%

Source: FAO, 2020

Table 6.1: Overview profile Kenya

Although forest cover is reported to be gradually increasing since 2015, the REDD+ baseline suggests that deforestation continues at a rate of 103,368ha per year (0.17 per cent of national area) and reforestation at a rate of 90,477ha per year (0.15 per cent of national area), thus indicating a net loss of 12,891ha (MEF, 2019).

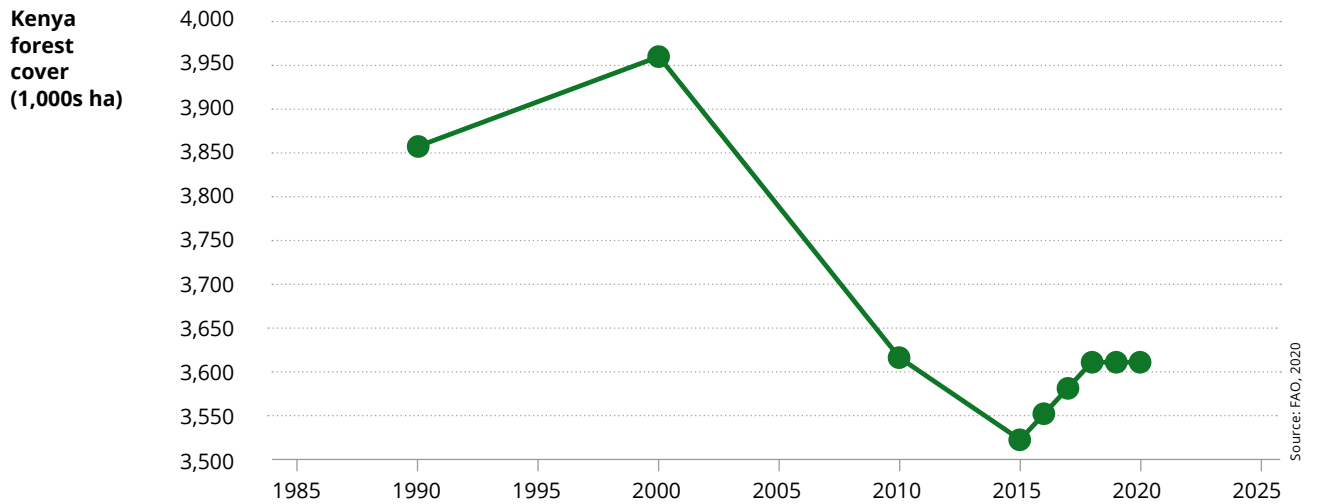


Figure 6.1. Forest cover change

The ROAM assessment carried out in 2016 by the Ministry of Environment and Natural Resources in collaboration with numerous actors, including WRI (MoENR, 2016), identified 5.2 million hectares of forestland potentially available for restoration. As a result of the assessment, Kenya committed to restoring 5.1 million hectares of deforested and degraded land by 2030, including 1 million hectares of forestland (the rest being made up of cropland, rangelands and other areas) under the Bonn Challenge and the AFR100. A tree-based landscape restoration potential options map was developed as a product of the ROAM process (see: ken.restoration-atlas.org/map). It identified the following restoration options: reforestation and rehabilitation of degraded natural forests; agroforestry and woodlots on cropland; commercial tree and bamboo plantations; tree-based buffers along waterways, wetlands and roads; and silvo-pastoral and rangeland restoration.



Peter Muriuki, member of the Mkungu Floriculture Group, weeding tree seedlings with other members in their nursery. Mkungu district, Lake Naivasha, Kenya.

Principle	Translation to Kenya
1. Focus on landscapes	Restoration opportunities identified in the wider landscape context.
2. Engage stakeholders and support participatory governance	Change in government approach since 2005 to engage communities more.
3. Restore multiple functions for multiple benefits	Water protection and ecotourism are two major benefits sought, but agroforestry is also being pursued.
4. Maintain and enhance natural ecosystems within landscapes	Natural forests are to be restored with native species.
5. Tailor to the local context using a variety of approaches	Since 2005, increasing community engagement has allowed more local knowledge to be included. Indigenous species are promoted in many restoration initiatives.
6. Manage adaptively for long-term resilience	The 10 per cent forest target set by the government is in response to ecosystem degradation and the loss of ecosystem services.

Table 6.2: Link between implementation in Kenya and the FLR principles

6.2 Motivation

Forests have been recognized in Kenya for their value in providing ecosystem services and revenue through ecotourism. The following ecosystem services have been highlighted as important for the country: watershed services, soil erosion control, air quality, regulation of climate and carbon sequestration, biodiversity, recreation and tourism, timber products, and cultural values. In addition, both rural and urban populations are highly dependent on biomass energy, notably charcoal, which is estimated to account for 60 per cent of energy use (Drigo et al., 2015).

Land degradation has been estimated to cost the Kenyan economy US\$1.3 billion annually.

Land degradation is estimated to have cost the Kenyan economy US\$1.3 billion annually between 2001 and 2009 (Mulinge et al., 2016). Kenya is one of 13 countries that manages 100 per cent of its forests for soil and water conservation (FAO, 2018). For example, Mombasa's population is heavily dependent on the forests of the Chyulu Hills (100km away) for its water supply, as is Shimba Hills (Kwale county) (UNCCD, 2017). Water is particularly important for agriculture, which directly and indirectly accounts for 60 per cent of the country's GDP (MEF, 2020), 80 per cent of formal employment and 60 per cent of export earnings (MEF, 2020). Furthermore, hydropower supplies an estimated 70 per cent of the country's power (Ngigi and Tateishi, 2004). Forests comprise Kenya's water towers and catchments, where over 75 per cent of the country's renewable surface water originates (Republic of Kenya, 2020). Devastating droughts in 1999/2000 further raised the alarm about the state of the forest estate (Gachanja 2003). As a result, a flagship project included in Kenya's

Vision 2030 (Third Medium Term Plan 2018–2022) concerns the rehabilitation and protection of indigenous forests in the five water towers (Mount Kenya, the Aberdare Range, the Mau Forest Complex, Mount Elgon and the Cherangani Hills). Additionally, an estimated 80 per cent of the country’s tourism sector, which generates a third of the country’s foreign exchange earnings, revolves around wildlife viewing (much of it associated with forests) (UNCCD, 2017).

Acknowledging the importance of forests and the state of the country’s forests, the new constitution in 2010 set a goal of ensuring 10 per cent forest cover for the country.

Thus, a recognition of the country’s reliance on ecosystem services, particularly water regulation, and their role in meeting the SDGs and poverty reduction, together with the observation that these services are being lost as forests are lost and degraded, has led the government of Kenya to define a 10 per cent forest cover target and to actively engage in reforestation and FLR.

**Kenya’s 2010
Constitution set
a target to ensure
a minimum 10%
forest cover.**

6.3 Implementation

The less populated arid and semi-arid lands have been identified in the new forest policy (2020) as appropriate for afforestation and reforestation. Indeed, they cover 80 per cent of Kenya’s total land surface but hold 25 per cent of the human population. They are also the ones that appear to be suffering most from deforestation and degradation.

Policy and legislative framework

The first formal forest policy was prepared in 1957, during the colonial period, and then revised in 1968 (after the end of colonialism, though it was criticized for maintaining colonial influences) (Mwangi, 1998).

In 2005, the first amendment was made to the 1968 Forest Policy. A major milestone of this 2005 Forest Act was the increased role of communities and participatory forest management (through the establishment of community forest associations). It also encouraged private-sector investment. This forest act acknowledged the need for plantation forestry on public lands for commercial purposes. It took stock of previous problems with exotic species (including pests) and promoted the use of indigenous species. In the drylands, it promoted the rehabilitation of forests through community forestry with government support.

The Constitution of Kenya from 2010 set a target to ensure a minimum tree and forest cover of 10 per cent. The constitution also promotes greater devolution of responsibility for land and environmental policies, which is allocated to the county level via the Transition to Devolved Government Act 2012.

In 2014 a new forest policy was drafted. It led to a revised forest law (the Forest Management and Conservation Act 2016) to facilitate the implementation of the

The 2014 Forest Policy aims at rehabilitating, restoring and protecting degraded forest ecosystems, water towers and catchment areas.

policy. It also provides for increasing involvement of communities in forest management, including through the introduction of benefit-sharing schemes. Restoration appears prominently in the 2014 Forest Policy, which states an objective to “rehabilitate, restore and protect degraded forest ecosystems, water towers, catchment areas and other ecologically fragile areas” (GoK, 2014). It distinguishes plantation forests, which are essentially on public land and produced for industrial purposes, from indigenous forests, which are to be managed for multiple uses, including ecosystem services (Ibid.). The policy explicitly acknowledges the need, even within plantations, to diversify species and not rely exclusively on a small number of fast-growing exotic species (Ibid.).

In 2019, a strategy was developed to support the 10 per cent tree cover objective enshrined in the constitution. It includes specific interventions such as rehabilitating 300,000ha through enrichment planting; fencing 1,500km of natural forest boundaries; rehabilitating 200,000ha through natural regeneration; and rehabilitating 50,000ha of degraded community and private forests (GoK, 2019b).

As of 2020, a new draft forest policy has been developed. In March 2020, as a result of the ROAM process, Kenya developed a five-year FLR plan that is intended to support the development of “an effective system for FLR in Kenya” (Ministry of Environment and Forestry, 2020).

Multisectoral platforms were created to assess potential restoration opportunities.

Several **multisectoral platforms** were created, including the multistakeholder National Technical Working Group, which was established in 2014 to assess opportunities for restoration and is led by the Kenya Forest Service (KFS). Intersectoral collaboration had already been promoted in the 2005 Forest Act, which highlighted the need for the creation of an interministerial committee related to forest issues (GoK, 2005). More recently, intersectoral collaboration has been promoted around



Planting of Erythrina trees.

© WWF

Colonization led to the nationalization of forests and large-scale exploitation.

climate change mitigation strategies, given that the National Climate Change Response Strategy and National Climate Change Action Plan call for growing 7.6 billion trees on 4.1 million hectares of land over a 20-year period (MoENR, 2016). Thus, the Council of Governors (CoG) and Inter-Governmental Relations Committee were established to strengthen collaboration across national, county and community levels, as well as with the private sector. Under the strategy for 10 per cent tree cover, several intersectoral committees were established, notably the national interministerial Steering Committee, based in the Ministry of Interior and Coordination of National Government, which is tasked with oversight and policy guidance on the strategy; an interministerial Technical Committee tasked with coordinating and supervising the implementation of activities; and a multi-institutional Technical Team with representatives from relevant government agencies, the Council of Governors, NGOs, the private sector and development partners (MEF, 2019b). At the county level, it also calls for the establishment of county implementation Coordination Committees co-chaired by county commissioners and county governments, with the Kenya Forest Service as the secretary (Ibid.)

Tenure

Prior to the colonial period (pre-1895), forests belonged to the community in Kenya and were managed by them through a series of rules (enforced by a Council of Elders) and systems that limited and controlled access and extraction from forests (Mwangi, 1998). Colonization led to the nationalization of forests and large-scale exploitation, notably for the construction of the Kenya-Uganda railway. Forests were either excised (up to 1972) or gazetted as protected areas. During the colonial rule, exclusion of native Kenyans from the forest was widespread, directly impacting on their livelihoods and establishing mistrust between communities and forest authorities (Republic of Kenya, 2020). Only recently (since the early 2000s) has authority over forests begun to gradually devolve to local governments (counties) and communities (Kagombe et al., 2017).

Land in Kenya can be under the authority of traditional tribes or customary tenure, modern private tenure, or state ownership.

Today, land in Kenya can be under the authority of traditional tribes or customary tenure, modern private tenure, or state ownership. Public forests are generally managed for ecosystem services, as well as timber, poles and fuelwood, and are under the management of either the Kenya Forest Service or the Kenya Wildlife Service, in addition to county governments. In contrast, community forests are owned and/or managed by communities who have rights and responsibilities through long-term leases or management arrangements. Private forests are in turn owned or managed by private entities as freeholds or leaseholds. In its report to the FAO for the 2020 Forest Resources Assessment, Kenya reported that in 2015, 1,326,290ha of its forests were public, while 2,196,120ha were private, of which a large but “unknown” amount was held by local, tribal and indigenous communities (FAO, 2020). It is estimated that about 135,567ha of plantations are under the management of the KFS and another 95,000ha are privately owned forest plantations (Kogo et al., 2019). Sacred forests (predominantly coastal forests) are managed by elders and protected under the Antiquities and Monuments Act. Sacred forests and groves are central to the management of forests, as they provide locations for traditional rituals and ceremonies. Different tribes use forests differently, and care needs to be taken not to overgeneralize across the country.

