TROPENBOS INTERNATIONAL

Restoring Tropical Forests

Lessons in participatory productive restoration from six countries

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Preface

Despite decades of effort, forests are still vanishing at alarming rates. No amount of restoration can fully replace what is lost, but it remains the second-best option we have to keep our planet liveable, by making forests work for people, climate resilience and biodiversity. The opportunity is enormous. As the ecologist Willem Ferwerda has said, we need nothing less than a "restoration industry." Like any new industry, it will not emerge from nowhere. It will emerge once the enabling conditions are in place, but it starts with local initiatives, daring start-ups, and the commitment of engaged people who make restoration real in their own landscapes and inspires others to follow.

Therefore, it is with great pride that I present this publication, the result of seven years of joint learning and collaboration across the Tropenbos network. Together with our partners in Bolivia, Colombia, Ethiopia, Ghana, Indonesia and Viet Nam, we have put into practice and refined what we call Participatory Productive Restoration (PPR).

This approach was born in Colombia, where local communities first showed us how ecological recovery could be combined with tangible livelihood gains. Through facilitated learning within our international network, it has since taken root and matured in very different landscapes across five other countries. What unites these experiences is a conviction that restoration will endure only when it works for people on the ground — when communities can regenerate their ecosystems while also strengthening their economies and cultures.

The chapters in this book show how communities themselves defined priorities: recovering from wildfires in Bolivia, restoring water sources in Colombia, embedding restoration into Ethiopia's national strategy, diversifying cocoa and coffee farms in Ghana and Viet Nam, and rewetting peatlands in Indonesia. The Synthesis chapter brings together these experiences into a set of practical lessons. They show that restoration is most effective when it is inclusive, negotiated, productive and embedded in strong local institutions and governance.

This publication is more than a set of case studies — it is also a reflection of what the Tropenbos network stands for. Our network enables practitioners and champions in a range of countries to learn from each other, adapt ideas to their realities, and strengthen their capacity to influence policies and markets. PPR is a clear example: it grew from a local innovation into a network-wide practice precisely because we invested in collaborative learning.

As the world struggles to meet its restoration pledges, this experience carries an important message: investing in programmes that connect different experiences across countries and ecosystems through peer learning is as critical as financing restoration projects. By sharing lessons and fostering collaborative learning, we enable a wider group of stakeholders to engage and to contribute ideas, shaping supportive policies, mobilizing adequate finance and finance mechanisms, and building the capacities needed for restoration to thrive. These collective efforts take time to mature. That is why long-term support is essential: it provides the stability and continuity for local actors to move beyond isolated projects and turn restoration into systemic and lasting change

We invite donors, policymakers and practitioners to take these lessons forward, and to join us in supporting locally led restoration that delivers for people and nature alike.

Joost van Montfort,
Executive Director, Tropenbos International

Introduction

Transferring seedlings to planting media, West Kalimantan, Indonesia. Photo: Tropenbos Indonesia

Why participatory productive restoration?

Carlos Rodríguez, Humberto Gómez and André Brasser

The global moment for restoration

Around the world, degraded forests and landscapes are undermining biodiversity, rural livelihoods and climate stability. Forest restoration is gaining attention on the political agenda. At all levels, pledges and commitments to restoration have grown dramatically in number and significance over the past years. The main regional and international initiatives include the Bonn Challenge (2011), the New York Declaration on Forests (2014), the Land Degradation Neutrality Target Setting Programme of the UN Convention to Combat Desertification, the Great Green Wall initiative, the African Forest Landscape Restoration Initiative, Initiative 20x20 in Latin America and the Caribbean, and the Asia-Pacific Regional Strategy and Action Plan on Forest and Landscape Restoration to 2030.

The UN General Assembly proclaimed 2021–2030 the UN Decade on Ecosystem Restoration on 1 March 2019 (A/RES/73/284). To address food security, job creation and climate change all at once, this Decade has a lot of potential. According to the UN Environment Programme, the New York Declaration on Forests' commitment to restore 350 million hectares of degraded land by 2030 could create USD 9 trillion in various ecosystem services and remove 13–26 gigatonnes of greenhouse gases from the atmosphere.

Yet outside of a few success stories, restoration is not taking place at the required scale, despite the number of entities — public, private and civil society — involved from local to global levels and despite the high level of political engagement. To create and develop effective forest restoration approaches that will be widely scaled in the coming years, research and knowledge are urgently needed, together with developing partnerships and stakeholder participation, fostering learning and customizing, and sharing and delivering information. And at the same time, all these processes need to be locally owned.

The world has missed earlier global targets, which underlines a simple message: restoration has to work better for people on the ground if we want it to scale and endure. The failure of not meeting the Aichi Target (of restoring 15% of degraded ecosystems by 2020) underscores the need to enhance the effectiveness and efficiency of current restoration mechanisms in order to meet the Bonn Challenge of restoring 350 million hectares of degraded forests by 2030. Securing the active participation of local people is one way of doing this, as incorporating indigenous knowledge can help overcome technical barriers and local limits in resources and finance to achieve the desired trajectories and scales of restoration.

This publication responds to that need. It shares lessons from participatory productive restoration across diverse contexts in six tropical countries, showing how to couple ecological recovery with tangible livelihood gains, and how to embed that practice in landscape governance that communities trust and can maintain.

What is participatory productive restoration?

Participatory productive restoration (PPR) is a practical way to restore land with the people who use and manage it. It rests on three linked ideas.

Ecology and livelihoods rise or fall together: Degraded land that is restored will stay green only if people can make a decent living from it. That pushes design choices toward mixes of native trees, shrubs and productive species that reduce pressure on remaining forests while creating income in the near term.

Knowledge is plural: Indigenous knowledge, women's ethnobotanical understanding and farmers' trial-and-error techniques belong on equal footing with formal science. Effective processes make that possible: participatory mapping and planning, local experimentation, and regular cycles of reflection and learning. In practice, this co-knowing, co-planning and co-deciding builds the capabilities for participation step by step.

Process matters as much as planting: Rights, roles and benefit sharing must be negotiated alongside technical choices. Projects that invest in capability building (e.g., co-developing a shared vocabulary so residents can engage in formal water and land forums) create the social foundations for long-term care. That takes time and an ongoing presence, but it's what turns one-off projects into durable local practice. It means long listening phases, inclusive local bodies, a flexible menu of field options and space for learning by doing.

In short, PPR is restoration as a local development pathway — practical, negotiated and constructive — so that ecological gains and household benefits reinforce each other in the short term and over time.

PPR is most effective when nested in a wider landscape plan that coordinates water, soil, grazing, fire suppression and markets. Building governance capabilities alongside field practice — progressing from co-knowing to co-planning, co-acting, co-influencing and co-deciding — improves the likelihood that ecological gains will translate into fair, lasting benefits.

Three practical moves help: 1) link field and forum by providing local groups with simple monitoring and choices; 2) budget for regular plan-act-reflect-learn cycles; and 3) translate working practices into brief notes that agencies can adopt and fund together with communities. Collaboration with agencies and regional or national institutions and platforms prepares the ground to create impact beyond the area where PPR starts when these organizations include the PPR approach in their operations at much wider scales.

Why does the Tropenbos network focus on PPR?

Tropenbos International works at the interface of knowledge and action with local partners in the tropics. Through exchanges in its international network, countries are able to learn from each other's experiences and apply these lessons, where appropriate, to their own context. The organization's ambition for restoration impact is to help shift global efforts toward bottom-up models, so that by 2030, a large share of real restoration outcomes comes from locally led initiatives that are productive and inclusive. That means supporting learning networks, strengthening local institutions, and translating evidence into policy guidance and field practice.

This publication is part of that effort. It documents six cases where communities co-designed restoration options, tested productive mixes (from agroforestry to assisted natural regeneration), and wove them into broader landscape plans and markets. The common features across all cases were practical choices, negotiated locally, with benefits that people could receive soon — not only decades later.

Locally owned solutions are at the heart of PPR. In Colombia's Amazon region, for example, the approach has been developed as an inclusive option that recognizes and builds on communities' knowledge, practices and resources. This makes it socially appropriate and sustainable in the future, while also generating income and well-being. By basing restoration on what people already value and control, PPR strengthens territorial governance and fosters long-term commitment. This anchors people to their landscapes and makes restoration both durable and meaningful.

Who should read this publication?

This publication brings together six country chapters that document how partners put PPR into practice in different settings: coffee and cocoa agroforests, dryland watershed restoration, post-fire recovery, peatland rewetting and more. Each chapter describes the local context, explains the process and the technical choices, and describes what changed on the ground and in the social fabric. The focus is on how to do PPR, with practical guidance and examples that readers can adapt to their realities.

This publication is for practitioners and facilitators who co-design restoration with communities. This includes local organizations and leaders seeking to turn scattered projects into a coherent landscape effort; and policymakers and programme managers looking for tested ideas to enable community-led restoration at scale.

For donors and impact investors, this publication is a hands-on guide for choosing where money can drive real change. Across six different settings, it points to priorities and policies to support. The publication shows what PPR looks like in practice — local ownership, cost-effective methods, simple indicators suitable for monitoring — and how these factors can build a foundation for projects that deliver climate, biodiversity and livelihood results together.

Chapter 1
Bolivia

Community members evaluating the PPR of Chiquitana almond seedlings in Lomerío. Photo: Miguel Manchego Chavez. IBIF

Putting communities at the forefront of restoring their ecosystems

Joris Tielens, Nataly Ascarrunz and Juan Carlos Licona

After the large forest fires *of 2019, the communities of Lomerío and San Ignacio de Velasco, in Bolivia, took the initiative to restore their productive ecosystems. They replanted or regenerated their forests, cultivation areas and forest watersheds to ensure access to water and agroforestry products. Women marketed their products at agroecological fairs. The lesson is that restoration is not just about planting trees, but about community efforts that generate benefits for people from the forest economy.*

The communities of Lomerío and San Ignacio de Velasco, in Bolivia's Chiquitania region, lost much of their productive landscape due to devastating forest fires in 2019. In the department of Santa Cruz, more than four million hectares were affected. In the indigenous territory (*Tierra Comunitaria de Origen*, or TCO) of Lomerío, the fire devastated 90,000 hectares of Chiquitano dry forest and cerrado. The fire burned trees and crops, and scorched the soils, leaving them unproductive.

