

Forest landscape restoration: Why a culture of continuous improvement is vital for long term success

Forest Landscape Restoration (FLR) is one of the most powerful tools at our disposal to address the triple crises of climate change, biodiversity loss, and socio-economic inequality. Healthy forests play a critical role in sequestering carbon, protecting biodiversity, and supporting the livelihoods of millions of people around the world. Yet despite the many benefits of FLR, not all restoration efforts deliver on their potential — and the experience we gain and the lessons learned from both successes and failures are key to ensuring future projects achieve lasting impact.

“Achieving lasting impact will require more than just scaling up restoration efforts — it will require doing restoration better”



The Urgency of High-Quality Forest Landscape Restoration

FLR has gained significant traction as part of global efforts to reach climate and biodiversity targets. However, the quality of restoration matters as much, if not more, than the quantity. Restoring forests is not simply a matter of planting trees – it is a long-term process of rebuilding ecosystems, strengthening community resilience, and creating sustainable livelihoods.

Poorly designed restoration projects can inadvertently cause more harm than good. For example, planting fast-growing, exotic species in semi-arid areas can deplete water resources and increase fire risks. Meanwhile, planting a 'monoculture', without taking into account the diversity of tree species that make up natural ecosystems, can result in a change to or reduction in vital habitat for wildlife. These unintended outcomes underscore the importance of careful planning and community engagement.

Many restoration efforts also take place in dynamic landscapes where land use is in flux. If the underlying drivers of degradation – such as poverty, insecure land tenure, or unsustainable agricultural practices – are not addressed, there is a high risk that restored areas will be lost again in the future.

We are already mid-way through the UN Decade on Ecosystem Restoration and the urgency to meet global climate and biodiversity goals is increasing. Fostering a culture of continuous improvement in our work is vital. Now supporting forest restoration across 13 countries through our ReForest Fund, we have gained insights that will help guide us to stronger, more resilient results in the future:

- Budgeting for success
- Community-based decision making
- Transparency, monitoring and the role of technology
- Climate risks and the challenge of permanence
- Scaling up: moving from philanthropy to market based finance

Budgeting for Success: The True Cost of Restoration

One of the biggest challenges facing FLR is the persistent underestimation of the true cost of successful restoration. Too often, projects focus on the upfront costs of planting trees without adequately budgeting for the use of rights-based approaches in designing and delivering restoration, as well as the long-term care and maintenance that is essential for forests to recover and thrive. Further, restoration projects that fail to invest in addressing the root causes of forest degradation will result in unsustainable short-term gains, undermining the long-term ecological and social impacts.

While offers such as the dollar-per-tree approach might sound appealing, they often fail to account for the broader investment needed to secure long-term restoration outcomes. This includes factors such as site preparation, community engagement, monitoring, and contingency planning. Without proper budgeting, projects risk setting communities and ecosystems up for failure. We have highlighted this issue and provided some essential considerations when budgeting for forest restoration projects, in our white paper [Defining the Real Cost of Restoring Forests](#).



Community Participation and Land Use Change

Restoration projects often require adapting and shifting land use – whether transitioning from single crop agriculture to mixed crops and agroforestry or restoring degraded pastureland to forest. These changes can have profound implications for local livelihoods and well-being, making community participation and rights-based approaches essential. It is clear that restoration efforts that fail to engage local stakeholders and employ appropriate environmental and social safeguards are unlikely to succeed.

A pragmatic approach is needed – one that respects the rights and knowledge of local people, where necessary taking the approach of Free, Prior and Informed Consent (FPIC) while ensuring that agreements are clear, transparent, and documented. The example of Trillion Trees partner, WCS's work in the Cañamomo Lomaprieta Indigenous Reservation in Colombia demonstrates how restoration efforts can align with local cultural values and traditional knowledge and practices, building broad-based community support.



Climate change mitigation - Colombia

WCS is helping communities in the Cañamomo Lomaprieta Indigenous Reservation in Colombia to restore water catchment areas and sacred sites. Restoration efforts are taking place within the Indigenous Reservation, an area of spiritual and cultural importance, and a critically important watershed for the surrounding communities. This year will involve planting around 20,000 new trees across 19 hectares of degraded hillside. To do this, WCS is partnering with the Natural Heritage Group of the Cañamomo Lomaprieta Indigenous Reservation. A working group was formed of local leaders from the eight communities associated with the reserve enabling wide communication of the project objectives across the participating communities. Communication material was also shared via radio broadcasts and a [video](#) disseminated through Facebook.