Devolution has been central in Kenya's forests over the past decade, but especially since the 2016 Forest Conservation and Management Act. The role of county governments was strengthened via transitional implementation plans, and community forest associations were also strengthened thanks to participatory forest management plans.

In 2019, to achieve the 2010 constitutional target of 10% forest cover, the government established the National Tree Planting Campaign.

Stakeholders

Public

The Kenya Forest Service was formally established in 2005 as a semi-autonomous body within the Ministry of Environment (whereas before it had been a department within that ministry) (GoK, 2005). Its role, as defined in 2005, includes notably the management of forests for ecosystem services such as water and soil conservation, and carbon sequestration. It is the ultimate authority for the country's forests and is responsible for ensuring that all of Kenya's forests are sustainably managed. The KFS is managed by a board that reflects the multisectoral nature of forests, as it includes representatives from the environment ministry, the permanent secretary responsible for water, the permanent secretary responsible for finance and the director of the Kenya Wildlife Service, among others (Ibid.). In 2019, in support of the 2010 constitutional target of 10 per cent forest cover, the government established the National Tree Planting Campaign. A new department was created in parallel – the resource assessment and planning department (DRSRS) – to coordinate surveys and the mapping of forest resources in order to identify areas for restoration interventions.

The Kenya Forestry Research Institute, as established under the Science, Technology and Innovation Act, was founded in 2013 as the main agency dealing with forestry research and development.

The 2016 Forest Conservation and Management Act has provisions for the creation of a forest conservation committee for each forest conservation area, which is intended, among other functions, to make recommendations on the conservation and use of forests. It is made up of public and private stakeholders, including relevant civil society organizations involved in the area of forest conservation.

Communities

Until 2005, the forest sector did not formally allow for the participation of the private sector or communities in the management of forests. This changed with the passing of the 2005 Forest Act (GoK, 2005). According to this act, community associations may be registered by providing, inter alia, the names of participants, a constitution for the association, the area of forest in question and financial arrangements. Once established, a community association has a number of responsibilities with respect to forest management, including protection, conservation, management and enforcement. Reviewing the role of 16 community forestry associations, Mogoi et al. (2012) found that 72 per cent were engaged in tree planting.

In the 2015 Forest Resources Assessment, Kenya notes the existence of a national platform for stakeholder participation in forest-related decisions (FAO, 2015). The Kenya Forests Working Group (KFWG), established in 1995, is an umbrella organization

Kenya has a national platform for stakeholder participation in forest-related decisions.



Coastal forest landscape restoration project, Kwale, Kenya.

that brings together all parties concerned with forests and their conservation and management – including NGOs, government professionals and concerned citizens. Participants are diverse and include pastoralists as well as government representatives. This umbrella group has played an important part in strengthening the role of non-governmental stakeholders in decision-making in forestry (Gachanja, 2003).

Farmers have been encouraged to plant trees on farms since the 2014 Forest Policy, which recognizes that this forms an important component of the plan to achieve the 10 per cent target in the constitution. The policy promotes partnerships and incentives to encourage such tree planting (GoK, 2014). Furthermore, in the context of the country's various restoration initiatives, a framework has been developed to allow the registration of private forest nurseries for both commercial and conservation forestry. For example, in the state Gathiuru Forest Station in Mt. Kenya, community forest association (CFA) members have earned more than US\$6.5 million over eight years from the sale of food grown alongside newly planted trees (both indigenous and exotic species). 1,000ha of forest were planted.

Wangari Maathai's Green Belt Movement, which won her the Nobel Peace Prize in 2004, helped to establish over 30 million trees and 6,000 tree nurseries between 1977 and 2003 (Green Belt Movement website). Seeing widespread degradation, deforestation and food insecurity prompted Maathai to design this programme, which sought to achieve the twin goals of empowering women by paying them to plant trees and improving tree cover. The success rate of these efforts by approximately 80,000 women was reported to be between 70 per cent and 80 per cent (Cockram, 2017).

Deforestation has been estimated to cost the economy over US\$19 million each year.

Economic aspects

Arid and semi-arid lands are prioritized in Kenya's forest policy, as they have the potential for producing income via tourism, NTFPs (gums, resins, aloe, charcoal, essential oils, silk, edible oils, fruits and honey) and timber on a sustainable basis. It is estimated that forestry contributes 3.6 per cent to Kenya's GDP, excluding charcoal and direct subsistence use (Republic of Kenya, 2020). Fuelwood represents 80 per cent of all energy used in the country. Deforestation has been estimated to cost the economy over US\$19 million each year (GoK, 2014). The 2005 Forest Act recognizes that funding for the forest sector has been too reliant on the government purse and notes the need to diversify income, including from payments for ecosystem services and revenue from plantation forestry (GoK 2005). To ensure a stable funding base in support of the 10 per cent forest target, a presidential decree was passed that allocates 10 per cent of the corporate social responsibility budgets of all ministries, departments and agencies to tree planting.

In 2016, the Forest Conservation and Management Trust Fund was established by the government, with one of its purposes being to support afforestation and reforestation, in addition to community forestry and PES programmes. It is financed by government funds allocated by the parliament as well as levies on forest-related operations and other additional grants (GoK, 2016). The KFS created the Forest Investment Facility in 2017, which is a revolving loan scheme providing financial support to forest conservation and community livelihoods specifically in four counties. The scheme is a partnership between the KFS and the Equity Bank Group, with initial capital of US\$700,000. Operating like a microfinance scheme, the partners offer financial services and training, as well as loans ranging from US\$100 to US\$50,000 to rural farmers (GoK, 2019). Other trust funds, such as the National Environment Trust Fund (NETFUND) and Water Service Trust Fund (WSTF), were also created.

A cost-benefit analysis of the strategy for achieving 10 per cent tree cover showed that implementation of the strategy would cost KES48 billion (US\$442 million), while the cost of inaction was estimated at KES168 billion (US\$1.55 billion) over the four-year period (MEF, 2019b).

An economic analysis of the restoration potential has demonstrated that the benefits outweigh the costs of restoration.

6.4 Sustaining factors

An economic analysis by Cheboiwo et al. (2018) of the restoration potential has demonstrated that the three scenarios proposed under the ROAM would cost KES1.9, 2.8 or 3.7 trillion respectively, while providing significantly higher benefits of KES7.6, 11.2 or 14.9 trillion respectively (MEF, 2020). Such funds will be sustained only if several sources, both national and international, can contribute. The government has made a provision of KES1 billion to support afforestation (GoK, 2019).

Various sources of funding, both public and private, are needed for restoration, including innovative funding.

Kenya's Strategic Investment Framework for Sustainable Land Management 2017–2027 (GoK, 2016) focuses on five land-use areas, one of which is water towers/forest areas. This framework acknowledges that public-sector funding is critical for sustainable land management but will also seek to tap into private resources, as well as innovative funding mechanisms such as PES, carbon markets, water funds, green climate funds and public-private sector partnerships (MEF, 2020).

In support of the government policy to expand forest cover, several banks and NGOs (e.g. Komaza, One-Acre Fund, Better Globe Forestry and Gatsby Africa, Proposed Nature Conservancy Tree Fund, and corporations like Kakuzi, James Finlay, Equity Group Holdings, etc. (GoK, 2019)) are proposing lending facilities for restoration. Payments for ecosystem services are also included in the draft strategy for implementing the 10 per cent forest cover, as are conservation levies, particularly on water and tourism (GoK, 2019b).

Reports and plans by Kenya under all three Rio Conventions refer to reforestation and/or forest restoration. The 2000 National Biodiversity Strategy and Action Plan under the **CBD** (GoK, 2000) acknowledges the need to restore ecosystems. Under the UNFCCC, Kenya provided an intended nationally determined contribution in 2015 that refers to both afforestation and reforestation as methods of reducing greenhouse gas emissions (MoENR, 2015) and refers also to the role of forest restoration in climate mitigation. Forests and forest restoration are central to Kenya's climate policy, with the government pledging a 50 per cent reduction in greenhouse gas emissions from the forest sector by 2030 as part of its INDC. As of 2005, the government was already promoting tree planting for carbon sequestration (GoK, 2005). The 2002 programme of action under the UNCCD also refers to reforestation (GoK, 2002). In addition, the government aims to achieve land degradation neutrality by 2030 as a commitment to the UNCCD.

6.5 Key findings and lessons

Kenya has made significant changes in recent years to upscale forest restoration. Lessons and key findings include:

1. The trigger for restoration in Kenya was the recognition of a dramatic loss in ecosystem services and the subsequent impacts on rural livelihoods.
2. A recognition of the role of communities and their increased participation in forestry after decades of exclusion marked a turning point for Kenya's forest sector.
3. Kenya's forest sector is characterized by a complex and extensive policy environment, with major changes in the direction of restoration in the last decade.
4. The ROAM process has seized the opportunity presented by the 2010 constitution to promote FLR and has had a major influence on Kenya's approach to restoration/reforestation since 2014.

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Case study 7:

Madagascar

(Fandriana-Marolambo Landscape)

*Interior of Montane rainforest, close to Andringitra National Park.
Manambolo Soil Project, near Ambalavao, Madagascar.*

7.1 Overview

Madagascar has not yet undergone a forest transition. However, although its rate of deforestation continues, there are arguments to suggest that it may have been worse without active interventions. Reports indicate a slowing of deforestation rates between 1990 and 2005 (FAO, 2020) and localized increases in forest cover (McConnell et al., 2015).

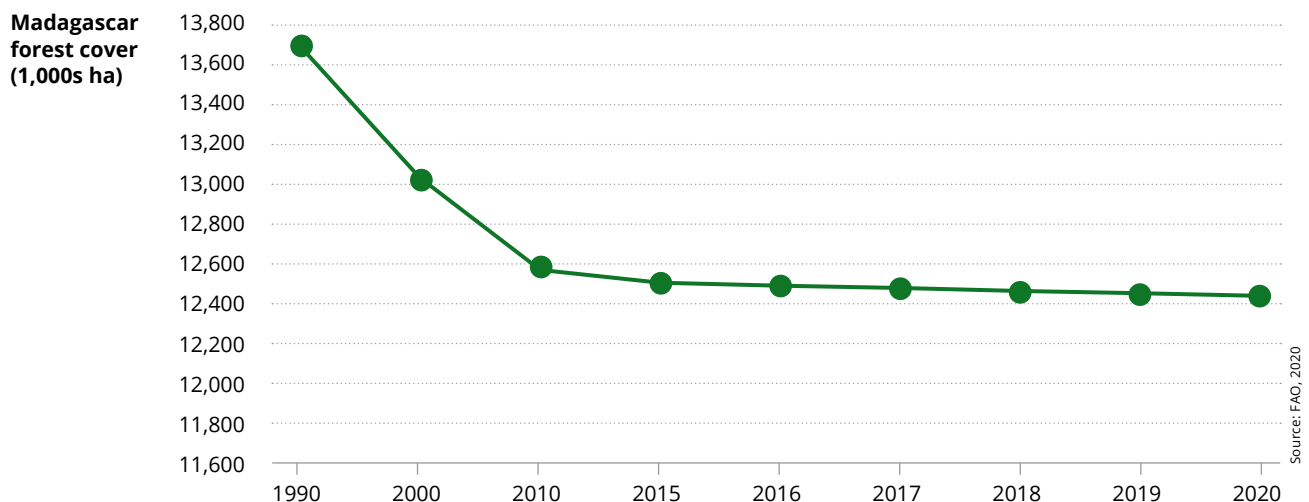
Because of the ongoing loss of forests at the national level, this case study focuses on a particular forest landscape restoration project (Fandriana-Marolambo (FM), in the south-central tropical moist forest, led by WWF from 2004 to 2017) while situating it within the broader national context. The distinction is made in each subsection between the landscape of FM and the national context.

Total country area (million ha)	58.74		
Bonn Challenge commitment (million ha)	4		
ROAM-identified potential for restoration* (million ha)	35-44		
	2010	2015	2020
Forest area (million ha)	12.561	12.495	12.429
% forest cover	21.59%	21.48%	21.36%

Source: FAO, 2020

Table 7.1: Overview profile Madagascar

* source: UNIQUE, 2016



Source: FAO, 2020

Figure 7.1.: Forest cover change

Madagascar is among the top 10 countries with the most tree species and is home to 2,991 endemic species (second only to Brazil) (Beech et al., 2017).

An important wave of settlers reached Madagascar from Southeast Asia around 800AD (Mitchell, 2019), though this was preceded by earlier human presence, as suggested by recent archaeological findings. There is no consensus on the extent of forest cover on the island before anthropogenic modifications. While there has been a tendency to assume the island was once entirely forested, it has also been suggested that grasslands were more largely present than widely assumed. This has implications for the widely shared deforestation rate of 90 per cent (Kull, 2000; McConnell and Kull, 2014), which could in fact be lower, depending on baseline forest cover.