The people who depend on these ecosystems took the initiative to restore what was lost. In Lomerío, indigenous communities used a participatory productive approach, restoring their watersheds and the water sources in their community forest, on which they depend for drinking water for both humans and livestock. They reforested the area with a native species of the Chiquitana almond, which restores the ecosystem and, at the same time, generates income for the community thanks to the nutritious nuts it produces. Moreover, although the water sources in the entire Chiquitania were dry in 2024, Lomerío had water all year round.

In the municipality of San Ignacio de Velasco, women took the initiative to produce vegetables and restore their *chacos* (production systems: fields approximately one hectare in size where crops are grown), and market the vegetables at local agroecological fairs that are held every two weeks in the municipality (agroecology applies ecological processes to agricultural production systems in order to make them more sustainable). The effort had the support of women and women's organizations, who created a committee for the agroecological fairs. They also successfully pressured the municipality to support the fairs, the agroecological production and the enactment of a law to promote agroecological production.

"The community must benefit from restoration. It is up to them to decide which trees to plant and which products to focus on."

Nataly Ascarrunz

These are examples of participatory productive restoration (PPR), explains Nataly Ascarrunz, director of the Bolivian Institute of Forestry Research (IBIF). "We call it participatory productive restoration to make it clear that we are not focused on planting trees as such, but on ensuring that the people who depend on the ecosystem can take care of it. This requires local solutions. The community must benefit from restoration. It is up to them to decide which trees to plant and which products to focus on. We contribute to revitalizing the economy based on this."

The PPR approach — based on locally owned solutions — took shape after previous experiences in 2014, when IBIF implemented a restoration project with funding from Bos+ in Lomerío. That project focused on the restoration of areas that had been damaged by logging and the felling of trees in *chacos* for the construction of roads. "We did a study at the beginning of that project, which showed that fallow land recovers 80% of its biodiversity after 20 years. Logging did not destroy the forest's ability to recover." In other words, there was no need to plant trees because there was sufficient natural regeneration of trees. As part of the project, some communal nurseries to grow seedlings were constructed. "So we ended up building these nurseries and planting trees in an area that didn't really need them. That was an idea that fueled much of the work we did later in restoration, starting in 2019, and after the pandemic."

Over the years, it became increasingly apparent what the idea of local solutions entails, Ascarrunz says. "It's about respecting and recognizing that people can know better than we do what they need for themselves and their families. And that they may have better answers than we do about the problems they face. Once you let go of preconceptions that you know better, it becomes much easier to sit down and talk to people and work with them. And to develop a collaborative process where we support the process, rather than pressuring and forcing people to do things they don't care about."

IBIF has been supporting restoration initiatives in Lomerío and San Ignacio since 2019 through its ongoing restoration programme. The programme has received funds over the years from Tropenbos International, BOS+, Both ENDS and Wetlands without Borders.

The community of Palmira in the indigenous territory of Lomerío. Photo: Miguel Manchego Chavez, IBIF

About the landscape

Chiquitanía is a large region in the eastern part of the department of Santa Cruz in eastern Bolivia. Several indigenous peoples live in the region. The Chiquitanía comprises a range of vegetation of semi-deciduous subhumid forests, vegetation of the cerrado and saxicolous vegetation. Drought and recurrent wildfires induced by climate change are major problems in the landscape. Within the Chiquitania region are the municipality of San Ignacio de Velasco and the indigenous territory (TCO) of Lomerío. San Ignacio is a municipality of 48,959 square km, with 41,412 inhabitants and 117 indigenous and peasant communities. Lomerío TCO, with 8,000 inhabitants and 29 indigenous communities, is located in the provinces of Ñuflo de Chaves and Velasco, and covers 2,690 square km.

The process

How was the restoration initiative established?

The process was participatory from the beginning. It began with meetings of members of the community and IBIF staff, says Juan Carlos Licona. Licona coordinated the restoration programme at IBIF and participated in all aspects of it. "We talk to individual families to learn about their priorities." And since the needs of the territory of Lomerío differ from those of the municipality of San Ignacio, the process was different for each place.

In Lomerío, indigenous communities own their communal forests in indigenous territory. They have a tradition of restoring the land when they move to another area of shifting cultivation. Following the 2019 wildfires, the community said their priority was to restore communal watersheds to ensure access to water sources, which are used for human consumption and for livestock. In addition, the community wanted to restore the

communal forest areas that had burned down, so that they could be maintained and conserved as productive forests. According to Licona: "This community wanted to plant trees in a collective effort in the indigenous territory."

At the same time, the people of Lomerío wanted to use trees in the restoration of their productive systems (*chacos*) through an agroforestry system that diversified their products and generated an economic benefit. This included fruit trees (citrus, mango, coconut palms and other fruit species) and Chiquitana almond (*Dipterix alata*, a native tree). This local tree produces nutritious nuts of great economic value. Most of the restoration in Lomerío was carried out through natural regeneration, direct seeding and planting seedlings. The community led the selection of fruit trees, developed the layout of the plantations and determined the protection of the Chiquitana almond. In addition, they grew some seedlings of timber and non-timber trees with economic value in nurseries and planted them in two forest ecosystems.

"This community wanted to plant trees in a collective effort in the indigenous territory."

Juan Carlos Licona

In the municipality of San Ignacio, the community does not own communal land. The effort here is more individual and began with women who were engaged in family gardening. The women received technical assistance in the cultivation of vegetables in agroecological production systems. When production increased, women began selling the products in the local markets. Often, their husbands joined this business and began growing the same crops in their *chaco*, the agricultural field that many families own. Husbands and wives began to plant fruit trees in their *chaco*, such as citrus trees, almond and mangoes, in an agroforestry system.

This process was complemented by training in the best practices and management of their production systems. People were also trained in how to process their agroecological products (jams, pickles, extracts and juices) so they can be sold on the market. "This was done in coordination with renowned chefs from the city, who went to the municipality of San Ignacio and gave courses to 51 people from 18 indigenous communities on the preparation of all these products," Nataly Ascarrunz says. People have also been trained as evaluators of agroecological production and certification. This benefited 23 producer families, who each got an agroecological certificate for their products, which is a guarantee to consumers, says Ascarrunz.

A key element of the process in San Ignacio was the participation of women. With the support of IBIF, the women organized themselves into an agroecological committee in order to promote activities related to the production and consumption of products of agroecological origin. The committee influenced the municipal government of San Ignacio to promote policies that support agroecological production, and lobbied at the municipal level to obtain support for the agroecological business. Subsequently, the municipality began to hold a local agroecological fair. Initially (2019 to 2021) these fairs were held annually; later (2022 and 2023), they took place twice a year. At present they are held every two weeks. Women and their families can sell their products at the fairs. Also participating were artisans and weavers as well as producers of poultry, honey, Minga coffee, cassava flour and various kinds of cheeses and milk.

In 2020, the municipality of San Ignacio de Velasco approved a law for the Promotion of Agroecological Production; it took four years for the law to be approved. Its regulation was strongly pushed by the committee of women agroecological producers. The municipality provides financial support to the fair and the production process of the women and men of the communities. Ascarrunz says: "This law makes it more sustainable, since the initiative no longer depends on a single mayor."

The Regional Organization of Chiquitana Women (ORMIC) supported the local producers' committee. As Licona says: "We work closely with them. They have promoted the organization of this committee and have promoted municipal support for these producer organizations, since they are mostly led by women."

Vital to the process was ongoing technical assistance to ensure that women knew how to manage their gardens, what seeds to use, and how to grow them. They also learned how to manage the expansion of their efforts and work on larger plots. IBIF's Juan Carlos Licona provided much of the technical assistance, in cooperation with IBIF's partner ProBioma.

How was the local community involved?

The idea for the restoration came from the communities, says Ascarrunz. "We received a request from the communities to support them in restoring these lands." Since 2019, meetings have been held in each community. Communities not only set their priorities but also decided what kind of crops and trees to plant and how to plan all aspects of the restoration. In Lomerío, it was the community members who decided which areas of the communal forest they considered necessary for restoration, and how to expand and restore them, with what type of trees.

In Lomerío the participation was mostly community-based, while in San Ignacio individual families from more than 40 communities participated. These communities elected five representatives who are part of the producers' committee.

It is important, says Ascarrunz, that technical assistance is provided by someone who understands the communities. "Because you can't just go to a workshop and leave; you have to understand how people think and what activities they do. We are collaborating with them in the development of the project."

This applies especially to the participation of women. "We follow their schedules. When we organize workshops or give technical assistance, we adapt to their daily schedules. For this reason, technical assistance is carried out within the communities. We can't take women to a workshop in the city and ask them to spend the night in a hotel. Some husbands would not accept it, or the community would consider it strange." Learning from experience, adaptations to the process were made; for example, hiring child care so that women could participate.

Results: reclaimed land and water and economic benefits

In Lomerío, indigenous communities restored watersheds and community forests after forest fires, generating productive soils for shifting agriculture and restoring water sources. The communities that achieved this now have access to water even in times of drought. In the TCO of Lomerío, almost 67 hectares of productive systems or agroforestry systems (chacos) were restored; people planted 10,800 fruit trees and 5,000 Chiquitana almond trees. This benefited 162 families from 22 communities. In addition, a forest restoration area of 103.5 hectares was restored with more than 19,000 trees. Through passive restoration — based on the natural regeneration of trees — 1,181 hectares of water recharge areas were restored.

> *"Because you can't just go to a workshop and leave; you have to understand how people think and what activities they do."*
>
> Nataly Ascarrunz

In San Ignacio de Velasco, women and their families benefited economically from vegetable cultivation and agroforestry. Through agroforestry, 153 hectares of productive systems were restored. There are 278 beneficiary families from 19 communities.

In addition, women were empowered by organizing themselves into a producers' committee. More than 40 communities are represented on this committee, and women are supported by the regional women's organization.

A fair organized with the support of the municipality gave women and their families the opportunity to sell their products. The committee pressured the municipality to pass a law that will generate budgetary commitments on behalf of the municipality to continue supporting fairs and agroecological production in the municipality.

Contributing factors and barriers

Contributing factors

The main contributing factor is that the community is in charge. According to Ascarrunz: "What has made this a success is that the community is driving it. We are not deciding what will be done or how it will be done. That's something that communities are deciding, either at the family or community level." In Lomerío, for example, the community has initiated the protection and restoration of watersheds. And it is thanks to their interest that they continue to monitor these areas.