The reserve is densely populated and there is significant human pressure on natural resources, but the project has been able to build support for ecological restoration through group dialogues. These have emphasised the links with traditional practices, such as the protection of sacred sites, and the importance of trees and forest cover to protect water sources. The project has also promoted the use of native species known to have traditional value, including plants with medicinal value and fruits and seeds that are used by the local communities.

For every restoration site, a written agreement is created with the community group that owns the territory. This agreement clarifies the objective of the restoration effort, defines the support that WCS is able to provide, and sets out the contribution of the community group to ensure successful restoration. In the case of Cañamomo, WCS signed the second subgrant with this Indigenous Reservation to provide technical advice on restoration strategies selection, financial support for nursery propagation and site preparation and maintenance. The final selection of plants and restoration sites is done in consultation with the governors and traditional healers of the *resguardo* who have extensive knowledge of the biodiversity of the territory. The community provides labour for site preparation and tree planting, and, crucially, for weeding and maintenance in the years after planting.

Watch a [short video](#) about our work in Colombia.

Transparency and Monitoring: The Role of Technology

Transparency is vital for ensuring the credibility and impact of FLR efforts, and to improve success rates and move away from methodologies that may be less effective. However, monitoring restoration outcomes is often complex, time-consuming, and expensive. Monitoring needs to be flexible so that approaches can be tailored at the field level yet sufficiently standardised to ensure common metrics across a portfolio of projects. Minimum consistent standards, that strengthen the ownership and agency of local rights-holders are more suitable, sustainable and inclusive than state of the art high tech solutions.

Trillion Trees has improved its data management and monitoring systems through the adoption of FORMAPP – our web-based platform that integrates geographic, ecological, and socio-economic data from our projects. By using simple, open-source tools like KoboCollect, our projects can systematically track progress and gather critical information on land use history, land ownership, and the restoration interventions being employed. Tech, used appropriately, has an important role to play in improving the accuracy and consistency of restoration monitoring.



Transparency and monitoring - **Madagascar**

Since 2012, WCS Madagascar has been working with community groups to plant trees on degraded lands in the forest corridors of Makira Natural Park. Interventions include the restoration of native forest, and/or the promotion of agroforestry approaches with clove, cardamom and vanilla, in place of destructive slash and burn for annual crops around park margins. While all restoration sites are mapped using GPS, it was challenging to keep track of restored sites using traditional GIS-based data management methods. More importantly, important socio-economic data linked to the restoration sites, such as land ownership, land use history, and crop production is complex to collect and store in traditional GIS systems, and any data analysis of these aspects requires specialist GIS technicians.

Trillion Trees has helped improve data management and monitoring in the Makira programme through the use of FORMAPP, a web-based data portal that links with free, open source survey tools. Tools such as KoboCollect, originally designed for social surveys, have proved useful for collecting and analysing the socio-economic parameters linked to the individual restoration sites. This has increased the rigour of data collection, allowing the project to record a comprehensive land use history, information on baseline site conditions, photographs of each plot, and ensure land ownership details are clearly and consistently recorded. GPS polygons of each plot can be recorded in the KoboCollect app, and are automatically uploaded to the FORMAPP data portal, so FORMAPP provides a convenient platform to integrate the geographic and socio-economic parameters of each site.

Climate Change and the Challenge of Permanence

Climate change presents an ever-growing threat to the long-term success of forest restoration. Extreme weather conditions such as droughts, floods, and shifting unpredictable rainfall patterns can all undermine restoration efforts. Strategies including choosing the right species to be fit for the future alongside preparations to remediate if initial survival is below expectations, are important considerations.

Planning for long term maintenance and potential risk, including for example, fire management and pests are key. Addressing water shortages in drought-prone areas can include installing wells or systems that harvest rainwater near tree nurseries and restoration sites. The ability to respond and adapt to changing climatic conditions will be critical to the future success of FLR efforts.

Climate change mitigation - Kenya

Kaptagat, in southwest Kenya, is not only an important forest landscape, providing many local communities with water, wood products and agriculture; but it is also a training ground for professional long-distance runners including Olympic marathon champion, Eliud Kipchoge.

WWF Kenya, with support from Trillion Trees, has continued to work with Eliud Kipchoge, local communities and government stakeholders to restore and maintain the 50.8 hectare forest site adopted by Kipchoge. The initiative underscores the intersection of environmental conservation and community empowerment leveraging Kipchoge's influence to promote sustainable practices.