Nevertheless, recent estimates of forest cover allow comparisons for the 20th century and early part of this century. These estimates indicate a fluctuation with a significant acceleration of forest loss in 1990, followed by a decline in the rate of forest loss for the next 15 years and a gradual rise again since 2005 (Table 7.2).

Year	Forest cover 1,000s ha	Annual deforestation	
		1,000s ha	Rate (%)
1953	15,968		
1973	14,243	86	0.6
1990	10,762	205	1.6
2000	9,879	88	0.8
2005	9,668	42	0.4
2010	9,320	70	0.7
2014	8,925	99	1.1

Source: Vieilledent et al., 2018

Table 7.2: Deforestation in Madagascar

About half of the forests (4.4 million hectares) are tropical moist forest that are primarily situated along the east coast, 2.6 million hectares (29 per cent) are dry forests along the western coast, and 1.7 million hectares (19 per cent) are spiny forests of the south. A further 177,000ha are mangroves found along the western and northern coast (Vieilledent et al., 2018).

Madagascar committed to restoring 4 million hectares of forest under the Bonn Challenge in 2014, of which 2.5 million was projected for 2020 and a further 1.5 million for 2030. To date, other than individual projects, large-scale nationally led interventions to increase forest cover have focused on reforestation or afforestation with exotic tree species (eucalyptus and pines) (FAO, 2014). A target of 250,000ha for the period 2007–2012 was set by the government, with actual interventions totalling 20,000ha on average per year over that period (FAO, 2014).

The government reports an annual growth of 25,000ha of plantations (primarily for timber) since 2005 (FAO, 2014). It also reports that there is no natural expansion of the forest because of continued pressure from rural populations seeking land for cultivation.

The ROAM assessment carried out by UNIQUE in 2016 identified five options for restoration in Madagascar: 1. reforestation of degraded lands with fast-growing species for fuelwood and construction timber (and to combat soil erosion); 2. restoration of degraded forests, both natural and plantations, through protection or enrichment planting; 3. reforestation of agroforestry landscapes on degraded sites (often on slopes); 4. restoration of pine plantations for industrial purposes; and 5. restoration of degraded mangroves for the purpose of wood production, fisheries and coastal protection.

The WWF Fandriana-Marolambo FLR project was initiated in 2003 with a national workshop on FLR held in March (WWF, 2003). This workshop – attended by both public- and private-sector actors, including NGOs and research institutes – helped to define nationally relevant criteria (eight sociocultural, five economic, seven ecological and biophysical, and four political criteria) for the selection of a pilot FLR landscape. Following the definition of these criteria and a field reconnaissance phase in three preselected landscapes, Fandriana-Marolambo was identified, and an FLR project developed. Funding for four consecutive phases was obtained for this FLR initiative, which was carried out over a total of 13 years with additional donor funding (Mansourian et al., 2018). Its initial and overarching objective was that “the goods, services and authenticity of the moist forests of the landscape of Fandriana-Marolambo are restored to support the development of the populations and to secure the objectives of biodiversity conservation” (Ibid.). For this case study, the decision-making and implementation process at the level of the landscape is explored, as well as its interactions with the broader national context.



Community members restoring forests in the Fandriana-Marolambo landscape, Madagascar.

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Principle	Translation to Madagascar's Fandriana-Marolambo (FM)
1. Focus on landscapes	FM was the selected landscape within which FLR was planned and designed (an area of 203,080ha).
2. Engage stakeholders and support participatory governance	Close to 100 villages were engaged in the project at the local level (from three ethnic groups), as well as local authorities and associations and the parks authority.
3. Restore multiple functions for multiple benefits	Restoration centred on both indigenous and exotic species, each providing different functions (e.g. eucalyptus for fuelwood, fruit trees for food and other native species for biodiversity conservation).
4. Maintain and enhance natural ecosystems within landscapes	Native species were used to improve natural ecosystems. Areas around the buffer zones of the Marolambo National Park were prioritized for the use of native species.
5. Tailor to the local context using a variety of approaches	The project adapted to the local socio-economic context by hiring more facilitators from the different communities, as well as using a mix of species that catered to both ecological and socio-economic priorities. It also valued local knowledge and practices.
6. Manage adaptively for long-term resilience	Over the different phases of the project, different aspects were prioritized, including focusing on engaging local communities, improving alternative livelihood practices to reduce pressure on forests, strengthening local institutions, etc.

Table 7.3: Link between implementation in Madagascar's Fandriana-Marolambo and the FLR principles

Motivation for restoration in Madagascar is probably mostly externally driven.

7.2 Motivation

Fandriana-Marolambo landscape

The FM FLR project was driven by the international NGO WWF and was intended to be one of its 10 worldwide FLR initiatives. Madagascar was selected because of its unique biodiversity and rate of forest loss. To initiate this work, the organization brought together some national-level stakeholders in March 2003 to: 1. strengthen understanding of FLR; 2. discuss opportunities for implementing FLR in Madagascar; 3. develop a list of potential landscapes for the implementation of FLR; 4. determine the next steps for implementing FLR in Madagascar; and 5. introduce FLR to donors and policymakers to raise their awareness of the role for FLR in development priorities (WWF, 2003).

Beyond Fandriana-Marolambo

More generally, motivation for restoration in Madagascar is probably mostly externally driven. The island has had a recent history of strong environmental movements (essentially externally driven) because of its biological uniqueness, and restoration is one of the more recent priorities to be introduced to the country. Nevertheless, as with many other concepts and as in many other locations, there is a process of appropriation and co-creation of new concepts such as FLR (Chazdon et al., 2020).

Earlier experiments with tree planting had already taken place in Madagascar in the early 1900s (Mansourian et al., 2016), but these were essentially plantations for timber supply. The World Bank initiated a 100,000ha pine plantation in the 1950s, with the intention of providing wood for a pulp and paper mill. Of this, 60,000ha remain today that are managed by Fanalamanga and 29,000ha are managed by the sawmill of Betsileo (UNIQUE, 2016). As early as the 1920s eucalyptus plantations were established to provide wood for the railways. This plantation continues to provide charcoal to the capital city, Antananarivo (Ibid.).

Co-management contracts with local communities empower them to restore forests.

7.3 Implementation

Beyond Fandriana-Marolambo

Policy and legislative framework

There are several legal texts for the forest sector in Madagascar that are relevant to FLR. With support from the World Bank, Madagascar developed a National Environmental Action Plan in 1989; it was renewed three times, terminating in 2010. It not only emphasized forest protection but also sought to address the underlying drivers of deforestation, a first step toward restoration. The National Development Plan (2015–2019) emphasized a new vision for Madagascar based on its immense natural capital and included a focus on improving watersheds, managing forest and reforesting 5,000ha, as well as restoring 35,000ha by 2019. The Forest Policy of 1997 focuses on better engagement of rural populations in the management of natural resources (through co-management arrangements), control of fire and protection. It also emphasizes the need to tackle drivers of degradation and to expand forest cover. Madagascar has embraced REDD+ and sees it as an essential source of financing for restoration activities. Thus, the country's REDD+ strategy aims for a 14 per cent reduction in greenhouse gas emissions through an expansion of its forest cover and control of deforestation and forest degradation (Republic of Madagascar, 2018).

In 1996, Madagascar developed the local land-management law, entitled GELOSE (“gestion locale sécurisée”), to devolve management of natural resources to the local level (Kull, 2002). It was complemented in 2001 by the GCF (“gestion communautaire des forêts”), which defines co-management contracts for state forests, and the decree that provided for the legal creation of grassroots communities managing renewable natural resources (Mansourian et al., 2014).

Madagascar developed a national restoration plan.

In 2017, Madagascar developed a national restoration plan (published in 2019) – the National Strategy on Forest Landscape Restoration and Green Infrastructures in Madagascar – and, in 2018, defined spatial priorities for restoration (MEEF, 2019).

Other sectors that influence forest restoration in Madagascar include the agriculture, energy and mining sectors. For example, the Energy Policy seeks to ensure regular reforestation in order to manage the country's charcoal and fuelwood needs. Thus, it includes an annual reforestation target of 35,000–40,000ha (UNIQUE, 2016). The mining sector has been a significant player in restoration/rehabilitation in the

country; for example, the mining company QMM⁹ reported in 2020 that it has planted 400,000 fast-growing trees in the Mandena area in the south of the island since 2009 (QMM, 2020).

Tenure

Except for about 260,000ha, all forests in Madagascar are state-owned (FAO, 2020). However, through co-management arrangements initiated in the 1990s, communities play an increasing role in forests and are entitled to some uses according to the GCF legislation (see above).

In practice, local customary rules and practices exist that determine how land is used (Ranjatson et al., 2019). State and other external interventions and legislation that are not responsive to local needs often lead to conflict, which is reflected frequently in the over-use of fire in land management (Kull, 2002). The history of reforestation, restoration and FLR in Madagascar mimics that of conservation, with the input of outside experts carrying excessive weight in the decision-making process.

The overlap between community forests and permits granted for the exploitation of mines or oil has also been identified as a problem (Republic of Madagascar, 2018).

Category of tenure	1,000s ha
Private	260
Public	12,101.66
Unknown	134.23
Total	12,495.89

Source: FAO, 2020 (data for 2015)

Table 7.4: Forest tenure

Stakeholders

At the level of FM, local communities were significant stakeholders, with 100 different villages engaged in the project over the 13 years (Mansourian et al., 2018). A total of 35 community groups were organized (COBAs – “communautés de base”) to officially engage in co-management of the forest. Restoration was inserted in the plans developed at the level of the COBAs. The 35 COBAs, in turn, were gathered under one umbrella federation that was able to represent them at official meetings. At the community level, the project paid particular attention to engaging elders and regional chiefs, whose role and influence at the level of the community is essential. Mayors (elected officials at the level of the commune, typically representing a dozen villages/fokontany) played a crucial role as a bridge between the local populations and the project, and thanks to them, the project was inserted into 14 communal

⁹ Rio Tinto QIT Madagascar Minerals – 80% owned by Rio Tinto, and 20% by the government of Madagascar.

development plans (Ibid.). Public-sector representatives were made up of local extension officers and representatives of the environment sector. In the 2008–2010 period, a working group was established that was composed of ministerial representatives and other bodies working in the landscape.

Because the Marolambo National Park was in the process of being laid out within the landscape, Madagascar National Parks was an important stakeholder as well. Other Malagasy organizations that were brought into the project include, for example, the Madagascar Savings Bank (Caisse d'épargne de Madagascar), which was brought in to emphasize the value of microcredit as an option to support local farmers (Ibid.).

Beyond Fandriana-Marolambo

The public sector has more recently engaged in FLR.

The **public sector** has more recently engaged in FLR, in particular since the 2011 Bonn Challenge and Madagascar's commitment in 2014 of 4 million hectares. Although a national-level working group on FLR had already been created in 2003 (Mansourian et al., 2016), it eventually ceased meeting and was only re-energized in 2016. The Environment and Sustainable Development Ministry (MEDD) and the Environmental Governance Department (DGGE) are the national leads on FLR. Their regional representatives – the Regional Environment and Sustainable Development Departments – are responsible for reforestation/restoration at the regional level.

The Agriculture Ministry (MINAGRI) is responsible for agroforestry and reforestation to combat erosion and as such is an important actor in the rolling out of FLR and other restoration initiatives. The MEDD, in collaboration with the energy ministry, plans annual plantations of 40,000ha for several purposes, including fuelwood.



Raising awareness and mobilizing local communities for FLR.

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Furthermore, the ministry in charge of the economy and planning, the ministry in charge of land-use planning (MEPATE) and the ministry of the interior are all working to clarify tenure conflicts. Interministerial platforms are organized at the regional level via the regional chief to ensure coordination around cross-sectoral issues such as FLR (UNIQUE, 2016).

In a country like Madagascar, where local travel is highly challenging, national-level policymakers rely on their local representatives to enforce legislation. Yet, Kull (2002) highlights that in a decentralized context (and in remote locations), local-level forestry representatives often have limited means and may not be in a position to enforce legislation (e.g. related to fires).

Local-level stakeholders contribute to scaling up restoration.

Importantly, local-level stakeholders contribute to scaling up restoration. Traditionally, community customs and traditions related to land use regulated swidden agriculture, including the use of fire and fallow periods (Kull, 2002). However, as in many other locations, colonialism quashed these traditions, imposing a model that was not integrated by local communities, leading to resistance, conflict and, ultimately, mismanagement of natural resources. Reversing this trend is essential for large-scale forest restoration.