In San Ignacio, the interest of women is the main driver. "Women are very interested in developing their own economic production systems, in generating their own income. There is more demand from women and women's organizations elsewhere for this kind of assistance that we can't supply,"says Ascarrunz.

The key to success, Ascarrunz concludes, was the participatory productive approach to restoration. "We build on local community initiatives, and tailor IBIF's technical assistance to their needs. We are there to collaborate and provide assistance in what the community considers best for them."

Barriers

One of the limiting factors is climate change, says Ascarrunz. The region is experiencing prolonged droughts. "That can ruin everything that's been worked on."

Another barrier is the lack of market development. There is consumer demand in cities, but the value chain of families' agricultural products needs to improve, Ascarrunz says. Once families start producing on a larger scale, it is necessary to ensure that there is a market for those products.

In addition, it is necessary to increase processing capacity, as well as transportation to reach larger towns, such as San Ignacio. New markets need to be developed for processed foods. "For example, almonds can be processed into snack bars of high nutritional value, for which there is a market among athletes in city gyms. To do this, there must be sufficient nut production, and the necessary processing capacity must be in place." Ascarrunz adds that developing a value chain to connect small, environmentally friendly producers to markets is a concern in many places around the world. IBIF is seeking funding to support value chain development.

More broadly, a lack of funding is an obstacle to further restoration efforts, Ascarrunz adds.

> *"What has made this a success is that the community is driving it."*
> Nataly Ascarrunz

Impacts

The restoration had an impact on biodiversity, increased tree cover in the restored areas, and improved water availability. "In Lomerío, the forests are in very good condition," says Ascarrunz. "There is a greater awareness of the value of forest lands among the communities of Lomerío."

Apart from that, the most important impact of restoration was the greater role that communities acquired in the management of their productive ecosystems, adds Ascarrunz. "By ensuring that protective measures also generate an economic benefit, communities are interested in restoration."

Compared to the top-down approaches of the past, the impact of participatory productive restoration is much greater, according to Ascarrunz. Previously, after each massive fire, the government would launch large, top-down restoration projects across the country. This involved building greenhouses to grow seedlings, and planting them. "Many of these large-scale projects were implemented without consulting or involving the community," Ascarrunz explains, "without taking into account the needs and capacities of the people." They ended up with a lot of projects that, for the most part, failed. "The trees that are planted do not survive. And it's a huge waste of money — because there is no benefit for local communities. How will they benefit? Their production systems have been burned. How do they benefit from trees being planted somewhere without their participation?"

"We are bringing the men and women of the community into a family that is much like their own family."

Nataly Ascarrunz

Lessons learned

It's not just about planting trees

The main lesson from the restoration initiative is that it's not just about planting trees — it's about empowering communities to manage their own productive landscape, Ascarrunz says. "That means we want to make sure that people are actively involved in these areas that require special care, and we do that by collaborating with communities and making sure they use species of interest to them. This is part of our local solutions approach, and with IBIF and Tropenbos International, with the support of BOS+ and Both ENDS, we approach everything in this way." In addition, it was crucial to involve women and to support their restoration work with ongoing technical assistance. Restoration succeeds when it strengthens livelihoods and respects indigenous and gender dynamics.

Teach by practice

In terms of learning and knowledge sharing, it's easier to teach by practice than through instruction or on paper, Ascarrunz says. "We are bringing the men and women of the community into a family that is much like their own family. A family that has successfully implemented an agroforestry system through trial and error, and that now produces and manages agroforestry to generate an economy from its production. And that family tells them about their experience, their successes and mistakes." This way, people will be able to walk the terrain and see the results with their own eyes.

Convince donors

Donors may need to be convinced of the value of the participatory productive restoration approach, Ascarrunz adds. "Many donors want to plant trees, as they like to count how many trees they helped plant. But, as we've seen, that's often not the best option. Often, assisted regeneration techniques are better, based on the forest that still exists. What is often needed is not to plant trees, but to help communities."

Upscaling: many requests for support with this approach

The approach is easily replicable, Ascarrunz says, because it focuses on what interests people, including women. "Whenever the opportunity presents itself, people will start working this way on their own initiative."

Institutional advances within the restoration effort also support its replicability, Licona adds. "Thanks to the participation of women and the producers' committee, the municipality got involved, supported the fair and approved legislation to support agroecological production." This makes it easier for more communities to follow the same path. "In addition, it attracted the attention of other NGOs to start working in the same way, says Licona.

Key findings

- Community engagement and locally led solutions are key in restoration efforts in Bolivia. Support must be participatory and inclusive. Community governance and advocacy unlocked public co-finance.
- Restoration must be economically productive for communities. In Lomerío, restored watersheds secured year-round water access. In San Ignacio, a producers' committee initiated by women's homestead garden groups now runs a municipal agroecological fair and channels new income to farming households.
- Enriching naturally regenerating saplings delivered greater survival rates and lower costs than large-scale nursery planting, while maintaining native species diversity.
- Processing, transport and market development for almonds and agroecological produce are the critical next steps to sustain and expand restoration across the Chiquitania. Scaling now depends on investment in the value chains.

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Chapter 2
Colombia

Restoration initiative in Resguardo Teófila La Arenosa, Solano, Caquetá. Photo: Sofía Cumaco. Courtesy Tropenbos Colombia

Intercultural agreements form the basis of locally led restoration

Joris Tielens and Carlos Rodríguez

In the municipality of Solano, Colombia, *intercultural connections and cooperation between Indigenous communities and peasants laid the foundation for successful forest restoration in more than 100 bottom-up initiatives, repairing the ecosystem of tropical forests, soil and water and increasing biodiversity. One of the lessons learned is that the knowledge and involvement of Indigenous communities is key. When policy and spatial planning includes participatory productive restoration, a much wider impact is possible.*

In the past, there were conflicts between peasants and Indigenous communities in the municipality of Solano, on the border of the northern Amazon in Colombia. Drought was increasingly common and water sources dried out due to deforestation of the area around them. Farming families entered the Indigenous territory in search of water and grazing land for their cattle. That gave rise to environmental conflicts.

But over time, the differences between the peasants and the Indigenous communities could be bridged. Tropenbos Colombia facilitated meetings between the two, focusing on the environmental issues they have in common. This eventually led to intercultural agreements between the peasants and the Indigenous people. These agreements allowed them to restore water sources on the boundaries between *resguardos* (reserves) and the lands of farmers, in the territory of the Indigenous people. Moreover, the peasants learned from the Indigenous people how to do this.

"For zero-net deforestation, we need to reverse deforestation."
Carlos Rodríguez

Planting the right type of trees in the area around the water sources, with the correct spacing, ensured that more rainwater could infiltrate the soil. Water sources that had previously dried out recovered. "In one example, a small water source with little and intermittent water supply changed in two years' time into a productive source that now brings water 24 hours a day to 25 families all year, even in the dry season," says biologist Carlos Rodríguez, director of Tropenbos Colombia since 1997.

Restoring water sources is an example of the impact of participatory productive restoration (PPR) approach developed by Tropenbos Colombia. Forest restoration in general refers to planting or regenerating trees. Through this method, degraded land is recovered, biodiversity increases and climate change impacts are reduced.

Participatory productive restoration differs from the large-scale and top-down restoration that has taken place in Solano and elsewhere in Colombia, whereby large numbers of seedlings from only a few tree species are planted in degraded areas, and without much participation by the local population. That method often proved to be unsustainable. PPR entails more than just planting trees in degraded or barren land. It is about repairing the ecosystem of the tropical forest, including the soil and water sources. It makes use of a large variety of tree seedlings, thereby increasing biodiversity. An example of PPR in Solano is the conversion of pastures with *vendeaguajal*, an invasive species of grass, into forest with timber and fruit trees. It has made these areas suitable for more diversified agriculture in future.

The process

How was the restoration initiative established?

Deforestation is progressing at an alarming rate in Solano, a reason to focus on that area. "But just stopping deforestation is not enough. For zero-net deforestation, we need to reverse deforestation. So we also need restoration of degraded areas," says Rodríguez.

The restoration process in Solano started from the needs of the local population, tells Rodríguez. Peasants experience the results of climate change and the periodic climate event of El Niño, resulting in drought and a shortage of water. "From the communities we clearly heard the need to improve water availability. Also, people were worried about erosion of riverbanks. Houses around the riverbank were about to collapse," says Rodríguez. Another problem experienced by peasants was the compacted soil due to cattle ranching on the same plots for long periods.

Restoration initiative in Resguardo Teófila La Arenosa, Solano, Caquetá. Photo: Sofía Cumaco. Courtesy Tropenbos Colombia

About the landscape

Solano is the second largest municipality in Colombia, with 4.2 million hectares of land, about the size of the Netherlands, but with only 12,196 inhabitants. It is part of the department of Caquetá in the south of the country. Solano has large expanses of forest with high biodiversity, but deforestation rates are high and large parts of the forest are degraded, driven mainly by cattle ranching and to a lesser extent illegal coca cultivation. The landscape is composed of islands of small forested indigenous *resguardos*, home to more than 2,000 Indigenous Korebaju, Murui Mina, Nasa and Inga people, surrounded by large areas of pastureland of peasants who make a living through cattle ranching. The area is affected by conflict and experienced a strong presence by guerrilla fighters until the signing of the peace agreement in Colombia in 2016. The area currently has weak governance, and illegal armed groups are again present in the landscape, closely related to control over areas and narcotic trafficking routes.

Tropenbos Colombia started by organizing workshops that gathered peasants and Indigenous people to discuss these problems. Historically, when peasants arrived in search of land, they were unaware that it was a territory occupied by Indigenous people, who gradually lost control over these areas. Great mistrust arose between the two groups, aggravated by the presence of illegal armed groups. A second problem arose when an oil company that wanted to exploit the area started a consultation process. Although the company used Free, Prior and Informed Consent (FPIC), the process was very unclear to the Indigenous communities, and the peasants accused the indigenous people of selling the land to the company.