Severe droughts in 2022 and early 2023 had an impact on the survival of seedlings in the landscape. The project needed to procure around 18,000 new seedlings from community nurseries to replace those that were lost. Careful maintenance of the restoration sites by the Community Forest Associations has enabled these seedlings to thrive, with a survival rate of 94%. This effort highlights the resilience of collaborative conservation in the face of climate challenges.

In another landscape, near Mount Kenya, BirdLife International partner, Nature Kenya, is working to restore the forest which is also an important water catchment. Milka Musyoki, a conservationist for Nature Kenya describes the challenges that climate change presents for their forest restoration work:

“One of the biggest challenges we face is variation in rainfall patterns. Two to three weeks of rain are needed for the saplings to survive, and many of them can be lost if the rains don't come. Grazers are also a threat and can sometimes eat the saplings, but communities have come up with ways to put up protective fencing against this. We have also identified tree species that are unpalatable to the local wildlife so are less likely to be eaten.

Climate change is affecting the rainfall with many areas already much drier than they used to be. This affects the tree species that we can plant and the way we plant. For example, the local communities used to collect 'wildings' from the forest to cultivate, but there are no longer enough to be found. One glimpse of hope is that we are working on species diversification to try to find those that are more drought resistant and can cope better with climate change.”

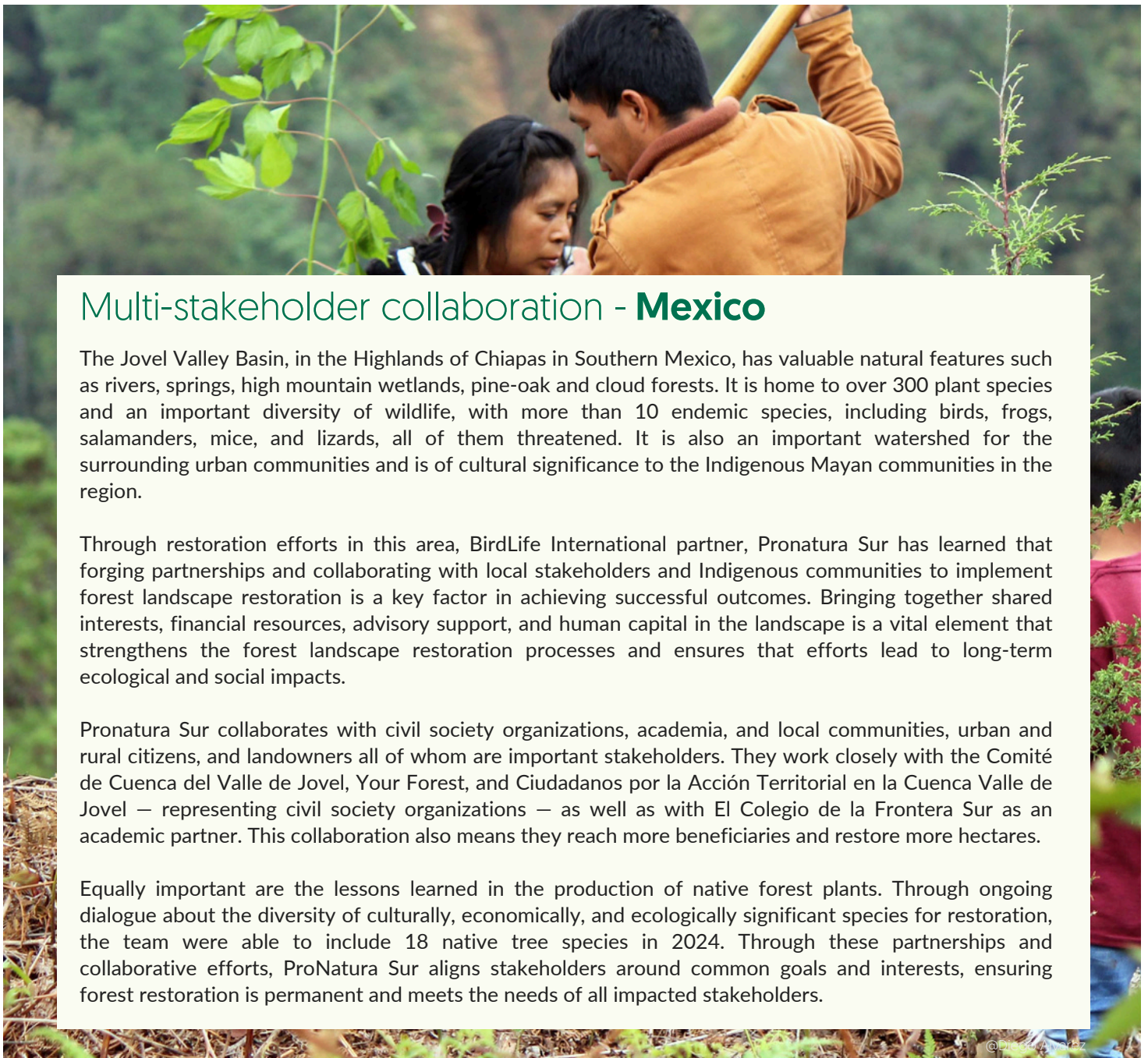
Read more about Milka's work [here](#).