Fire suppression has been a cornerstone of conservation and government approaches in Madagascar, with little to no effect (Kull, 2002). Fire was criminalized during colonial rule (1895–1960) yet continues to be highlighted as the main direct driver of deforestation, demonstrating that despite 100 years of attempts to manage it, fire remains a challenge (Kull, 2002; Republic of Madagascar, 2018). Indeed, fire is a central land management tool for rural peasants and has also become a symbol of the political struggle of the peasantry against law enforcement agencies perceived to be outsiders.

Additional actors that have engaged in restoration in Madagascar are WCS, Conservation International and, more recently, GIZ. Major donors in Madagascar that have shaped the country's environment and forest sector include USAID, France, Germany, Switzerland, GIZ and the World Bank. USAID funded, for example, the 15-year environmental plans, while GIZ is active in the recent development of FLR in Madagascar. GIZ has also been involved in the charcoal supply chain since 1995 (UNIQUE, 2016).

Economic aspects

The four successive phases of the Fandriana-Marolambo project cost a total of approximately €1.6 million (US\$1.9 million – Mansourian et al., 2018). Raising funds specifically for the landscape after the first phase proved more difficult, with funding deriving from more extensive related programmes that were not perfectly aligned with the initial three-year project in the landscape. Nevertheless, the ambition of the project indicated that just three years of funding was unrealistic. In the end, WWF exited the landscape only after 13 years of funding, when it felt that local capacity was sufficient to pursue key activities developed with the local communities over the years. Thus, the FM programme lasted 13 years in total (and is far from complete), demonstrating the long-term nature of FLR.

Raising funds specifically for the landscape after the first phase proved more difficult.

Legislation and policies are in place to support Madagascar's aim to scale up restoration.

7.4 Sustaining factors

Legislation and policies exist that support Madagascar's objective to scale up restoration. The 2015–2025 National Biodiversity Strategy and Action Plan (NBSAP) under the CBD has adopted the Aichi target to restore 15 per cent of degraded ecosystems (Ministère de l'Environnement, de l'Ecologie, de la Mer et des Forêts, 2015). More concretely, the intended nationally determined contribution prepared under the UNFCCC in 2016 highlights as targets the restoration of 35,000ha of mangrove and primary forest by 2020, 45,000ha of forests by 2025 and 55,000ha of forests and mangroves by 2030. In total, it plans to restore 270,000ha of forests with indigenous species (Republic of Madagascar, 2015). The UNCCD targets for land degradation neutrality are more ambitious, set at 400,000ha per year by 2025 through "green infrastructure" (UNCCD website).

Yet, at the field level, there is a need to work closely with communities and ensure that their needs are met before seeking to alter their livelihoods. Without the full participation of communities, restoration – and indeed FLR – cannot succeed, whether in the short or the long term.

Securing long-term financing for FLR is central to Madagascar's national FLR strategy. The strategy regards FLR as a long-term investment rather than as necessitating short-term aid funding.

7.5 Key findings and lessons

Though its biodiversity is highly unique, Madagascar is classified as one of the low development countries according to the UN. It is particularly vulnerable in the face of climate change. Some key findings and lessons from this case study are:

1. Tackling some underlying drivers of forest loss and degradation is a priority in Madagascar; yet it is a complex process that has not been resolved to date. New plans and strategies, often imposed from above, may not be the solution to halting forest loss and inducing a fuller engagement in restoration or FLR.
2. Co-management arrangements for forests have shown some success in Madagascar and can provide a solid foundation for the expansion of both forest conservation and restoration interventions.
3. Integrating top-down and bottom-up approaches where lessons from pilot projects can be scaled up is an effective way of testing complex approaches such as FLR.
4. Madagascar has multiple strategies related to restoration, but with limited visible results on the ground. Field projects, such as the one in FM, can provide a way of connecting with local communities, responding to their needs, engaging with them and ultimately demonstrating that FLR can be a viable option and make a difference on the ground. These initiatives can then be scaled up gradually, building on successes and lessons learned.

Co-management arrangements for forests have shown some success in Madagascar.

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Case study 8:

Viet Nam

Heaven's gate mountain landscape, Sapa, Viet Nam.

8.1 Overview

Forest cover increased from 43% in 2010 to 47% today.

Viet Nam’s forest cover was significantly affected by the Indochina wars, which led to the deforestation of 5.7 million hectares between 1943 and 1995 (Tuynh and Phuong, 2001), with much of the remaining forest degraded. Population redistribution initiated after the end of the war put additional pressure on forested zones. Despite significant numbers of trees being planted between the 1950s and 1980s, researchers (e.g. De Jong and van Hung, 2006; Sikor and To, 2014) have highlighted that a lack of technical capacity and inappropriate species (not adapted to local conditions) have led to low survival rates. Since the 1990s, however, the country has seen a significant increase in forest cover, which has made it the subject of much attention and research. Although the approach selected by the country does not strictly adhere to the FLR approach (and predates it), there are some similarities with FLR, as illustrated in **Table 8.2**.

By 1990, 9,363,000ha were forested in Viet Nam, which was down from 14.3 million hectares in 1943, prompting the government to launch Programme 327, aimed at “re-greening the barren hills”. By 2015, 14,061,860ha, or 45 per cent of the country, was classified as forest; today, an estimated 47 per cent is forest.

The country’s forests are divided into three categories: protection forests serve to protect water and soils; special-use forests may be designated for nature protection, cultural values or tourism, for example; and production forests are managed to supply timber and non-timber forest products. The area that is protected for biodiversity has steadily increased from 600,000ha in 1990 to an estimated 2,115,190ha in 2020 (FAO, 2020). The decree on special-use forests was formulated in 2010 and applied to forests with a special value related to the conservation of “nature, standard specimens of national forest ecosystems and forest gene sources; scientific research; protection of historical-cultural relics or scenic places, relaxation and tourism in combination with protection, contributing to environmental protection” (Decree No. 117/2010/NĐ-CP; see Viet Nam legal website).

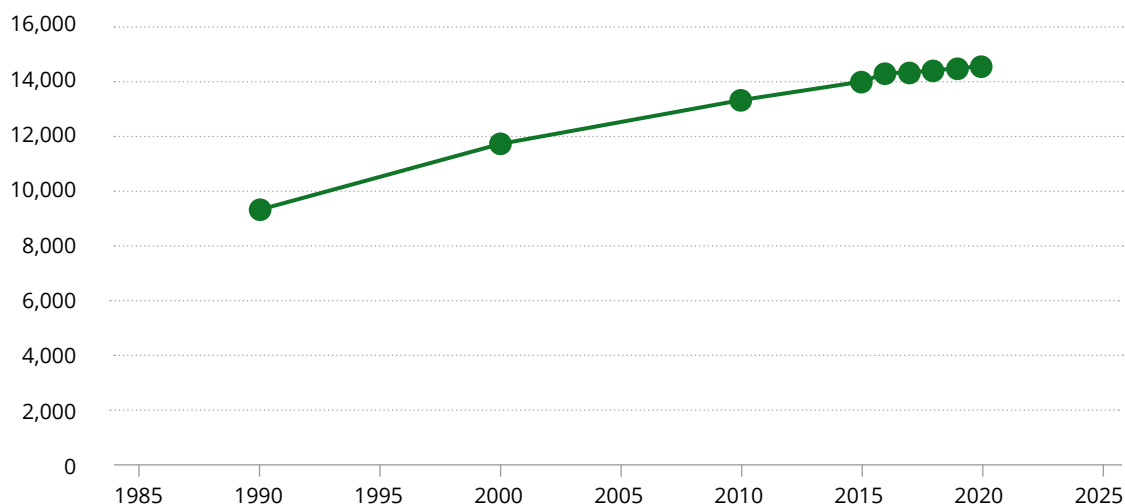
Total country area (million ha)	31.077		
Bonn Challenge commitment	N/A		
ROAM-identified potential for restoration (in Quang Tri province)	54,000 ha (or 11% of the total area of the province)		
Annual reforestation (2015–2020)*	241,300 ha		
	2010	2015	2020
Area forest (million ha)	13.388	14.061	14.643
% forest cover	43%	45%	47%

Source: FAO, 2020

Table 8.1: Overview profile Viet Nam

* Choi et al., 2019

Viet Nam forest cover (1,000s ha)



Source: FAO, 2020

Figure 8.1. Forest cover change

According to government data submitted to the FAO for the 2020 Forest Resources Assessment (FRA), active reforestation over the 2015–2020 period amounts to 241,300ha per year. Although the country is undergoing a clear forest transition, forest loss and degradation continue in some regions, particularly in the Central Highlands and Southeastern Region (Cochard et al., 2017). The role of the logging ban in supporting the expansion of forest cover in Viet Nam is unclear and may be underestimated (Meyfroidt and Lambin, 2009).

Viet Nam has not committed to the Bonn Challenge. Nevertheless, an IUCN-led ROAM process was carried out in the province of Quang Tri, one of the three provinces identified with the highest rates of deforestation and forest degradation, along with Binh Phuoc and Lao Ca (Van Khuc et al., 2018). Through this process, a total of 54,000ha were identified as being available for potential restoration (Rizzetti et al., 2018).

Seedlings being produced from plant tissue culture through micropropagation at the nursery at Tien Phong Forestry Company, Huong Thuy Town, Viet Nam.



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Principle	Translation to Viet Nam
1. Focus on landscapes	A nationwide perspective drives the country-led massive reforestation programme.
2. Engage stakeholders and support participatory governance	Stakeholders are engaged to the extent that they are paid to reforest. Land reallocation and incentives have helped to engage rural stakeholders.
3. Restore multiple functions for multiple benefits	Through the identification of three different categories of forests (protection, special-use and production) restoration conforms with multiple functions.
4. Maintain and enhance natural ecosystems within landscapes	In the case of protection forests, restoration is carried out with indigenous species.
5. Tailor to the local context using a variety of approaches	Protection forests are identified based on the topography, relationship to watersheds and wider ecosystem services that they offer.
6. Manage adaptively for long-term resilience	While reforestation is focusing on ecosystem services, species diversity appears to be limited.

Table 8.2: Link between implementation in Viet Nam and the FLR principles

8.2 Motivation

Viet Nam’s famed political leader, Ho Chi Minh, said in 1963 that “forests are gold, If we know to protect and develop them well, they will be very precious” (McElwee, 2016). Yet, over the course of the two major wars suffered by the country (1945–1954 and 1961–1975), more than 5 million hectares of forest were lost (Thuynh and Phuong, 2001). Forest loss and degradation following the Viet Nam–US war exacerbated land degradation and low agricultural yields, which had a direct impact on famine and poverty. Indeed, the mass migration to cities following the war also contributed to rural land abandonment and significant food shortages (Desbarats, 1987). The World Food Programme (WFP) was a major actor in Viet Nam throughout this period (1970s and 1980s), providing significant support in terms of famine relief as well as the launching of tree-planting projects in an attempt to rehabilitate damaged land. The UN agency spent an estimated US\$500 million between 1974 and 2000 and helped to plant over 1 billion trees (Reliefweb website). Up until the mid-1980s, the country’s poverty levels were high, placing Viet Nam among the poorest nations, with an estimated 75 per cent of the population qualifying as poor (Klump, 2007). After the end of the war with the US in 1975, in an attempt to rebuild its economy, the country further exploited its forest base, leading to a vicious circle of more severe land degradation, agricultural precarity and poverty. Resettlement programmes were initiated, with the mass movement of an estimated 600,000 to 1 million people per year from the lowlands to the highlands (Desbarats, 1987). Three resettlement

Forest loss and degradation had a direct impact on famine and poverty.

The country's reliance on hydro-power for much of its energy was further affected by the loss of forest cover.

programmes and phases can be defined: the first (1975–1976) encouraged urban “refugees” to return to their villages, the second (1976–1980) created new economic zones and encouraged settlers there, and the third (1981–1985) was marked by the rural development programme. However, deforestation contributed to making the land poor for agriculture, leading to many failed crops.

The country's reliance on hydropower for much of its energy was further affected by the loss of forest cover. Overall, Viet Nam is considered one of the world's most vulnerable countries to extreme climate change (FAO, 2016). For example, floods in October and November of 1999 killed 600 people and were estimated to cause damages of US\$265 million (de Jong and van Hung, 2006).

This context prompted the government to launch a reform process, the “doi moi” (or renovation), in 1986 (Klump, 2007). Within this framework, the government initiated widespread restoration/reforestation starting in the 1990s. The loss of ecosystem services as well as unusually large-scale landslides and flooding intensified the desire to restore forest cover, which was formalized through Policy 327 on Re-greening the Bare Hills in 1992.

There is a symbolic (and patriotic?) value in the targets set by the government for increasing forest cover. Indeed, forest cover was estimated at 14.3 million hectares in 1943, representing 43 per cent of the country. As such, the target set under the 327 Programme was to return to this pre-war figure of 43 per cent forest cover.