Bringing the two groups together in a neutral space — where they could share their histories and the legal framework which is specific to each group — helped to create an understanding of each other's situation. In this way they were able to express grievances and discuss the difficulties of coexistence in the area. As it is sometimes difficult for the Tropenbos team to enter the area because of the presence of illegal armed groups,

the team discussed the strategy with Indigenous and peasant leaders at a location outside the area. They were able to guide the meetings and in this way establish agreements between neighbouring groups. Tropenbos is adept in finding alternative ways to keep processes going under difficult safety conditions.

"What brought them together is that they share the same problems. And from the start, the peasants recognized that the Indigenous people know a lot about the forest and have always taken care of it. They have centuries of experience. The Indigenous people trained the peasants and they were very happy with it,"says Rodríguez. For example, Indigenous people shared their knowledge on what type of trees are resistant to sun and shade, which trees tolerate drought, and where to plant such trees.

Building on these efforts, Tropenbos Colombia helped both peasants and Indigenous communities with making restoration plans and by delivering the materials needed for them, such as fencing material and seedlings. Two nurseries led by Indigenous women were set up for producing a wide variety of tree seedlings.

How was the local community involved?

Tropenbos has worked for decades with Indigenous communities and local communities on forest management, including their traditional knowledge. "For us it was easy to get into contact with them," says Rodríguez. "We have connections with two local Indigenous organizations. They invited us to support their initiatives. The Indigenous communities are very driven to conserve and restore the forest." The peasants and farmers were also easily approached, as they are the neighbours of the Indigenous communities, and were interested in hearing about solutions to their shared problems. Peasant families got involved in planting seedlings to restore some areas on their farms.

"This was a very interesting framework for creating an intercultural participatory platform, together with the municipality and other NGOs."

Carlos Rodríguez

In addition, Tropenbos Colombia also involved the officials of the municipality and regional environmental offices, as well as other NGOs that support restoration. All municipalities are obliged by a court ruling to present plans to stop deforestation. As Rodríguez said: "This was a very interesting framework for creating an intercultural participatory platform, together with the municipality and other NGOs. Since then we have been trying together to gather efforts and resources to maintain this intercultural environmental roundtable of Solano."

Within Indigenous communities, Tropenbos specifically involved women, youth and elders. "We have always done that, from the beginning," says Rodríguez. "If you don't do that from the start, it is difficult to include them later." Elders contribute their knowledge of the trees and the forest, and youth their energy and enthusiasm. Women had a key role in setting up and managing the two tree nurseries. Being responsible for food preparation and caretaking, women have specific knowledge about edible and medicinal plants and trees. Rodríguez: "At the start, women did not show up at meetings, as they were very shy and not familiar with participating in these kind of meetings." Tropenbos Colombia set up a process of building the confidence and skills of women. The Indigenous women made up a list of medicinal plants and trees of importance to them. This led to them setting up the two nurseries. They cultivate, transport and sell more than a hundred different species of seedlings to other communities that are part of the planting schemes of the restoration projects that Tropenbos Colombia supports in the Solano area.

Results: surpassed expectations

The nurseries are just one of the results of the participatory productive restoration of Tropenbos Colombia. The most important result, Rodríguez says, is that while in the past there were conflicts between peasants and Indigenous communities, they now cooperate. "Intercultural agreements solved the environmental conflict and brought about restoration projects across the landscape."

To date, Tropenbos Colombia has supported 113 restoration initiatives in Solano. About half of them focused on the recovery of water sources, mostly by peasant families. Among Indigenous communities, many projects worked on the restoration of areas of *vendeaguajal* with timber and fruit trees that restore the soil and convert the areas for future productive diverse agricultural fields. All restoration efforts contributed to recovery of the forest ecosystem, and improved water availability and the quality of soils.

The 113 restoration proposals each involved about one hectare of restored land. So it was a big surprise, says Rodríguez, when a measurement — calculated by the geographic information equipment of Kadaster international — showed that the total area restored in Solano was 478 ha. "The measurement was done by the local communities themselves. They measured not only the restoration projects we supported, but also other projects that the communities initiated themselves and got financed through other NGOs." Communities copied the approach of participatory productive restoration, seeing that in this way, tree cover is better, the soil regenerates, and water sources increase. "This social appropriation of the concept and the exchange of ideas among communities is a great result and an example to scale out," Rodríguez says.

The 478 hectares that have been restored are only a small part of the total area of Solano; the largest part of the municipality is still covered by forest. The area that is restored is located in a small frontier landscape in the northwestern part of the municipality. In this area deforestation is a real threat, and 478 hectares of restored land makes a modest but significant contribution.

For Indigenous people, the benefit of restoration is in the increase and maintenance of the forest itself, Rodríguez says. "They are not interested in copying the capitalist model and getting the maximum income from the forest. Their main aim is to maintain the spiritual and cultural value of the forest. The whole being of Indigenous people depends on the forest. That is the reason that in indigenous territory, the forest is still in very good shape."

The restored forest does also provide material benefits, such as restored water sources and agricultural fields, food, medicine and hunting grounds, as well as timber for construction and the production of furniture and handicrafts. And for the women who run the nurseries, selling seedlings creates an income.

Contributing factors and barriers

Contributing factors

"The most important success factor in our restoration is the participation of Indigenous communities and the inclusion of their knowledge," says Rodríguez. What drives success is the involvement of local communities, both indigenous and peasants. "They clearly have the motivation to restore degraded forests. To solve the environmental problems, restoration is the answer."

A contributing factor to success is the new national goal on ecological restoration: to plant more than 700,000 ha in which local communities can play an important role in reducing deforestation. Restoration can also contribute greatly to the Nationally Determined Contribution (NDC) of Colombia, the country's contribution to countering climate change as agreed under the Paris Agreement.

Barriers

Institutions could better promote the use and benefits of restoration. According to Rodríguez, "Until now, at the level of the regional environmental authorities *(Corporaciones Autónomas Regionales)*, restoration has been seen as a way to conserve and protect forests, instead of as a way to support income and well-being for communities." In addition, the agencies have limited staff personnel who are specialized in restoration.

Legislation can also be a barrier to productive restoration (whereby the community earns an income from restoration efforts). Under current law, people can plant trees as part of restoration efforts, but cannot sell these trees once they are grown, because the laws relate to reforestation, and not restoration. Similarly, there are subsidies for conserving forest area, but not for restoration.

Also, local government is mostly focused on stopping deforestation and conservation of the forest, Rodríguez says, and is not as interested in restoration at a large scale. "Funds and resources are limited and focused on stopping deforestation, because deforestation is a political priority. Restoration is [seen as] an option for the long term, while the local government has to act immediately to stop deforestation. It is an important topic in the peace negotiations."

Another barrier to wider restoration is the lack of social organization. "At the local level Indigenous communities and peasant work with each other in local initiatives, but there are no organizations aimed at restoration specifically. If we could bring together indigenous organizations and peasant organizations in a big programme aimed at restoration, with finance from the government, we could increase impact."

Also, the economic benefits from restoration have not yet been realized, Rodríguez says. "We need to build the economy of restoration." For that, local initiatives for income generation from the products of restoration are needed, as are new and innovative financial mechanisms.

Commercial banks will readily provide a loan for cattle ranching, but not for restoration. And since trees take a long time to grow, it is necessary to develop financial mechanisms that can provide income to families from the moment they begin planting.

Impacts

"The main impact is the change in the minds of peasants and Indigenous communities," Rodríguez says. "They interact with and learn from each other. The number of farmers who learn from Indigenous communities grows every day. This increased interaction between Indigenous communities and peasants is part of a social movement in Colombia."

Nowadays, Rodríguez adds, peasants say that they are not against the forest, but with the forest. They want to be part of the conservation of the forest. Through agreements between peasants and Indigenous communities, restoration projects were made possible.

Water bonds and biodiversity bonds

Combining climate finance with water bonds and biodiversity bonds in future financial mechanisms creates opportunities to support restoration in the long term. Through these bonds, investors pay for restored water resources or recovered biodiversity, in the same way as through climate credits when CO_2 emissions are reduced.

In 2024, the Colombian financial institution BBVA and the International Finance Corporation (IFC), a member of the World Bank Group, issued the world's first biodiversity bond. It will amount to USD 70 million, with the objective of financing projects that address the key drivers of biodiversity loss. Investors pay for the reduction in biodiversity loss. The bond focuses on reforestation, regeneration of natural forests on degraded lands, climate-smart and regenerative agriculture and restoration of wildlife habitat, among others things.

https://www.ifc.org/en/pressroom/2024/28298

Also, through the restoration work boundaries of indigenous territories are respected and unauthorized timber extraction and hunting are prevented.

Another change is that Indigenous communities and peasants have a greater say in local policies and spatial planning. The municipality can now decide on and implement land-use plans. According to Rodríguez: "This is now a much more inclusive process. We created a round-table with the municipality and NGOs, such as Natura, The Nature Conservancy, and Amazon Conservation Team, to assure the participation of Indigenous and peasant communities and organizations."

More local and regional governments are becoming interested in participatory productive restoration, as they see that the concept has spontaneously been adopted elsewhere. Moreover, the new progressive national government has shown interest in the bottom-up approach of participatory productive restoration.

Lessons learned

Take time to do it right

The main lesson is that local indigenous knowledge is key to the process of participatory productive restoration. "Technical knowledge from science and formal institutions is welcome, but it is not the only form of knowledge. We should combine that knowledge with the ten thousand years of experience of Indigenous peoples," says Rodríguez. "So, we should not be too technical. We must be more open to including more kinds of knowledge."

That includes information expressed in other languages. Indigenous communities in Colombia speak a variety of indigenous languages, so that needs attention.

"Technical knowledge from science and formal institutions is welcome, but it is not the only form of knowledge."

Carlos Rodríguez

Another lesson is that it takes time to work with local communities. To create confidence, processes with local communities should occur over a lengthy period, Rodríguez says. Also, social organizations of local communities should be facilitated. Involving communities in policy and planning is something that takes time. But it is necessary, as restoration is a cooperative development, with participation by many actors. This means that long-term funding is needed.

It is also important to make the results apparent to others as much as possible. "That will motivate people to do the same and will spread the news," Rodríguez says. "This is happening at a small scale, but we need to do it at a larger scale."

Upscaling: show how it works, and make it pay

The process of restoration in Solano showed that there was spontaneous upscaling. While about 100 hectares of restoration projects were supported and financed by Tropenbos Colombia, more than 400 hectares were actually restored, some without financing and others financed elsewhere. "So there is a lot of potential for scaling," Rodríguez says. "The motivation is there."