Scaling Up: From Philanthropy to Market-Based Finance

To meet global climate and biodiversity goals, it is estimated that we need to restore around 600 million hectares of degraded and deforested land by 2050. To meet that ambition, forest landscape restoration needs to scale at an unprecedented pace. This will require a massive increase in funding – far beyond what philanthropy alone can provide. Market-based mechanisms and sustainable finance models, such as results-based payments for ecosystem services, carbon sequestration and water-capture, to name but a few, will be essential to closing the financing gap.

However, many restoration projects struggle to transition from small-scale, timebound grant-funded initiatives to scalable investment-ready models. Bridging finance and blended finance approaches, such as the Trillion Trees Forest Restoration Catalyst – which co-designs forest landscape restoration initiatives with local stakeholders and promotes a fair shift towards regenerative and sustainable economies – can help projects navigate the funding gap between initial feasibility and full-scale implementation.

[Watch our short video](#) that explains how mechanisms such as the Forest Restoration Catalyst can help.



Multi-stakeholder collaboration - **Mexico**

The Jovel Valley Basin, in the Highlands of Chiapas in Southern Mexico, has valuable natural features such as rivers, springs, high mountain wetlands, pine-oak and cloud forests. It is home to over 300 plant species and an important diversity of wildlife, with more than 10 endemic species, including birds, frogs, salamanders, mice, and lizards, all of them threatened. It is also an important watershed for the surrounding urban communities and is of cultural significance to the Indigenous Mayan communities in the region.

Through restoration efforts in this area, BirdLife International partner, Pronatura Sur has learned that forging partnerships and collaborating with local stakeholders and Indigenous communities to implement forest landscape restoration is a key factor in achieving successful outcomes. Bringing together shared interests, financial resources, advisory support, and human capital in the landscape is a vital element that strengthens the forest landscape restoration processes and ensures that efforts lead to long-term ecological and social impacts.

Pronatura Sur collaborates with civil society organizations, academia, and local communities, urban and rural citizens, and landowners all of whom are important stakeholders. They work closely with the Comité de Cuenca del Valle de Jovel, Your Forest, and Ciudadanos por la Acción Territorial en la Cuenca Valle de Jovel – representing civil society organizations – as well as with El Colegio de la Frontera Sur as an academic partner. This collaboration also means they reach more beneficiaries and restore more hectares.

Equally important are the lessons learned in the production of native forest plants. Through ongoing dialogue about the diversity of culturally, economically, and ecologically significant species for restoration, the team were able to include 18 native tree species in 2024. Through these partnerships and collaborative efforts, ProNatura Sur aligns stakeholders around common goals and interests, ensuring forest restoration is permanent and meets the needs of all impacted stakeholders.

Fostering a Culture of Continuous Improvement

Restoring the world's forests is one of the greatest challenges of our time. Yet if we are to succeed, we must have the courage to learn from failure as well as success. Every investment in FLR – whether large or small – must be maximised, and the lessons from each project applied to those that follow.

Are we fostering a culture of continuous improvement? Are we building on traditional knowledge and learning from what doesn't work and sharing those lessons openly? Do we have the courage to talk about failure? Can funding models accept there may be some setbacks before success?

By embedding transparency, community participation, and adaptive management at the heart of FLR, we can build a future where restored forests not only sequester carbon and protect biodiversity – but also support thriving, resilient communities.

Forest Landscape Restoration holds the key to addressing many of the interconnected crises facing our planet. But achieving lasting impact will require more than just scaling up restoration efforts – it will require doing restoration better. A culture of continuous learning and knowledge sharing will be critical to ensuring that every dollar invested delivers the greatest possible benefit for people, nature, and the climate. By acknowledging the challenges, learning from failure, and applying solutions at scale, we can unlock the full potential of FLR and secure a better future for both people and planet.