In 1992, Viet Nam issued a landmark decision to re-green the bare hills.

8.3 Implementation

A complex governance architecture has characterized the forest sector in Viet Nam since the 1990s. Several policies and agencies intervene to support this sector, particularly its large-scale reforestation and restoration drive, which was initiated in the early 1990s.

Policy and legislative framework

Choi et al. (2019) identify four policies that have had the most impact on restoration in Viet Nam: 1. the Land Law and its multiple revisions (1993, 1998 and 2013), which provides the basis for allocating land rights to private stakeholders (see **subsection on tenure**); 2. the Law on Forest Protection and Development (1991), designed to classify land and define rules for forest protection; 3. the three decisions related to increasing forest cover, i.e. Decision 327 (1992), Decision 661 (1998) by the prime minister, and the National Action Plan on Forest Protection and Development (2012) for the period 2011–2020; and 4. Decision 187 (1998) by the prime minister to reform the State Forest Enterprises (SFEs).

A partial logging ban was instated in 1992 – barring the export of roundwood, sawnwood and rough-sawn flooring planks – which was then gradually expanded (Thuynh and Phuong, 2001).

The 2011–2020 Green Growth Strategy includes a target of 45% forest cover through afforestation and reforestation

The 2011–2020 Green Growth Strategy, which contains targets concerning the reduction of greenhouse gas emissions, also includes a target of 45 per cent forest cover by 2020. It seeks to implement “afforestation and reforestation projects, encourage enterprises to invest in production forests to increase forest coverage to 45 per cent by 2020, improve forest quality, enhance carbon sequestration capacity by forests and increase standing biomass and secure timber production and consumption” (Socialist Republic of Viet Nam, 2012).

The three national reforestation/restoration programmes (Decisions 327 and 661 and the National Action Plan on Forest Protection and Development) were established to return tree cover particularly in the highlands and in areas that were considered barren. Many of these “barren” areas were, in fact, open access, and therefore provided important livelihood resources for poor rural communities (McElwee, 2009). The main aims of these programmes have been to rehabilitate degraded land and hills, protect existing forest areas, and promote natural regeneration and forest plantations (de Jong and van Hung, 2006). However, before 1995, much of the funding for “restoration” was allocated to SFEs for plantation forestry (using fast-growing exotic acacias and eucalyptus species), with minimal impact on forest cover and quality (Ibid.). After 1995, the target group for implementing the programme was modified, in tandem with the reforms in land allocation under the revised Land Law of 2003. The focus of Programme 327 shifted after 1995 from production forest to protecting critical watersheds in the protection and special-use forest category, i.e. in mountainous areas in the Northern and Central Highlands. Farmers became significant actors in the process at this stage. Agroforestry that mixed indigenous and exotic species (in a 40:60 ratio) was promoted (Nguyen and Gilmour, 1999).

Under the 661 Programme, 2 million hectares were to be for protection and special-use forest (1 million for natural regeneration and enrichment planting, and 1 million for protection forests in sensitive areas such as watersheds) and 3 million hectares were to be for production (2 million for industrial plantations of acacia, bamboo, pines and eucalyptus, with some special-purpose and high-value species, and 1 million for commercial cash crops such as rubber, tea, coffee, medicinal plants and fruit) (Ibid.).

The decree on payments for forest ecosystem services represents a mechanism for ensuring that providers of forest services are compensated.

Households were given several **incentives** to participate in restoration/reforestation (Choi et al., 2019), including being paid daily wages to participate and plant. Tax incentives were granted to those planting trees on denuded hills and fallow land. In 2003, farmers with less than 30ha engaging in tree planting were exempted from paying the agricultural and land-use tax. Larger operators saw a 50 per cent reduction in the tax (de Jong and van Hung, 2006).

The decree on **payments for forest ecosystem** services was promulgated in 2011 and represents an important mechanism for ensuring that providers of forest services are compensated (Decree 99/2010/ND-CP; see Viet Nam legal website).

Overall, a diversification of the economy (including toward manufacturing and industries) has led to a significant reduction in land-based economic activities. The forest sector, for example, accounted for 8.57 per cent of GDP in 1990, 5.5 per cent of GDP in 1995 and only about 1.4–1.7 per cent of the national GDP since 2000 (FAO, 2016).

Tenure

In Viet Nam, the land is officially owned by the people and is managed by the government on their behalf.

Category of tenure	ha
Public ownership	9,221,500
Private ownership	4,497,910
...of which owned by individuals	3,145,470
...of which owned by private business entities and institutions	241,630
...of which owned by local, tribal and indigenous communities	1,110,410
Unknown ownership	342,450
Total forest	14,061,860

Source: FAO, 2020 (data for 2015)

Table 8.3: Forest tenure

The government first nationalized forests after independence, but since 1995 it has pursued a gradual allocation of rights (e.g. use, management, etc.) to communities (Thuynh and Phuong, 2001). Viet Nam recognizes eight forest tenure groups: 1. households and individuals; 2. communities; 3. protection forest and special-use forest management boards (state bodies responsible for the conservation of protection forests and special-use forests); 4. state-owned forest companies (SFCs, which used to be SFEs); 5. other economic entities; 6. the armed forces; 7. communal people's committees' and 8. others (e.g. organizations involved in forestry-related scientific research and technological development, and training) (FAO, 2016).

The above data for 2015 (**Table 8.3**) from the FAO FRA report shows a public-to-private split of 66 per cent to 32 per cent, with a further 2 per cent of unknown ownership. By 2013, almost 9 million hectares of state forestland had been allocated to private owners (households, communities and economic entities) (Phuc et al., 2013). However, other estimates suggest that by 2014 approximately 1.4 million households had received a total of 3.4 million hectares of forestland (To and Dressler, 2019).

The Land Law of 2003 marked a turning point in communities' rights to land.

The Land Law of 2003 marked a turning point in communities' rights to land. It defined a range of rights and encouraged allocation of forestland to communities, with the intention of ensuring that those closest to the forest could be empowered to plant trees, manage the forest and benefit from it. This applied to the forest categorized as production forest (Phuc et al., 2013). According to this law, communities' rights of forest ownership are for 50 years, assuming they adhere to the respective government regulations (Ibid.). Such rights can be transferred, inherited, mortgaged or leased (Thuynh and Phuong, 2001). Households were provided with up to 30ha in these less critical areas (generally land under the production forest category – Phuc et al., 2013), whereas the more sensitive areas (e.g. watersheds) that fell under the

protection or special-use categories were allocated to state organizations (e.g. the forest management board). These state enterprises could then, should they wish, enter into contractual arrangements with households to manage the forest. The state body would pay households to carry out contractual obligations (such as tree planting), akin to a payment for an ecosystem service. Rights differ based on whether the forest is defined as production, protection or special-use, but in all cases, the sale of the forest is not allowed (Ibid.). Land allocation has led to some conflicts, notably because it has favoured stronger economic groups over more marginalized groups that may have long-term claims to the land or forest (Ibid.).

Management by local people appears to be more effective than by other stakeholders.

In practice, there remain some overlapping forest tenure arrangements; for example, areas that are formally under state management but in reality are treated as common property. Nevertheless, based on experience, it would appear that management by local people is more effective than by other stakeholders (Nguyen, 2005). There have also been some issues with land use right certificates (known as “red books”), whose issuance has been slow and complicated. Furthermore, although local communities may be granted improved rights, they are not given the power to determine how to manage the forest and to establish their own rules. Instead, they have to follow the rules laid out by the government. Lack of capacity and the complexity of procedures for land allocation has led to elite capture (Phuc et al., 2013).

In terms of tree tenure, a bias toward exotic species remains. While indigenous trees are the property of the state (Nguyen and Gilmour, 1999), exotic species can be disposed of by the community. Thus, under the 327 Programme, farmers were entitled to two-thirds of the products from non-native trees planted (Ibid.).

Forestry agencies in Viet Nam can be found at four different administrative levels: national, provincial, district and communal.

Stakeholders

Public-sector forestry agencies in Viet Nam can be found at four different administrative levels: national, provincial, district and communal. At the national level, forests fall under the Ministry of Agriculture and Rural Development (MARD), which has two forest departments: the VNFOREST (Viet Nam Administration of Forestry) and the Forest Protection Department (de Jong and van Hung 2006). The next level is the provincial level, within which the representative of the MARD can be found: the Department of Agriculture and Rural Development (DARD) (World Bank, 2019) operating under the Provincial People’s Committee (PPC). The Sub-Department for Forest Protection and the Sub-Department for Forestry can be found under DARD (FAO, 2016). Then, at the district level, the Economics Division on Agriculture and Rural Development falls under the District People’s Committee (DPC), with a Forest Protection Unit operating in some districts. At the lowest level, though forested communes are expected to recruit forest employees (commune forest rangers), budgetary constraints mean that, in practice, this is rare (de Jong and van Hung 2006). The all-important Land Law falls under the Ministry of Natural Resources and Environment, which is in charge of the state administration of land. In some cases, several communities may also regroup under a hamlet with a head of hamlet representing the people from the community. These, however, are not administrative units, but rather representatives of the local population.

The provincial level was key in carrying out restoration work.

State forest enterprises (SFEs) were initially major actors in forest exploitation. Starting in the 1990s, however, their mandate was broadened to include forest protection, and some became State Forest Companies (SFCs), while others repurposed to become Forest Management Boards (MBs) (To and Dressler, 2019).

The provincial level was the most important in terms of the 327 Programme, as the government at this level was responsible for working with households to carry out the restoration work. Projects were to be formulated by the provincial government on 5,000–10,000ha, and households were each allocated a part of that project area. State farms and forest enterprises also carried out much of the restoration/reforestation work under this first programme (Nguyen and Gilmour, 1999).

Development partners played an influential role in the 5MHRP via the Forest Sector Support Programme and Partnership (FSSP), which was launched in 2001 and brought together 18 international partners (Choi et al., 2019).

Households were granted rights to land and forest with the responsibility to plant trees.

Private

In 2005, an estimated 25 million people were living in or near forests and therefore were very much dependent on goods and services from the forests (de Jong and van Hung, 2006). The role of communities and households in the restoration/reforestation programme of Viet Nam is significant. Through the land law, households were granted rights to land and forest along with the responsibility for planting trees, albeit under different sets of conditions depending on whether the land was a protection, special-use or production forest.

A benefit-sharing scheme ensures that communities are duly encouraged to protect and restore forests. When households sign contracts with a public forest owner, they are obliged to protect forests categorized for protection and special-use, but they are allowed to collect fuelwood and NTFPs under the forest canopy (Hidayat 2018).

Viet Nam has 54 ethnic minorities (Dang, 2012) that originate from rural and remote highland areas. These communities have strong traditions and traditional rules that determine how to use the forest. Here, customary tenure systems dominate, often leading to clashes with authorities or between villagers (FAO, 2016). Researchers have highlighted that the majority ethnic group (the Kinh) have been favoured in the land allocation process (Phuc et al., 2013).

Economic aspects

Viet Nam's forest sector has relied to a large extent on overseas aid, with Viet Nam being among the top 10 recipients of ODA in the world (OECD website). Major donors include Finland, Germany, the Netherlands, Sweden and Switzerland. The FSSP was established by donors as a means of supporting Viet Nam's forest sector. Estimates of annual amounts spent on restoration/reforestation vary from US\$11 million to more than US\$100 million (Table 8.4).

Viet Nam's forest sector has relied to a large extent on overseas aid.

Payments for forest environmental services (PFES) were launched in 2010. The decree on PFES initially set an amount of VND50,000 (US\$2) for the protection of 1ha of the forest, but this figure has since increased and was noted to be VND480,264 (US\$21) per hectare as of 2015 (Rizzeti et al., 2018). The scheme identifies three services provided by forests – water regulation, soil conservation and landscape aesthetics – and connects service providers with service users (e.g. hydro-electricity or water companies). The transaction is managed via a national fund (the Viet Nam Fund for Forests) and then transferred to a provincial fund before reaching service providers, with each fund taking a share of the payment along the way (To and Dressler, 2019). An estimated 506,298 households received payments over the 2011–2015 period. In 2015 alone the scheme covered 7,326ha of natural forest and 751ha of plantation forest for watershed protection. (Rizzeti et al., 2018).