What is needed for more upscaling is further support for the movement and social acceptance of PPR, says Rodríguez. "By working together with both peasant and Indigenous communities we show it is possible to build shared solutions." The approach has already generated interest among NGOs, the Ministries of Environment and Agriculture, and regional environmental agencies, as well as the Visión Amazonía programme. Tropenbos Colombia will continue to engage with these bodies and with the government's

restoration programme and other initiatives aimed at small-scale forest-based productive initiatives. "If more government programmes include participatory productive restoration, the impact could be much bigger,"says Rodríguez. Institutions such as regional environmental agencies, local government bodies and others need support in terms of training and skills development in the field of restoration, something Tropenbos Colombia is working on.

Upscaling of the approach would also increase when better financial mechanisms are available. More of these mechanisms, including those that provide income to families from the moment they begin planting, are needed. Tropenbos Colombia is working on these mechanisms. Combining the economic benefits of restoration with water or biodiversity bonds, both with private banks and government actors, is needed. These bonds can in turn can be combined with carbon bonds, whereby investors pay for the carbon fixed through planting trees and restoration of degraded land.

"There is also potential in the new political interest in debt-for-nature swaps," says Rodríguez. This is an arrangement, for example, between debtor countries and the countries with which they have debts to forgive a portion of these debts when it restores land and increases biodiversity. By the end of 2025, it is also expected that the government will include participatory productive restoration in its accounting for emission reductions within the framework of the Nationally Determined Contribution (NDC).

"Indigenous communities themselves are doing research, together with university researchers."
Carlos Rodríguez

Crucial to the broader adoption of participatory productive restoration is more and better education on the topic. Rodríguez has been working on this in recent years. In local primary, secondary and technical schools, students take courses on subjects like accounting, agriculture and animal husbandry, such as how to keep cattle or manage a farm. "But there is little education on forests, nurseries, biodiversity, forest conservation or climate change. We are trying to include that."

Local and indigenous knowledge should be included in education, Rodríguez says, and in research. "Indigenous communities themselves are doing research, together with university researchers. They document their knowledge on trees and forests in books, videos and radio broadcast programmes, as well as in peer-to-peer communication." Tropenbos Colombia has also invited Indigenous people to several local, national and international conferences on forest and forest management in recent years.

Key findings

- **When Indigenous communities and peasants united around emerging environmental issues such as lack of water and degradation of land, they made intercultural agreements, leading to restoration.**
- **Recognizing the value of indigenous knowledge was key — and doing that takes time.**
- **Over time, the participation of local communities in policy and spatial planning was increased.**
- **Further upscaling of the approach could be increased by continued sharing of experiences and lessons learned among communities and other actors, such as NGOs and government agencies.**
- **Innovative financial mechanisms will contribute to upscaling.**

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Chapter 3
Ethiopia

Seedling production at Tsigereda Cooperative. Photo: PENHA

A locally grounded national restoration strategy leads the way

Joris Tielens, Niguse Hagazi, Amsale Shibesi and John Livingstone

In Ethiopia, *a national restoration strategy was developed, which extended down to regional and local levels. This led to on-the-ground restoration in the Tigray-Afar border landscape, with a high degree of community involvement. It also led to the unlocking of substantial government funding for restoration at the national level. Both the practical implementation and the policy formulation were grounded in local needs and experiences; this is a turning point in Ethiopia.*

Nearly 70% of Ethiopia is considered dryland, and the country faces chronic land degradation caused by deforestation, climate stress and civil war. Most of Ethiopia's 110 million people live in dryland, and land degradation has serious impacts on rural livelihoods.

In 2024, however, new green shoots emerged in parts of the Tigray-Afar border landscape that had once been barren. This growth was the result of restoration activities driven by the Pastoral and Environmental Network in the Horn of Africa (PENHA), a partner of Tropenbos International in Ethiopia. PENHA is an African-led regional NGO, combining grassroots project implementation with research and policy analysis, focusing on drylands and dry forests, governance and gender.

As part of the PENHA-TBI restoration effort, a war-damaged public nursery was restored and handed over to 16 women, who now manage it as a cooperative. Women-led households engaged in homestead agroforestry, and a 10-hectare degraded hillside was allocated to a group of young people, who built water reservoirs to support agro-forestry. In addition, a group of women have set up a savings group, through which they generate start-up capital for keeping poultry, goats and bees.

"Policymakers now realize that for any strategy, policy or regulation they make, they need evidence from the ground of what works and what does not."

Niguse Hagazi

These are the practical results of a process that started in 2020 with the inclusive development of a national restoration strategy, which was adopted by the government of Ethiopia in 2022. Over the years, this national initiative led to six regional strategies and supported local implementation in the Tigray-Afar border landscape. The process is expected to spark more local-level restoration, for which significant national government funds are available.

In a change from previous practice, these policies — as well as the restoration work on the ground — are now integrated among various government departments and are based on the needs and priorities of local communities, says Niguse Hagazi of the Center for International Forestry Research and World Agroforestry (CIFOR-ICRAF) in Ethiopia, who is a technical advisor to the PENHA programme. Hagazi says: "Policy-makers now realize that for any strategy, policy or regulation they make, they need evidence from the ground of what works and what does not. And this evidence must be co-developed with communities." Government is listening to people, and that's a major change, in a conflict-torn country with a long tradition of centralized and top-down policymaking and limited space for civil society actors.

The process

How was the restoration initiative established?

Restoring the country's degraded drylands has the potential to contribute to the livelihoods of millions of Ethiopians. In the past, the national government has undertaken many restoration efforts. The PENHA-TBI restoration programme started with a problem analysis of these previous restoration efforts, says Niguse Hagazi.

Many of those programmes were hampered by a lack of coordination across government institutions and by a failure to harmonize policies across sectors. Moreover, restoration programmes failed to include local inhabitants. Tree planting and land restoration were based on area exclusion, which restricted communities' access to and use of dry forests and woodlands. This limited their incomes and their ability to maintain restoration efforts. Technical capacity was lacking at various levels. PENHA also studied the links between landscape restoration and Ethiopia's Nationally Determined Contribution (NDC), and assessed the frankincense value chain, emphasizing the importance of community forest ownership and management.

Homestead agroforestry in Arato.
Photo: Mulugeta Gemi, CIFOR-ICRAF

About the landscape

The Tigray-Afar border landscape is a mountainous dryland area affected by war. It is located in the north of Ethiopia, east of the mountainous and more temperate highland of Tigray Region, and northwest of the hotter and drier Afar Region. The reconstructed nursery is located in the Arato watershed. Within the landscape the PENHA-TBI programme operates in ten districts: two are intervention sites — one from each region — and eight are areas for scaling up. About 253,700 people live in the two districts. Land degradation and water scarcity are major challenges.

In 2020 the government asked PENHA to contribute to developing a National Drylands Restoration Strategy. PENHA facilitated the process, which led to the final strategy, in collaboration with CIFOR-ICRAF, and backed by the Ministry of Agriculture and Ethiopian Forestry Development. It held community-level consultations, and encouraged the active participation of and buy-in by relevant government agencies.

In 2021–22, around fifty high-level experts came together in a series of workshops. National and regional government agencies, research institutions and NGOs discussed the draft strategy. Task teams of around ten individuals each worked on four themes. This process revealed fragmented institutional mandates and a lack of technical capacity.

In December 2022, the Ministry of Agriculture formally endorsed the National Drylands Restoration Strategy. "Then the government made a request to cascade this national strategy to the regional level," Hagazi says. Between late 2022 and mid-2023, six regions with large dryland areas developed their own strategies, which adapt the national strategy to regional needs. The six regions are where most of Ethiopia's dryland is found: Afar, Amhara, Benishangul-Gumuz, Oromia, Somali and Tigray.

All this work was done despite the ongoing war in the Tigray Region, which started in November 2020 and lasted until the end of 2022. Beginning in 2023, pilot projects on participatory productive restoration (PPR) began in the Tigray-Afar border landscape.

According to Hagazi, "The PENHA-TBI programme started in the Arato watershed, where there was a government-led nursery that was damaged by the war. Restoring that was a priority for the community. In discussion with the district and regional governments, it was agreed that 16 women who had repaired it would get the ownership of the nursery; they now manage it as a cooperative." Initially paid as casual labourers, the women now earn income by selling seedlings.

Another nearby initiative is homestead agroforestry. Around 150 women-led households were trained, and planted avocado, vegetables and native trees around their homes, increasing both income and food security.

A group of 35 young people restored a degraded 10-hectare hillside in a nearby mountainous area. The group got ownership of the land, where they built water reservoirs to support agroforestry, vegetable growing and beekeeping. The local cooperative agency helped organize and support these groups. PENHA and TBI went through a long process with the local authorities to identify, organize and support the women and youth cooperatives.

Civil war

More than two million hectares of land were affected by the Tigray war, from November 2020 to November 2022. The PENHA-TBI programme in the Tigray-Afar border landscape uses the power and wisdom of local platforms for peacebuilding, conflict resolution and successful implementation and scaling up of good practices. Conflicts arise between individuals, small groups, and the wider communities. Typically these are resource-based conflicts around grazing, water, forest, woodlands and rangelands. The Abogerebs, a group of elders and influential community members from the border areas, have a key role in resolving conflicts and disputes and promoting cooperation and lasting peace.

Another practical action was setting up a savings group of about 15 women, generating start-up capital to support livelihoods. This improves womens' livelihoods and encourages investment in the landscape.

How was the local community involved?

When the national restoration strategy was formulated, it used an inclusive approach. Community-level consultations were conducted across various regions with forest user groups, smallholders and pastoralists, and women's and youth groups, as well as with Abogerebs, the traditional leaders in the Tigray and Afar regions. Abogerebs means "fathers of the trees," and these leaders have authority and influence.

From these consultations, twenty challenges for restoration were identified. These challenges were discussed in a series of workshops with experts and practitioners from across the country. This process resulted in a book (see Sources) and fed the policy process, Hagazi explains.

The experts working on the national strategy held several workshops. After each workshop, practitioners returned to their home areas to gather feedback, before reconvening to revise the strategy, based on the input they received. Through this back-and-forth between the national and regional levels, local perspectives were included. The final strategy emphasizes the need to involve communities in restoration, including women, youth, and landless and marginalized people. Hagazi says, "This is a clear change compared to previous restoration efforts."