Period	Amount	Source
1993	US\$11.7 million	Nguyen and Gilmour, 1999
1995	US\$56.4 million	Nguyen and Gilmour, 1999
1996	US\$43.6 million	Nguyen and Gilmour, 1999
1993–1998	VND2,987 billion (US\$200 million)	Nguyen and Gilmour, 1999
2005	US\$95 million in ODA US\$225,000 in government spending	FAO 2016
2010	US\$85 million in ODA US\$216,000 in government spending	FAO 2016
2006–2010	Total investment capital for forest restoration was VND18,196 billion (US\$786 million)	FAO, 2016

Table 8.4: Varying estimates of funding for restoration/reforestation

Viet Nam sees REDD+ as a significant opportunity for funding. In 2010 it developed a REDD Readiness Preparation Proposal (Pham et al., 2015) and a National REDD+ Steering Committee was established in January 2011. In June 2012 the prime minister of Viet Nam approved the “National action program on reducing greenhouse gas emissions through efforts to mitigate deforestation and forest degradation, sustainable management of forest resources, and conservation and enhancement of forest carbon stocks” (Pistorius, 2015).

**Viet Nam
sees REDD+
as a significant
opportunity to
fund restoration.**

8.4 Sustaining factors

Forest policy in Viet Nam continues to be guided by the desire to increase forest cover (to 45 per cent by 2030). Reports and plans by Viet Nam under all three Rio Conventions refer to forest restoration. Under the CBD, the National Biodiversity Strategy and Action Plan (NBSAP) refers to the restoration of 15 per cent of degraded critical ecosystems by 2020. In its intended nationally determined contribution to the UNFCCC, Viet Nam has committed that by 2030 it will reduce greenhouse gas emissions by 8 per cent, including through reaching a 45 per cent forest cover target. In its 2002 report to the UNCCD, Viet Nam noted already that afforestation and forest restoration on barren hills “is among the highest priorities in Viet Nam” (Socialist Republic of Viet Nam, 2002).

A trust fund for forests was established in 2004 to channel funding to the forest sector. Between 2006 and 2013, it approved €33.89 million (US\$39.7 million) for 34 projects and activities. This fund was merged with the Viet Nam Forest Protection and Development Fund as of 2013 (FAO, 2016).

In light of the focus on payments for ecosystem services, the value of services such as mangroves for coastal protection has increasingly been recognized. Tran and Tinh have estimated the cost of restoring 12,000ha of mangroves at US\$1.1 million; this was considerably offset, however, by its helping to reduce the cost of dyke maintenance by US\$7.3 million per year (cited in Buckingham and Hanson, 2015).



*A local harvesting team,
trained by the Forest
Stewardship Council,
working in Phu Loc
district, Viet Nam.*

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8.5 Key findings and lessons

The long-term experience in Viet Nam highlights some lessons for upscaling restoration:

Loss of ecosystem services, climate change vulnerability and over-exploitation of forests have led to major reforestation initiatives in Viet Nam.

1. Two major issues triggered the large-scale reforestation initiatives in Viet Nam:
 - i. Significant loss of ecosystem services, associated with a recognition of the country's frailty in the face of climate change impacts;
 - ii. A recognition that economic exploitation of the renewable resource base was ineffective and depleting the forest faster than it could regenerate.
2. Allocation of land rights starting in the early 2000s was a major tool for implementing the programme(s) and generated better results than public efforts until then.
3. A complex set of incentives, both material (e.g. financial incentives) and non-material (e.g. enhanced clarity of tenure), served to support the restoration/reforestation effort.
4. Payments for ecosystem services, implemented in Viet Nam via a central fund, have shown mixed results, with some researchers considering them a major success, and others (e.g. Nguyen and Vuong, 2016) highlighting the risks of non-additionality, leakage, inequity and corruption, among others (To and Dressler, 2019). Furthermore, due to the complexity of social, political and environmental factors associated with the payment schemes, attribution of cause and effect is very difficult.

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Case study 9:

Espírito Santo State

(Brazilian Atlantic Forest)



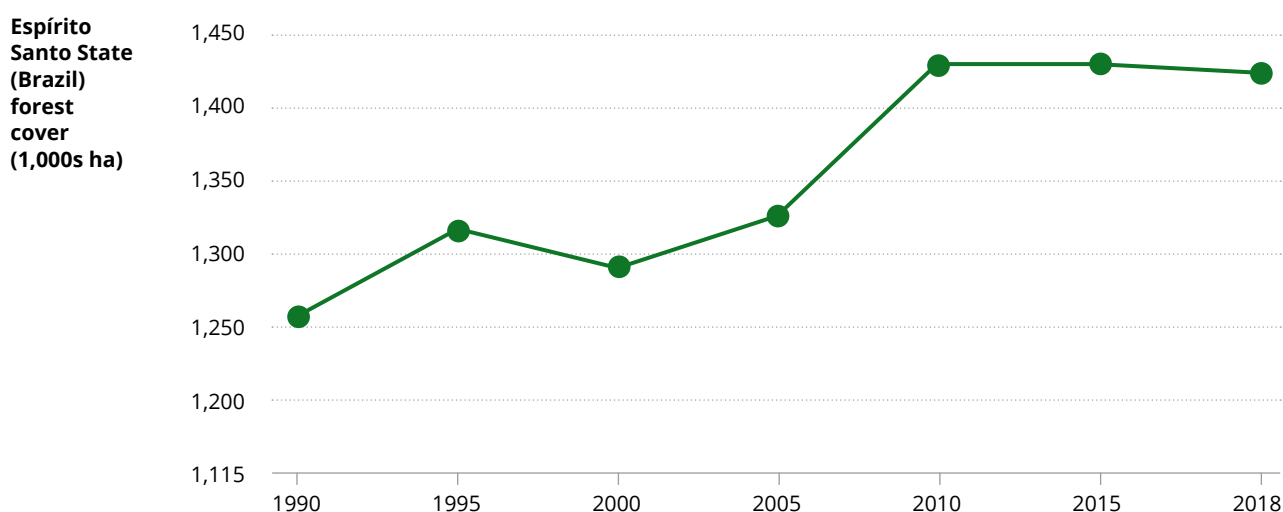
9.1 Overview

This case study focuses on the 4.6-million-hectare state of Espírito Santo in south-eastern Brazil, which contains part of the Atlantic forest. An estimated 3.5 million people depend on the ecosystem services provided by forests in Espírito Santo (WRI website). It is estimated that in 1500, 87 per cent of the state was covered by the Atlantic forest, a figure which dropped to its lowest in 2005 at just 8 per cent (Kissinger, 2014). The state has been engaging in forest restoration since 2008, with a focus on restoring water and soil quality. After a drop in forest cover between 1995 and 2000, a recent (2018) study comparing forest cover in the 2007–2008 period with that of the 2012–2015 period observed that forest cover had increased by 0.6 per cent, bringing it up to 15.9 per cent in total (Estado de Espírito Santo, 2018). Overall, while forests under the initial stages of regeneration dropped slightly, native forest cover increased by 0.6 per cent and eucalyptus plantations increased by 1 per cent (see Table 9.1). The forest is highly fragmented, with an estimated 72,989 fragments according to the same source, the majority of which (82 per cent) are fragments under 5ha.

Total area of Espírito Santo State (million ha)	4.6		
Bonn Challenge commitment	80,000ha (20,000ha planted and 60,000ha through natural regeneration)		
ROAM-identified potential for restoration	42,173ha		
	2010	2015	2018
Area forest (million ha)	1.431	1.431	1.424
% forest cover	31.06%	31.07%	30.92%

Source: mapbiomas.org

Table 9.1.: Overview profile Espírito Santo State (Brazil)



Source: mapbiomas.org

Figure 9.1.: Forest cover change

Espírito Santo is home to some of the last remnants of the unique Atlantic Forest. Vast areas of the territory have been converted to pasture and some eucalyptus plantations can also be found here.

The state of Espírito Santo committed to restoring 80,000ha of forest under both the Bonn Challenge and the Initiative 20x20. Out of this total, 20,000ha will be achieved through the implementation of PES schemes, while the remaining 60,000ha will be composed of areas under regeneration and legal protection (based on a land cover monitoring system). This target is low compared with the state's objective to increase forest cover by 235,000ha by 2025 in order to comply with the national forest code (Benini et al., 2016). The main restoration project, Reflorestar, is funded by a PES scheme.

Principle	Translation to Espírito Santo
1. Focus on landscapes	Large-scale planning, connectivity in the landscape to reduce fragmentation.
2. Engage stakeholders and support participatory governance	Landowners are engaged via PES schemes.
3. Restore multiple functions for multiple benefits	Several ecosystem services have been identified (but only water is paid for).
4. Maintain and enhance natural ecosystems within landscapes	Combination of protection, management and restoration within the landscape, including an emphasis on connectivity and natural regeneration.
5. Tailor to the local context using a variety of approaches	The focus is on payments, but the payment schemes reflect different implementation approaches.
6. Manage adaptively for long-term resilience	Evolution of forest policies stem in part from the need to adapt. Conservation of water resources that are in critical areas is key to social and ecological resilience.

Table 9.2: Link between implementation in the Espírito Santo State (Brazil) and the FLR principles

The prime motivation for engaging in restoration has been the risk to its water supply.

9.2 Motivation

The prime motivation for engaging in restoration in the state of Espírito Santo has been the risk to its water supply, which is key not only for domestic use but also for industry and agriculture. The state capital, Vitória, obtains almost 40 per cent of its water from the watershed of the Santa Maria da Vitória River, and degradation of the watershed has caused a sharp increase in water treatment costs (Pagiola et al., 2019). In the last two decades, the average turbidity levels almost doubled (Ibid.). Furthermore, two hydroelectric plants (Rio Bonito and Suíça) are impacted by this increase in sediment load, as is the port of Vitória (Ibid.). The city does not have a water reservoir.

A changing climate has exacerbated these concerns. In 2013, for instance, the state experienced flooding, followed by a significant reduction in rainfall, and in October 2015 the state declared a state of alert (Resolution 005/2015), leading to restrictions on surface and underground water use, notably in the agriculture and industry sectors, as well as the implementation of measures to encourage the population to reduce water consumption (SEAMA-ES, 2017).

Faced with the impacts (current and anticipated) of irregular water flow and sedimentation, coupled with legal obligations and a visibly changing climate, the state's response was a vast water fund and a PES scheme designed to involve private land-owners in large-scale forest restoration, the Reflorestar (“reforest”) programme.



Diverse and tree-rich landscape in the Brazilian Atlantic Forest.

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All private estates in Espírito Santo are required to maintain 20% forest cover.

9.3 Implementation

Sectors that have been affected by the loss of forest cover are primarily the coffee-growing sector, hydropower and water utilities.

Policy and legislative framework

Brazil's environmental legislation requires private properties to retain a fixed proportion of their total area under native vegetation – so-called “legal reserves” – which are set at 20 per cent in the state of Espírito Santo (Metzger et al., 2019; Pagiola et al., 2019) as it is part of the Atlantic Forest. At the national level, changes in the Brazilian Forest Code through Law No. 12,651/2012 and Law No. 12,727/2012 require rural landowners to conserve or recover vegetation located in permanent preservation areas (APPs¹⁰) and legal reserves (Benini et al., 2016). Furthermore, by law, Brazil is required to conserve riparian corridors as APPs and to maintain a minimum forest cover in each private estate (set at 20 per cent in Espírito Santo – Pagiola et al., 2019).

At the level of the state, the water law initiated in 1998 is key (Law 5,818, of 1998). It instated an integrated system for managing and monitoring water resources (SEAMA-ES, 2017), which was superseded by Law 10,179, of 17 March 2014, which reformulated the state policy on water resources.

By 2008, the state had already adopted a water fund and PES law and established the ProdutorES de Água programme. It was superseded in 2011 by the current Reflorestar programme (Pagiola et al., 2019). Reflorestar engages landowners in sustainable land-use practices – including expanding forest cover – to maintain and recover environmental services, mainly focusing on water but also on biodiversity (Diederichsen, 2017). A new (2016) PES Law (No. 10583) entrusts the state development bank (Banco de Desenvolvimento do Espírito Santo, BANDES) with the role of channelling funding from the scheme to landholders as well as overseeing the preparation of technical proposals and monitoring compliance. According to this 2016 PES Law, SEAMA will continue to set policy directions and will be responsible for assessing the overall impact of the programme (Pagiola et al., 2019).

Tenure

Land distribution in Brazil more generally is highly uneven (Reydon et al., 2015). The country lacks a single, integrated assessment of all public and private lands despite recent attempts to map these. Historically, since 1530 and until the first land law of 1850, land was transferred from the Portuguese crown to whoever occupied it and turned it into productive land (Ibid.). In 1850, land acquisition became the main legal means of obtaining land rather than occupation; nevertheless, the historical legacy of occupying land has remained and has led to a reluctance to demarcate and

¹⁰ APPs are protected areas, covered or not by native vegetation, with the environmental function of preserving water resources, the landscape, geological stability and biodiversity, facilitating the gene flow of fauna and flora, protecting the soil and ensuring the well-being of human populations (Embrapa website).



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Reflorestar programme landowners with their signed PES contracts.

register private properties, and a subsequent inability to clearly separate and demarcate public and private lands (Ibid.). Issues of land ownership, land appropriation and land consolidation have thus plagued Brazil since the mid-19th century, with many uprisings attributed to the problem of land concentration.

Since 2012, landowners can register their property boundaries in an electronic system.

Nevertheless, attempts to map land ownership via the Rural Environmental Registry (CAR) of the Brazilian Forest Law have been ongoing since 2012. Through a geodatabase, landowners can register their property boundaries directly into an electronic system to be validated by the state or federal government (Sparovek et al., 2019). This is an important step for landowners since they need to prove their ownership in order to participate in the Reflorestar programme. According to this land registry, land in the state of Espírito Santo was distributed across 133,000 properties as of 2018, with another 84,000 properties registered in 2019 alone. About three-quarters of the state has been thus formally titled, leaving a remaining 27 per cent currently untitled (Almeida et al., 2019). In terms of forest area, however, 638,000ha have been mapped, equivalent to 20 per cent of the area registered (Ibid.).

Stakeholders

Many actors were involved in the larger programme in some way or another. For example, the State of Espírito Santo Rural Research, Technical Assistance and Extension Institute (INCAPER) provided technical support to farmers in planning, diversifying and increasing their agricultural production. The World Bank and the Global Environment Facility (GEF) have provided support for the development of PES schemes in the state through a project entitled “Floresta para Vida” (Forests for Life) and for the development of a larger programme by the water utility company CESAN (Kissinger, 2014). NGOs are also a strategic partner for the state, including TNC, IUCN, WRI, CI and now WWF, among others.

The government of the state of Espírito Santo acknowledges the importance of its natural resources.

The government of the state of Espírito Santo acknowledges the importance of its natural resources. In its Vision 2025 plan it confirms that development strategies must combine economic benefits with the improvement of social and environmental well-being (Kissinger, 2014). The state development strategy has five objectives that include conserving and restoring the native Atlantic Forest in the State (including increasing native vegetation) (Ibid.).

Both the ProdutorES de Água programme and the Reflorestar programme were implemented by the State Environment Institute (Instituto Estadual de Meio Ambiente, IEMA), which is part of the State Secretariat for Environment and Water Resources (Secretaria de Estado de Meio Ambiente e Recursos Hídricos, SEAMA) (Diederichsen, 2017; Pagiola et al., 2019). A water fund, FUNDÁGUA, was established in 2008 (Law 8.960/2008) and reformulated in 2012 to transfer the payments. Initially it only focused on conserved forests, but in 2012 it was adapted to include restoration. It is partly funded by a 3 per cent levy on oil taxes paid to the state's IEMA (Kissinger, 2014; Pagiola et al., 2019).

Private landowners participating in the PES scheme have to develop a management plan, highlighting existing forest areas on their properties and areas to restore. While IEMA supported them in developing this plan under the ProdutorES de Água programme, NGOs and private companies have been more actively engaged in the Reflorestar programme. Their role has consisted of developing management plans, providing technical assistance and monitoring compliance, among other duties.

The Atlantic Forest Restoration Pact is a multistakeholder partnership to re-group the multiple restoration initiatives.

The **Atlantic Forest Restoration Pact** is a multi-stakeholder partnership that was formally established in 2009 in order to regroup the multiple restoration initiatives being carried out independently across this biome. It aims to restore 15 million hectares of land by 2050. Thus far it has convened more than 300 public, private and civil society entities engaging in restoration in the Atlantic Forest. One of the group's first activities was the production of a map to identify potential areas for restoration. It distinguishes, among others, areas that are of low agriculture value, areas best suited for natural regeneration and areas where landowners are compelled to restore the forest to comply with the 20 per cent legal requirement (Kissinger, 2014).

Economic aspects

At the core of the system in Espírito Santo is a payment for ecosystem services scheme that includes forest protection, natural regeneration, agroforestry, enrichment planting, and other activities that return forest cover for the benefit of soil and water conservation. Funding for the scheme comes from FUNDÁGUA, the state government and a series of partners (e.g. the development bank BANDES). Funding for FUNDÁGUA comes from a levy of 3 per cent on oil revenue, which amounts to US\$2 million per month (Kissinger, 2014).

It has been estimated that a total of BRL6 billion (US\$1.1 billion) would be needed over the next 22 years (as of 2017) just for the restoration of permanent preservation areas (APPs) in the state (SEAMA-ES, 2017).

At the core of the system in Espírito Santo is a payment for ecosystem services scheme.

Payments are offered to landowners for five types of interventions in addition to a payment for the ecosystem service generated:

1. Standing forest: up to 10ha per property can be considered;
2. Natural regeneration: payments include the acquisition of inputs to fence an area to allow it to regenerate;
3. Recovery with planting: payments are for the inputs needed to plant seedlings of species native to the Atlantic Forest;
4. Agroforestry systems: payments are for the inputs for agroforestry schemes that combine trees with crops such as coffee, cocoa, palm, banana and others;
5. Silvopastoral systems: payments are for the acquisition of inputs to implement systems that combine trees with pastures;
6. Managed forest: payments are for planting forest crops for forest management (without clearcut).

Private landowners participating in the Reforestar programme are compensated in one of two ways: where the revenue potential is short-term (e.g. agroforestry), payments are for three years with 50 per cent up front; where the payment is to cover the opportunity cost (e.g. restoration and protection), payments are for five years and renewable (Kissinger, 2014).



Reforestar programme landowner and a planted tree.

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The payment amounts per hectare are available on the website of the government of the state of Espírito Santo. Payments for inputs are provided for activities 2–6 above, while payments for the environmental service provided are rendered only for the first three. Payments vary from BRL204 to 241 (US\$35 to 42) per hectare for the environmental service, and from BRL2,600 to 8,600 (US\$457 to 1,500) for the inputs. Initially, under the ProdutorES de Água scheme, payments were set too low, making only conservation of existing forest attractive (Pagiola et al., 2013). A total of US\$6 million had been disbursed by 2017 to 2,587 properties for a total area of 21,675ha (Diederichsen, 2017).

Through forest restoration, water treatment costs can be reduced.

9.4 Sustaining factors

A 2011 analysis by Cedagro of the state's forestry sector, focusing essentially on eucalyptus plantations, identified that the sector generates about BRL5 billion (US\$880 million) per year in Espírito Santo – 25 per cent of the GDP of the state – and provides over 80,000 jobs (Benini et al., 2016).

Reflorestar seeks to promote a mix of land-use activities, including both restoration and agroforestry, that can generate revenue for landowners. Thus, while funding is provided to landowners for three years, after that period, income from sustainable land-use activities (agroforestry, silvopastoral systems and managed forests) is expected to take over (Kissinger, 2014).

Calculations made by IEMA for a 15ha farm suggest that with the support of the PES, farms can begin to generate revenue of BRL2,000 (US\$350) within three years, and up to BRL22,000 (US\$3,870) by the 10th year (Kissinger, 2014; Pagiola et al., 2019).

In terms of overall benefits to society in the broader state of Espírito Santo, the net present value of total benefits from conservation and restoration activities is estimated at about BRL18 million (US\$3.2 million) if turbidity is stabilized at current levels, and at about BRL25.8 million (US\$4.5 million) if it can be reduced to the levels of a decade ago (Pagiola et al., 2019). Of this amount about BRL13.5 million (US\$2.37 million) would benefit private landholders. The main beneficiary would be the water treatment facility that would be able to reduce treatment costs (Ibid.).



Reflorestar programme participant visiting a restoration area.

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9.5 Key findings and lessons

The case of Espírito Santo provides interesting insights into the role of payments for ecosystem services in promoting forest restoration.

1. Payments for ecosystem services schemes such as Reflorestar are complex and need refinement as they are implemented. Thus, Reflorestar builds on the previous scheme, and makes a distinction, for example, between payments simply for reforestation or payments for activities that can generate direct income, adjusting amounts accordingly.
2. Strong leadership emerged as an important success factor in Espírito Santo, coupled with a supportive public programme and legislation.
3. The quality of the state-level monitoring system contributes to the success of this case.
4. Land titling is a significant challenge affecting Brazil more widely, though it does not necessarily have to be a hindrance to PES schemes. Unclear tenure may be a limitation, however, to the long-term sustainability of conservation and restoration efforts.
5. Several actors (internal and external; private and NGOs) have contributed building blocks to the overall programme for restoration via PES. Thus, rather than following a simple model, the overall scheme has evolved over the years, with different components or actors filling identified gaps over time.



Forest landscape mosaic in the Atlantic rainforest, Socorro, São Paulo, Brazil.

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Case study 10:

Great Green Wall

for the Sahara and Sahel



10.1 Overview

The Great Green Wall brings together 21 governments to reverse land degradation in Africa.

The Great Green Wall (GGW) for the Sahara and Sahel was initiated in 2007 by 11 founding country members (Burkina Faso, Chad, Djibouti, Eritrea, Ethiopia, Mali, Mauritania, Niger, Nigeria, Senegal and Sudan – Goffner et al., 2019). Today it brings together 21 governments¹¹ from the northern part of Africa to reverse land degradation across the continent from east to west. The long-term aim of the programme is to restore 100 million hectares of currently degraded land by 2030, sequester 250 million tonnes of carbon and create 10 million jobs in rural areas (GGW website). While 21 countries are committed to the initiative, the Sahel countries are the most actively engaged in restoration, as they are situated straddling the humid savannah region to the south and the arid Saharan desert to the north and thus have the most at stake. Although originally the intention was to build a wall of trees across Africa, the aim of the GGW has become to “develop a mosaic of different land use and production systems, including sustainable dryland management and restoration, the regeneration of natural vegetation as well as water retention and conservation measures” (UNCCD, 2020).

Organizations and external partners involved in the GGW include the African Union, the GEF, the FAO, the French government, IUCN, the World Bank, CILSS, the EU, Kew Gardens, the Sahara and Sahel Observatory and the UNCCD, among others.

Total area	8,000 km across Africa
AFR100 commitment (million ha)	100
Identified potential for restoration *	166 million hectares (includes croplands, forests, wetlands and settlements, but not grasslands or other lands for which tree cover is not suitable)
Area restored to date (2020) **	4

Sources: GGW website

Table 10.1: Overview profile GGW

* Berrahmouni et al., 2016 ; ** UNCCD ; 2020

The emphasis of the GGW initiative is very much on “land restoration” (including agricultural fertility); although forest is a part of that, it is not synonymous with FLR. Nevertheless, the initiative provides an interesting case of a region-wide, transborder attempt to operationalize many of the FLR principles.

¹¹ Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Chad, Djibouti, Egypt, Eritrea, Ethiopia, Gambia, Ghana, Libya, Mali, Mauritania, Niger, Nigeria, Senegal, Somalia, Sudan and Tunisia.

The Sahara and Sahel Observatory, in reviewing forest resources in Benin, Burkina Faso, Ethiopia, Ghana, Mali, Mauritania, Niger, Nigeria, Senegal, Sudan, Chad and Togo, highlights that collectively they have dropped from 103 million hectares in 1990 to 77 million hectares in 2015, with only Ghana seeing an increase in its forest resources, at an annual rate of 0.3 per cent (OSS, 2019). At the same time, “planted forests” are reported (in FAO reports) to have increased in countries such as Burkina Faso and Niger.

We explore the initiative more broadly here, but with a specific focus on Niger as one of the countries that has made the most progress.

Niger lost about 40 to 50 per cent of its forest area between 1958 and 1997, although it suffers from a lack of a detailed forest inventory (MHE and FAO, 2012).

Principle	Translation to the GGW
1. Focus on landscapes	The landscape for the GGW is an 8,000km belt stretching across the African continent.
2. Engage stakeholders and support participatory governance	A wide range of stakeholders, particularly at national, regional and international levels, is engaged. Local stakeholders are involved at certain points when projects operating within the umbrella initiative are implemented locally.
3. Restore multiple functions for multiple benefits	The purpose of restoration in the GGW is to restore land productivity, reduce the impacts of climate change, and tackle food insecurity and poverty.
4. Maintain and enhance natural ecosystems within landscapes	Much of the drylands of the GGW countries are severely degraded. Restoration seeks to enhance these ecosystems so that they can be more productive.
5. Tailor to the local context using a variety of approaches	The GGW builds on local farming techniques and seeks to balance ecological and human needs.
6. Manage adaptively for long-term resilience	A predominant concern of the GGW has been both socio-economic and ecological resilience.

Table 10.2: Link between implementation in GGW and the FLR principles

The common motivation across the region to engage in the GGW was a loss of land productivity.