Importantly, the national strategy integrates conservation, restoration and livelihoods, in line with community priorities and the PENHA-TBI approach of participatory productive restoration. This is a shift away from top-down approaches that impose costs on communities to participatory approaches that restore degraded lands and conserve forests while promoting local livelihoods.

In developing the regional strategies, extensive community-level consultations were held across six regions. Diverse stakeholders participated, including forest user groups, pastoralists and traditional leaders. This fostered local acceptance and support.

"Each group comes up with its critical challenges and a list of priorities."

Niguse Hagazi

Local communities were actively involved in prioritizing and setting up the practical restoration activities, Hagazi says. "We made groups of different social categories, like the women, the youth, the elders. Each group has its own interests and its own vision for that particular area. Each group comes up with its critical challenges and a list of priorities. And how the group members want to tackle these, based on their experience." In addition, there is a lot of local experience in age-old practices that conserve soil and water. "And communities contribute free labour to carry out these indigenous soil and water conservation practices, up to 20 or 30 days per year. In our conversations, they told us about the good practices and also the failures they have."

Later, the various outcomes from these groups were synthesized into a common goal for the community, Hagazi says. "In the end, you need a common vision for the community to get into action."

Results: from strategies to practice

The main result is the formulation of a comprehensive national restoration strategy, which is translated into six regional-level strategies. These strategies form the basis of the implementation of pilot projects on the ground.

Pilot projects include the restoration of the nursery where women gain an income from selling seedlings. According to Hagazi, "They now really get some money in their bank account." Over 150 women-headed households now practise homestead agroforestry, bringing them increased income and food security. In addition, farmers received training in income-generating activities linked to restoration, such as beekeeping and fruit production, benefiting at least 5,500 individuals, particularly women and youth. These activities provide alternative incomes, reducing pressure on natural resources while supporting sustainable livelihoods. The 10-hectare hillside restored by young people is now used for agroforestry, vegetable growing and bee-keeping. Village savings groups generate start-up capital for women to support their livelihoods.

Direct beneficiaries include around 3,000 households: approximately 15,000 people. Restoration in the broader landscape spans more than 120,000 hectares; it contributes to protecting the Desa'a Forest, which is threatened by wildfire.

The same inclusive approach now guides the national fire-management strategy being co-developed by PENHA, CIFOR-ICRAF and Ethiopian Forestry Development.

Contributing factors and barriers

Contributing factors

A major contributing factor was the solid foundation laid by the truly inclusive consultation in six regions, Hagazi says. "The approach we apply is really a success factor. We started with evidence at local levels with which we informed policymakers at national and regional levels, and based on this we developed a broad and coherent strategy. This we took back to the local level." Due to the iterative collaborative process

of research, workshops, consultations and informal meetings, once implementation got started, all actors knew what was needed and what was going to happen, Hagazi says. "Coordination was well done. It was clear what was needed from different organizations and government sections, and it was there. And because several organizations are involved, resources could be pooled. For example, CIFOR-ICRAF could contribute materials like shade nets and fencing materials for the nursery, when the budget from PENHA-TBI was limited."

A key factor in the successful coordination was that Tropenbos International was seen as an honest broker. The PENHA-TBI programme was new, credible and unbiased and came in as a fresh voice focused on key issues. In addition, the government was looking for a way to enhance coordination.

"We started with evidence at local levels with which we informed policymakers at national and regional levels, and based on this we developed a broad and coherent strategy."

Niguse Hagazi

Another contributing factor was the active involvement of local communities, Hagazi stresses. PENHA has been involved in projects in Tigray and Afar regions since 1992 and over time has built trust with local communities. " The practices that we do on the ground are really locally owned; for example, the production of planting materials or homestead agroforestry. Indigenous methods are used as well. And the methods are not sophisticated, so they can be easily replicated," says Hagazi.

It is important to make the landscape productive, through initiatives such as agroforestry or beekeeping. Improving the availability of water and countering erosion, thus increasing soil fertility, can also be useful. "To make restoration productive, it is important to plan restoration activities in an interrelated way. You need planting materials to have them available for homestead agroforestry, and women need access to credit in order to buy them." This interrelated approach involves a range of actors in the local community, Hagazi says.

Barriers

These included the civil war, which kept Tigray in its grip between 2020 and 2022. Afterwards, people were recovering from the war, and food security and housing were the first priorities for many of them. Livelihoods were very poor. The war also caused delays in the regional policy processes in Tigray and Afar.

In addition, restoration is a long-term process and the results of it come later than the investment does. Financial incentives were needed, but the programme budget was limited, Hagazi says.

Another barrier was the severe level of degradation of many drylands, Hagazi says. "You need a lot of resources to restore such degraded land; for example, in terms of the seedlings and water."

Impacts

The most important change has been in mindsets, among both community members and policymakers, Hagazi says. Where trees were once viewed as secondary to crops and grazing, they are now considered essential to productive landscapes. Local communities are managing and protecting trees, and landscape restoration has become a shared goal. "The community is really very keen about the productive landscape restoration approach. They really understood and realized the importance of trees in their landscape. That's something which was not common in the past."

There is also a shift in mindset among policymakers on the value of community consultations and on policy-making based on local evidence, Hagazi says. "If policymakers want to develop a strategy, policy or regulation, they now realize that they need evidence from the ground. They have seen the consultative processes that we did, and they have seen that they bring solutions that work in practice." In the past, policies were usually made by experts working at a ministry or elsewhere. Hagazi says, "Integration of the local perspective should be there from the beginning."

This shift is exemplified by the federal government's creation of the national Green Legacy and Degraded Landscape Restoration Special Fund. The fund allocates between 0.5% and 1% of annual federal budget (several million dollars) for restoration. As Hagazi says, "That's really huge money for restoration, which will make a lot more possible in future."

The restoration initiative also contributed to conflict resolution, Hagazi says. Joint planning and shared benefits reduced tensions between Tigrayan and Afari communities, particularly over scarce water and grazing lands.

"If policymakers want to develop a strategy, policy or regulation, they now realize that they need evidence from the ground."

Niguse Hagazi

Lessons learned

Foster collaboration

This experience confirmed that iterative, multi-level consultations can break with past exclusionary policies and build momentum. By fostering collaboration among national and regional stakeholders, the initiative ensured that efforts were coordinated and cohesive. Combining local input from the ground in a national strategy — which was endorsed at the highest level and — was successful, Hagazi concludes. "We used a hybrid strategy of combining the knowledge and insights from local communities with a national federal strategy. We showed it is possible, and this makes the PENHA-TBI programme unique."

Generate income

Income-generating components proved key, and need to be built into restoration plans from the outset. Hagazi says, "We needed to support the communities with some incentives from the beginning." For example, the women who repaired and set up the nursery initially got paid for their labour. Later, after the nursery got running, they earned income from selling the seedlings.

Clarify user rights

It was important for farmers, women and youth to have ownership or user rights over the land they work on and restore. In the Ethiopian context, privatization or land ownership by individuals is still relatively new. Hagazi says, "Legalizing land use gives the community the chance to create a vision of what the area will look like in the future. Privatizing the previously public nursery to be run by a group of women, and creating ownership by the youth of a degraded hillside gave them that long-term perspective."

Value chains for products derived from forest restoration or agroforestry are important as well. "Often, the barrier to more productive resource conservation is the lack of efficient production, marketing and value addition." Studies and pilots are needed, Hagazi says.

Upscaling: the national strategy leads the way to local implementation

Setting up an inclusive national restoration strategy and extending it to regional levels leads the way to upscaling and replication, as shown by the practical experiences in the Tigray-Afar border region. Because of the coordinated efforts, the Tigray-Afar border area transformed into a learning hub on restoration, Hagazi says. "It attracts other researchers, NGOs and government representatives to come and learn, and upscale this elsewhere." Knowledge exchange and documentation were continuous during the process, which facilitated learning and scaling up. Using simple techniques such as farmer-managed natural regeneration and homestead agroforestry makes replication easy. However, Hagazi notes, each initiative should be adapted to the local needs and context.

The model has already influenced other regions and projects. Irish Aid, which has been working for years with CIFOR-ICRAF, was inspired to replicate the nursery and hillside models in nine districts within Tigray Region. Other NGOs have introduced similar beekeeping programmes and village savings and credit groups.

Upscaling is supported by the regional government. The Bureau of Agriculture and Natural Resources is promoting the participatory productive restoration approach of PENHA-TBI and its consortium of collaborative partners.

Key findings

- **Inclusive, evidence-driven policy design works. A nationwide consultation produced Ethiopia's first National Drylands Restoration Strategy. The broad ownership that the consultation generated is now accelerating adoption across ministries and regions.**
- **Pilot projects in the Tigray-Afar border landscape translate the national strategy into tangible livelihood gains, benefiting some 3,000 households.**
- **Field experience feeds back into national working groups, refining technical guidelines and spawning new initiatives, such as the co-design of a national fire-management strategy.**
- **Disruptions due to the civil war, severe land degradation and insecure tenure in some areas, as well as lag times between restoration costs and the resulting benefits still threaten progress. Overcoming them will require continued multisector coordination, market development for restoration products, and mechanisms to buffer communities during the early years of restoration.**

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Chapter 4
Ghana

Community members tending seedlings in a tree nursery, Ghana. Photo by Tropenbos Ghana

Cocoa agroforestry offers resilience to climate change

Joris Tielens, Kwame Obeng, Kwame Sekyere and Daniel Baffour Arkorful

In the Western North Region *of Ghana, climate change is threatening the current monocrop culture of cocoa production. By adopting cocoa agroforestry, smallholder cocoa farmers re-introduce trees on their farms and are better able to adapt to future climate conditions. In addition, improved access to credit has empowered women, enabling them to invest in restoration. The key to further upscaling of this restoration effort is broader cooperation in the landscape.*

The deforestation rate is high in the Juaboso-Bia and Sefwi-Wiawso landscapes, in the Western North Region of Ghana. According to Global Forest Watch, the area — of almost half a million hectares — has lost about 60% of its forest cover. The rapid loss of forest cover is attributed to expansion of cocoa farms and to illegal mining and logging.