10.2 Motivation

While there are different motivations at the different national levels, the common motivation across the region to engage in the GGW was a loss of land productivity. The populations in the region are predominantly dependent on agriculture and/or livestock and thus on the natural resource base (Goffner et al., 2019). The idea of the GGW came into being because of declining production in the region. As forests and lands were being degraded, agricultural yields were declining and in some extreme cases leading to famines (as was the case in Ethiopia and Niger in the 1970s and 1980s). The loss of fertile land translated into the direct loss of livelihoods for a large proportion of already vulnerable populations in the Sahel region (Abasse and Adam, 2020).

Populations living in these zones are already frequently living in marginal and precarious situations, often living below the poverty line. Improving these areas via restoration was perceived as a means of addressing the multiple goals of reducing poverty and tackling environmental challenges, food insecurity and desertification, while addressing the impacts of climate change and other disasters.

Political will was a central driver of the GGW Initiative, with former Nigerian president Chief Olusegun Obasanjo championing the initiative starting in 2005 (UNCCD, 2020). The link between restoration and food security was further endorsed by the African Union at the Food Security Summit in 2007, marking the official starting point for the GGW Initiative.

The link between food security and restoration was endorsed at the Food Security Summit in 2007.

10.3 Implementation

The GGW was designed to support implementation of the countries' commitments under the main environmental conventions (MHE, 2011). In 2015, the AFR100 initiative was launched as a regional embodiment of the Bonn Challenge on FLR; it is also a major coordination body related to restoration in the region and to the GGW.

As a regional initiative, the GGW falls under the auspices of the African Union (AU), a continent-wide agency established in 2002 as a successor to the Organisation of African Unity. This political body covers many sectors, one of which is rural economy and agriculture, within which the GGW initiative falls.

The GGW is aligned with some of the fundamental aims of the AU; namely, achieving greater unity and solidarity between African countries and their people and promoting sustainable development at the economic, social and cultural levels, as well as the integration of African economies. Nevertheless, ultimately each of the 20 nations involved in this initiative bears responsibility for implementation within its own borders. Political support for the GGW was translated differently in each country. Many member states have created national GGW agencies or focal points to supervise and coordinate the implementation the initiative, while others have set up coordination

units under the ministry of environment or forests (UNCCD, 2020). In Senegal, for example, an agency dedicated to the GGW was created. In Niger, the 3N Initiative – “Nigériens nourrissent les Nigériens” (Nigeriens nourishing Nigeriens) – acts as an umbrella framework guiding cross-sectoral development in Niger. In Burkina Faso, a national coordination unit was established under the forestry division of the environment ministry, along with four regional satellites (Ministère de l’Environnement et du Développement Durable du Burkina Faso, 2012).

In 2007, the African Union approved the Decision on the Implementation of the Great Green Wall.

Policy and legislative framework

The African Union officially issued Declaration 137 VIII in 2007 approving the Decision on the Implementation of the Great Green Wall for the Sahara and Sahel Initiative.

The **agriculture** sector is particularly important in a context such as this, where arid conditions, further exacerbated by climate change, impact directly on food production. Furthermore, particularly in some of the Sahel countries of West Africa, including Niger, poverty levels are very high and the population largely rural. The desire to modernize agriculture in the 1980s led to further forest degradation, when, for example, ploughs removed any remaining tree stumps in the landscape. There was a perception then that trees were an obstacle to agriculture rather than an aid to it (Place et al., 2016). At the same time, a revival of ancient methods for promoting natural regeneration (farmer-managed natural regeneration, or FMNR) was slowly taking place in parts of the region (Pye-Smith, 2013). By allowing “underground” forests to grow back, farmers could obtain several benefits, including shade, fuelwood and improved soil fertility (Ibid.). Based on the positive results, these methods are now being widely promoted in the region.

Many post-colonial systems have led to conflicts over land and forest resources.

Many of the countries in the GGW Initiative inherited centralized and exploitative colonial forest legislation. Furthermore, in many cases, postcolonial systems maintained these policies and laws that had excluded local communities, leading to many overt and covert conflicts over land and forest resources (Barrow et al., 2016). For example, in Niger, Sendzimir et al. (2011) refer to a postcolonial, “quasi military” style of operations from forestry officers, which acts as a deterrent to any collaboration with communities, resulting in a loss in forest.

It has only been in the last couple of decades that improvements have been seen in terms of decentralizing forest governance and better engaging with local communities. For example, in Niger, the 2012–2021 National Forest Plan includes devolving control of forests to local authorities and communities (MESUDD, 2014). As early as 2004, Niger’s Forest Law allowed for the transfer of responsibility for managing forest resources to local authorities and communities (Law No. 2004–040 of 8 June 2004). This larger trend toward decentralization is also evident in the management of natural resources more generally, with Law 212-013 of 2002, and Law 54-2010 of 2010 framing this transfer of responsibility to local authorities. Niger’s 2012–2021 National Forest Plan includes the restoration of 270,000ha of degraded lands (MHE and FAO, 2012).

Rules developed by village chiefs are more likely to be followed.

Tenure

Motivation to invest in sustainable practices in the Sahel, as elsewhere, is closely interlinked with tenure and the perceived likelihood of being able to enjoy the fruits of one's labour (OSS, 2019). Yet the postcolonial legacy of the forest system of most (although not all) of the countries in the region has resulted in a centralized system, whereby the state owns virtually all of the land and forests, with communities often disenfranchised. This challenge has been recognized in many countries, and tackling it forms part of the GGW Initiative. Challenges surround not only land rights but also the ownership of individual trees. This is particularly key in the context of natural regeneration, notably through the FMNR widely promoted in countries such as Niger (Place et al., 2016). Indigenous tree species are often protected and require a licence to be pruned, felled or otherwise used. This acts as a deterrent to their natural regeneration. Instead, farmers are perversely encouraged to plant exotic trees that do not have the same limitations (Place et al., 2011).

In Niger, local forestry authorities have overcome this challenge by granting farmers informal rights over trees that regenerate, thus creating an incentive to allow more trees to regenerate on farmland, given the many services they provide (Abasse and Adam, 2020). For example, Both Ends, a Dutch NGO, worked for many years in the municipality of Soukougoutane and helped support the devolution to village authorities. Thus, the village chief, rather than a distant official, was encouraged to develop rules and means of dealing with offenders. Such local methods of designing rules and enforcement measures proved successful in terms of promoting FMNR (Ibid.).

Stakeholders

Public-sector actors in the GGW operate both at the national level and, importantly, at the regional level, including the AU and the AFR100. At the national level, several ministries are engaged, and in many countries a focal point or agency is responsible for coordinating actions on the GGW.

A number of multilateral and bilateral partners are engaged in the initiative.

A number of multilateral and bilateral partners are engaged in the initiative. These include, for example, the Global Mechanism of the UNCCD, which implemented a capacity building project from 2014 to 2019 entitled FLEUVE that was funded by the EU, and which developed the *State of the Great Green Wall* report, published in 2020 (UNCCD website). The OSS is implementing the Sahel and West Africa Programme (SAWAP), funded by the World Bank and the GEF. It supports 12 sub-Saharan countries (Benin, Burkina Faso, Chad, Ethiopia, Ghana, Mali, Mauritania, Niger, Nigeria, Senegal, Sudan and Togo – all members of the GGW) to expand sustainable management of land and water resources at the national level, as well as a regional project called BRICKS – Building Resilience Through Innovation Communication and Knowledge Services. Another large project receiving World Bank funding (along with NEPAD-AU funding) is the TerrAfrica project, a partnership to tackle land degradation across sub-Saharan Africa. The FAO has been a principal multilateral actor in the GGW; notably, it has supported local communities in adopting locally appropriate technologies such as half-moons and Delfino ploughs that mechanize the traditional technique of zai to better harvest rainwater in this arid region (FAO website).

In addition to the large public and multilateral actors, the GGW Initiative has spawned numerous smaller projects that contribute as well. For example, Both Ends has been involved in Burkina Faso, Niger and Senegal since 2018 on a project entitled “Communities Regreen the Sahel”. The programme focuses not only on training farmers in FMNR but also on working with them to engage in practical actions.

Private

Local farming communities play a significant role in land use and land management and are key to the success of the GGW. Whereas under French colonial rule, farmers in the Sahel had learned to keep trees separate from agriculture, since the 1980s this has been gradually changing. Furthermore, the fact that all trees once belonged to the government created a disincentive for farmers to allow natural regeneration. Changes in these rules made a big difference toward a more comprehensive agroforestry system, promoted through FMNR (Smithsonian website). Engaging with communities and better understanding their needs has also been important in the GGW.

Local farming communities are key to the success of the GGW.

The FAO, for example, held discussions with grassroots communities to better identify their specific needs and how to marry those with the greater regional desire to restore lands. They found, for example, that communities wanted medicinal species, species for fodder and feed, as well as fuelwood. Focusing on multipurpose species valued by the communities led to more successful uptake. They also explored traditional knowledge, which provided an important approach to restoration. For example, in Senegal, traditional knowledge around water harvesting was mixed with western science to yield an optimal mechanized approach to water harvesting. Similarly, the traditional zai technique of digging pits to collect water and manure to promote regeneration has led to the successful restoration of 3 million hectares of land in Burkina Faso and is now being taken up by eight other GGW countries (UNCCD, 2020).

Indigenous land-use techniques have been favoured in farmer-managed natural regeneration (FMNR).

More generally, traditional knowledge related to forests and land management is gradually being revived and used within the sector (Smithsonian website). Indigenous land-use techniques, rather than exogenous tree-planting initiatives, have been favoured in FMNR. Support for new local management structures (SLG – “structures locales de gestion”) to strengthen local governance has also been part of the efforts within the GGW (Sendzisimir et al., 2011).

Economic aspects

A total of US\$8 billion has been mobilized and pledged for the GGW (UNCCD website). At the same time, it has been estimated that since 2007 the GGW has generated revenue of US\$90 million across all 11 original member countries through alternative income-generating activities (UNCCD, 2020).

Since 2001, Niger has used funds from debt relief to pay for plantations under a programme for land restoration (Programme Restauration des Terres). In 2014 alone this programme spent about US\$2.3 million on plantations from the state's budget (MESUDD, 2014). A recent estimate by UNCCD (2020) suggests that while the government of Niger put about US\$7 million toward GGW activities between 2011 and 2019, it had received US\$70 million in international funds for that purpose.

10.4 Sustaining factors

A total of US\$8 billion has been mobilized and pledged for the GGW.

Considered to be a locally grown movement, the GGW is an experiment not only in collaboration across nations but also in generating the momentum and responsibility across communities that may ultimately be the key to its sustainability.

The shift toward a more decentralized approach and the building of local capacity are key to long-term sustainability, both of actions and outcomes, in restoration. The GGW builds on lessons from earlier initiatives that attempted to plant trees in a top-down fashion across the desert (starting in the 1960s) with very limited success.

The FAO has focused on directing its support toward local communities to strengthen their capacity and their knowledge of restoration techniques that they can carry forward beyond the end of any financial assistance or project. For example, between 2013 and 2014 more than 100 village technicians were trained in the collection of seeds and the production of seedlings (Sacande and Berrahmouni, 2016).

International aid has been significant. This has been in part a result of the GGW Initiative shifting its focus from merely planting trees to recognizing the mosaic land use and wider needs of populations in the region (UNCCD, 2020). External support has been more forthcoming for an integrated approach to land use, which is perceived as being more sustainable. At the same time, reliance on foreign donor funding has been raised as a concern (Ibid.). Estimates suggest that the costs of land restoration in the region amount to US\$530 per hectare (Ibid.).

10.5 Key findings and lessons

The experience in the GGW, and in Niger specifically, provides some useful perspectives on the implementation of an ambitious transnational restoration initiative and its articulation at the country level:

1. Overcoming some of the challenges inherent to the postcolonial legacy in the forest sector in the region is a priority; in particular, devolving governance to local levels, building trust and reviving indigenous knowledge.
2. Transnational initiatives such as the GGW require multilevel implementation and governance arrangements, starting at the level of the continent with the African Union and moving all the way down to local municipalities and traditional authorities. This can raise challenges of coordination across these different scales.
3. The GGW is about much more than restoration, as it also integrates production systems. Given the local context, both ecological and socio-economic, across this zone of Africa, it is inevitable that trade-offs between forests and agriculture will need to take place.
4. Climate change and its impacts are an important mediating factor in this context given the vulnerability of local populations and the precariousness of the region and its natural resources.



Father and child planting a mango tree seedling below the canopy of older trees, close to Niamey, Niger.

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Annex III – List of people interviewed and consulted

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Viet Nam	Pham Quoc Hung, WWF-Vietnam (former Vietnam Administration of Forestry). Truong Quang Hoang, Center for Rural Development in Central Vietnam Tam Le Viet, WWF-Vietnam Quoc Nguyen Anh, WWF-Vietnam



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