The majority of smallholders in the area cultivate cocoa. They used to grow shaded cocoa in mixed agroforestry systems, but over the years, non-shaded monoculture plantations have become dominant. This is partly explained by the incidence of black pod disease, which thrives in humid conditions. Extension officers advised farmers to control the disease by reducing the number of trees in cocoa farms, allowing more light and air between the cocoa trees.

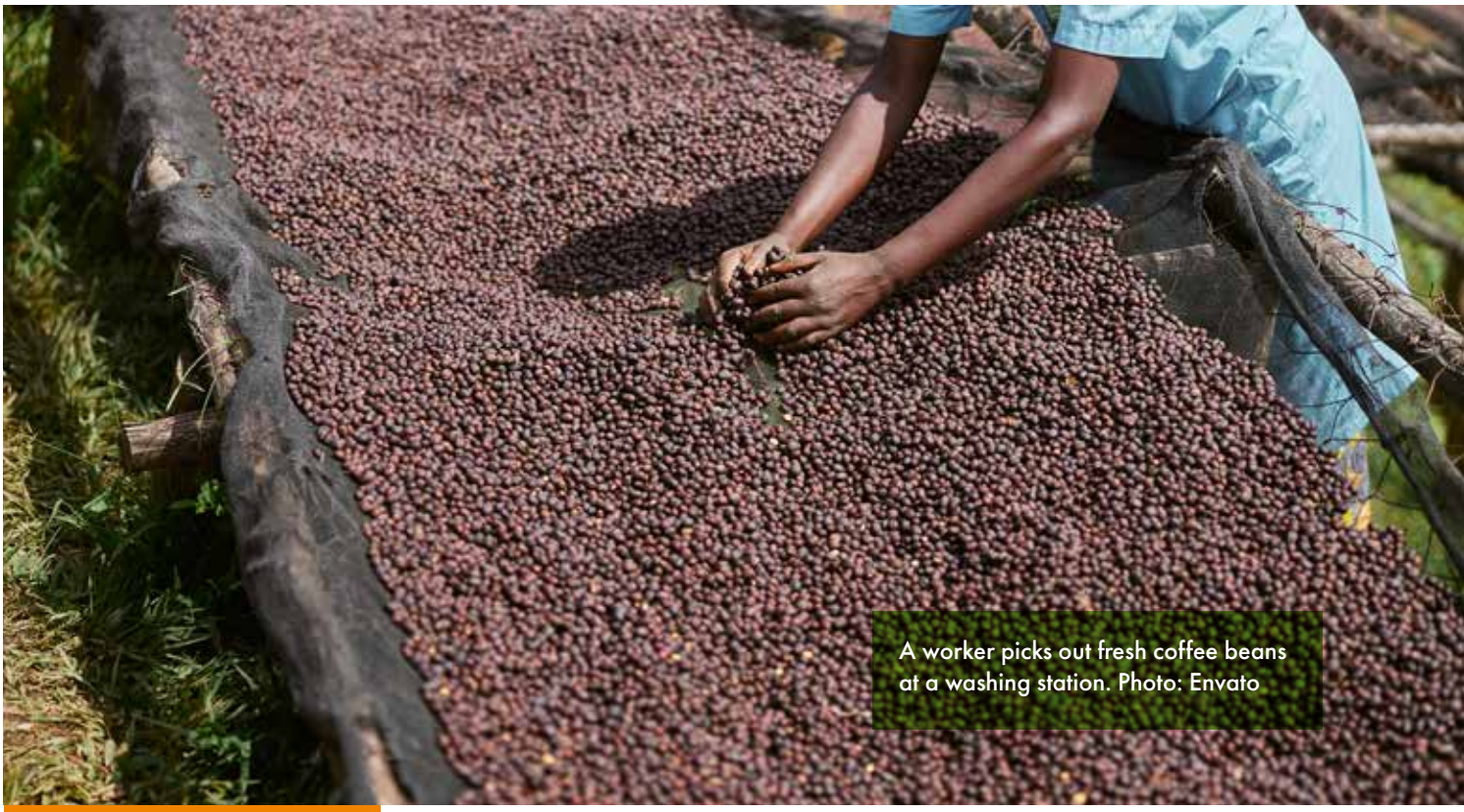
However, monoculture of cocoa led to many other problems. In a monoculture, the soils become degraded. Also, the production cycle of the traditional mixed system was about 40 years, while it is only about 20 years for non-shaded cocoa. After that, the cocoa trees and soils are exhausted, and farmers move on to look for new lands, which leads to deforestation. Moreover, with climate change, yields are reduced due to the higher temperatures and decreased rainfall. It is expected that with current climate change effects, cocoa yields in monocultures will be reduced by 28% in 2050. Given that many farmers depend almost entirely on cocoa for their livelihoods, and already struggle to make ends meet, such a decrease in yields would be disastrous.

As part of the Working Landscapes programme, Tropenbos Ghana has been working to make cocoa cultivation future proof and to prevent deforestation. To achieve this, it supports cocoa farmers to bring back trees into their farms, through planting trees or farmer-managed natural regeneration, in a mixed agroforestry system that combines cocoa with timber and fruit trees for shade, and other crops such as medicinal plants. Black pod disease is controlled by proper spacing of cocoa trees and effective pruning. Tropenbos Ghana has worked with the Cocoa Health Extension Division (CHED) under the Ghana Cocoa Board and major cocoa-buying companies such as Olam and Cargill, to change the message that farmers get.

This agroforestry effort is part of a landscape approach that also involves the restoration of about 110 hectares of degraded areas of community forest and riverbanks, which have been identified by communities, as well as a large school compound.

The restoration effort was supported by other ongoing initiatives being implemented by the government, private organizations and NGOs. Notable among them was Green Ghana Day, an initiative to plant trees across the entire country. In addition, Village Saving and Loans Associations (VSLAs) have been set up to give women smallholders access to cash to invest in restoration, tree planting and effective maintenance and pruning of their cocoa crop. Also, as part of the Working Landscapes programme, a template was developed to formalize informal oral agreements between land tenants and landowners, helping to secure income for smallholders.

In addition, advocacy work has been done to reach out to policymakers in order to improve tree tenure for farmers. Currently, in Ghana, all naturally occurring timber trees are considered the property of the state, regardless of where they grow. This limits the incentive for farmers to plant or regenerate trees.



A worker picks out fresh coffee beans at a washing station. Photo: Envato

About the landscape

The Juaboso-Bia and Sefwi-Wiawso forest landscapes are in the Western North Region of Ghana. Together, the two landscapes are home to nearly half a million people and stretch over 481,000 hectares. The area still has a forest cover with tropical forest of close to 60%, but it also has a rapid rate of deforestation. The two landscapes are considered hotspot intervention areas, as they have a high deforestation rate and an increasing area under cocoa farming, but they also have many stakeholders who are interested in maintaining the forest. There are a number of government-protected forest reserves and government-facilitated restoration efforts. Cocoa companies are active in the area, with various programmes that aim to make cocoa cultivation more sustainable. And there are various community forests.

The process

How was the restoration initiative established?

The restoration of riverbanks and community forest areas started in 2019. Community leaders, through consultation with Kwame Obeng, project lead for the Working Landscapes programme in Ghana, allocated degraded forestland for restoration. According to Obeng-Hinneh, "We wanted to see how we could support the local community members to restore their community forest land. So we began the discussions with the chief and elders in each community where we worked." The project provided support to map the degraded areas, which totalled 110 hectares. The degraded areas included riverbanks, where a variety of tree species with commercial value were planted to save water sources. With the help of local communities, many degraded riverbanks have been restored.

Before the restoration was carried out, members of the communities who were interested in participating received training in the purpose and importance of the restoration, and how trees should be regenerated or planted. Where new seedlings were needed, these were raised or purchased from vendors and given to the farmers to plant, Obeng says. "We didn't plant all the 110 hectares at once. Every year, we're doing some portion." In addition, a large plot that belongs to the compound of a secondary school was restored.

A range of people participated in the restoration work, Obeng says. Tropenbos Ghana brought together farmers, traditional leaders, cocoa companies and government agencies to promote practices that integrate trees and additional crops into cocoa farms. Farmers received training in cocoa agroforestry that strengthened their skills and their capacity to plant and nurture trees on farms. The training was delivered together with government extension officers of the Cocoa Health and Extension Division under the Ghana Cocoa Board, which supports farmers in the production and marketing of cocoa. Companies that procure cocoa, such as Olam Food ingredients, also took part.

Tropenbos Ghana engaged a consultant, and developed a business case and restoration management plan for the restored area. The management plan will guide restoration activities in addition to enhancing cocoa agroforestry by diversifying production and including non-timber forest products such as fruit and medicinal herbs.

A related effort looked for ways for farmers to benefit from payments for carbon emission reduction. Farmers in this landscape already benefit from emission reduction payments under Ghana's Cocoa Forest REDD+ programme (GCFRP). According to Obeng: "These payments include direct benefits, which go to the farmers directly, such as funding for farm inputs such as machetes and spraying machines, as well as indirect benefits that support community projects, such as the construction of boreholes and classroom blocks." The carbon finance is there for a long period of time.

"These payments include direct benefits...such as funding for farm inputs such as machetes and spraying machines, as well as indirect benefits."
Kwame Obeng

Agroforestry systems take years to yield returns, and most smallholders cannot afford to pay the upfront costs. The Working Landscapes programme has supported Village Savings and Loan Associations (VSLAs) since 2021, when it became clear that a lack of finance was a bottleneck for farmers, especially women, who wanted to invest in agroforestry. These community-run savings groups were set up based on lessons from CARE's VSLA initiative, and from ongoing VSLA efforts being implemented by NGOs in other parts of Ghana. Each group received a basic savings kit, training in financial management, and connections to local institutions for ongoing support.

How was the local community involved?

The participation of local communities was key from the start, Obeng says. "Rather than presenting a predefined agroforestry model, we started with listening to the communities."

They selected 17 communities in four districts in the landscapes to implement the Working Landscapes project. "When we moved into these communities, we first talked to the traditional leader, the chief and community elders. Then out of that, we got access to the people who were interested in participating in the project."

Through discussions with the chief and elders the team identified the areas within community forests to be protected. "Members of the community, especially women, also showed interest in protecting riverbanks, because most of them get water from the river. They see that rivers get polluted or get dryer, so they are keen to protect them."

For agroforestry, women and other smallholders indicated what type of timber trees, fruit trees, medicinal plants or other crops they would be interested in to plant between the cocoa trees. Women were also the target group for the project on VSLAs, since they are often the ones who invest in a more diversified livelihood. Obeng: "We have realized that the women are best in making money out of the village saving group for the household."

"We were able to expand our reach from 17 communities up to 51 communities in the same districts."

Kwame Obeng

Some farmers who showed a particular interest in agroforestry got individual training in climate-smart farming. They are called climate-smart agriculture (CSA) champions; after being trained, they in turn train other farmers in neighbouring communities. "In this way, we were able to expand our reach from 17 communities up to 51 communities in the same districts," Obeng says. "In general, the community members are very happy about what we have to offer."

Results: many hectares restored, village saving groups launch

The 110 hectares of community forests that chiefs demarcated to be restored in 2019 have now been reforested, or will be by the end of 2025. Several riverbanks have been restored, safeguarding water sources for communities.

Many trees have been planted in the cocoa agroforestry systems that have replaced cocoa monocropping. Key actors such as the Ghana Cocoa Board and several cocoa firms have integrated agroforestry in their programmes, and many farmers have adopted these practices. One study found that between 2020 and 2022, tree cover increased by 25% across 2,000 hectares of cocoa farms.

Concerted efforts to train farmers and CSA champions have helped 184,283 local community members to integrate trees and increase tree cover on their cocoa farms. In this way, 239,281 hectares of community degraded forestlands have been restored, halting degradation and improving biodiversity.

Thanks to the climate-smart agriculture champions, the agroforestry effort has been scaled from 17 to 51 communities in the landscape. Directly and indirectly more than 85,736 women participated in climate-smart practices. In addition, 51 women and youth who were CSA champions in turn coached other farmers to adopt climate-smart agricultural practices.

Village Savings and Loan Associations (VSLAs) were established, which increased members' access to credit, enabling them to invest in climate-smart practices. As Obeng says: "We started with about 25 savings groups. Due to the strategy that we have put in place, whereby VSLA agents have been trained to manage VSLA groups and establish additional groups, some of the groups have replicated themselves. So for now we have about 36 VSLA groups within the area." The groups are expected to continue to replicate. Each group has about 20 members, mostly women and youth. An impact study conducted in 2024 found that about three-quarters of VSLA members had taken out loans. Among them, 22% reported increased household income, and 26% noted increased savings.

Contributing factors and barriers

Contributing factors

What drives the restoration is the awareness among communities of the need to increase the number of trees in their farms and forests, in order for people to be resilient, says Obeng. "They have realized that the climate is changing and it's affecting their livelihoods and survival. The key strategy is to start increasing trees wherever they find them, and people know that. Along waterbodies, along degraded areas and in their farms. They have that positive mindset towards tree planting."

Another driver is that people can really make money by doing this, he adds. "We focus on how farmers can get some economic benefit from the restoration." The restoration is productive for them, partly because cocoa companies embraced agroforestry methods and offer farmers a premium price when they participate in agroforestry production. But it's also productive because farmers diversify their income by adding fruit trees, herbs and other non-timber forest products in their farm plan. If cocoa prices drop, there is alternative income. Finally, what makes it productive for farmers are the payments for carbon emission reductions that recently became available for them. According to Obeng: "Last year the emission reduction payment under the Ghana Cocoa Forest REDD+ Program (GCFRP) was around USD 900,000 for Sefwi-Wiawso and Juaboso-Bia Hotspot Intervention Areas, where we implement our programme. A large part of it gets to the farmers, and that is big money for them."

Despite hurdles, Tropenbos Ghana has consistently built trust over the years. Obeng: "We have been steadfast in our core message: the only sustainable path for cocoa production in a changing climate is through diversified cocoa agroforestry systems. Our focus remains on integrating a variety of economic shade trees into cocoa farms, a practice we believe is essential for the future of Ghanaian cocoa."

"We have been steadfast in our core message: the only sustainable path for cocoa production in a changing climate is through diversified cocoa agroforestry systems."

Kwame Obeng

Barriers

There are also serious barriers to the adoption of restoration and agroforestry practices, Obeng says. An important one is the uncertainty of tree ownership, which is a disincentive for farmers to invest in planting or maintaining trees or in restoration. A farmer who grows a timber tree is never sure if he or she can harvest it. "This is the main challenge that we have in Ghana as far as restoration is concerned," Obeng says. In Ghana, all naturally occurring timber trees are by law considered the property of the state, regardless of where they grow. When a farmer is unable to prove that he or she planted a tree, the state is legally entitled to license a logging company to harvest it. Although the licence holder must seek the farmer's consent before logging, this requirement is often flouted.

Obeng says that Tropenbos Ghana works on a solution through another programme, the Green Livelihood Alliance. Together with other civil society organizations, Tropenbos Ghana advocates for a stronger legal position for farmers in this matter. Obeng says: "We tell farmers that they have the legal power to take contractors that harvest trees that belong to the farmer to the Forestry Commission and also report them to the police since it is a criminal offence, but it is hard for farmers, who lack the power and the confidence to do so. Therefore we also advocate for a policy change by the Ghanaian government, which is a very long shot and probably not realistic." However, policymakers at the ministerial level are now aware that a policy change is needed to promote tree planting on farms, Obeng says, not only to maintain long-term cocoa production, but also to contribute to climate change mitigation objectives.

Another challenge is the uncertainty that sharecropping tenants experience about the share of benefits they will receive from their labour. In the landscape, cocoa-farming tenants engage with landowners through informal oral arrangements under traditional sharecropping systems, which stipulate the share of the proceeds that the tenant gets. These informal agreements often lead to misunderstandings, conflict and a reluctance to invest in agroforestry practices. Tropenbos Ghana is helping to resolve these issues by supporting the formalization of traditional agreements, while keeping the agreements grounded in local customs.

Impacts

There is a clear impact in the landscapes in terms of the large area that has been restored and the increased tree cover, Obeng says. Improved access to financial resources through the VSLAs is also a change in the lives of people, and supports investment in climate-smart agroforestry. But more important is the motivation to engage in agroforestry and tree planting, which is spreading through the landscapes, Obeng says.

"Important in this were the climate-smart champions who we trained," Obeng says. "They engage in peer-to-peer learning in other communities. They give day-to-day advice to ensure that best practices are being sustained and scaled up in the landscape." Those efforts are gradually changing the minds and behaviour of farmers concerning climate change and how to cope with climate-smart practices, Obeng continues.

In addition to communities and farmers, the companies, government agencies and NGOs that partnered throughout the programme are also key in the shift in mindset toward restoration and agroforestry. "Key in this is our landscape approach, in which we bring together all actors and have them look at restoration from the perspective of the landscape instead of the farm level." Companies have adopted agroforestry in their sustainability programmes. Three government districts have included agroforestry in their medium-term development plans, and local government agencies and assembly members actively promote tree planting in cocoa fields, after cooperating with Tropenbos Ghana on better integrated landscape planning.

Lessons learned

Trust is needed

A key lesson is that communities should feel ownership of whatever intervention is taking place, Obeng says, and confident that they will get fair benefits from it. "Communication and trust plays an important role," he says. "It's about openly telling the community what you intend to do and build trust. When you say A, you can't come later and say you are going to do B. You have to be consistent in your messages."

Partnerships are needed

Another key lesson, according to Obeng, is that partnership and coordination among NGOs, companies and government agencies are needed to share efforts and resources and prevent them from working in isolation or duplicating efforts. "If we really want to make an impact, we need to work together."

"If we really want to make an impact, we need to work together."
Kwame Obeng

With private companies, Tropenbos Ghana cooperates on a daily basis. "We do most of our training on cocoa agroforestry together with Olam Food Ingredients. They are our key partner in the landscape."

Close cooperation with various government agencies, such as the Ghana Cocoa Board or the Forestry Commission, is also needed, Obeng says. "We learned it is very important to engage them from the start. Because at the end of the day the project will not stay in the communities forever. When we involve these institutions and they know about our processes, they can take it over."

Among other NGOs and civil society in the landscape, coordination and cooperation also need to improve, Obeng believes. "We should coordinate activities and harmonize best practices, so that we all do the same thing." That is not always easy, Obeng says, because each NGO has a specific approach, which is often donor-led. "But in the end, it is the same farmer that we are all targeting. So we should all harmonize our interventions and our models. And even though it is difficult, it's time we start telling donors that this is the way to go to ensure that we have a sustainable environment and sustainable livelihoods for the people."

To promote coordination and learning, Tropenbos Ghana has facilitated an agroforestry learning and reflection platform within the landscape, Obeng says. "Every year we bring together all the actors within the landscape to learn and to see how we can scale up cocoa agroforestry." These landscape reflection meetings have been highly effective in pinpointing the key issues that are hindering the adoption rate of cocoa-agroforestry practices, Obeng says. "The finding that harmonizing agroforestry systems is crucial to alleviate farmer confusion about which models work best is a significant takeaway."

Upscaling: a lot of potential

There is a lot of potential for scaling up the approach, says Obeng. Many forests in the landscape are degraded and need restoration. The degradation of cocoa farms is a real threat not only to biodiversity and climate change adaptation, but also to the livelihoods of many smallholders. "We already have good cooperation with companies, government agencies and NGOs. With even better harmonization and sharing of resources, we can upscale and have more impact."

Key findings

- **Bringing back trees on cocoa farms helps smallholder cocoa farmers in Ghana make their farms more climate proof, securing a future for the cocoa sector in a changing climate.**
- **In an integrated approach, with the help of cocoa companies and government agencies, training farmers and climate-smart agriculture champions in agroforestry practices helped in scaling up efforts.**
- **Agroforestry practices brought a gradual shift in mindset among many people and organizations in the landscape, promoting cocoa agroforestry as well as restoration in community forests.**
- **Upscaling would benefit from increased coordination among civil society and other actors in the landscape.**

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Chapter 5
Indonesia

Seedlings being transported from the nursery to the field, West Kalimantan, Indonesia. Photo: Tropenbos Indonesia

Restoring forests by providing economic alternatives to communities

Joris Tielens, Ujang Susep Irawan, Edi Purwanto and David Simanjuntak

Seeing the economic potential *of agroforestry on peatlands changed the minds of people in forest communities in West Kalimantan. They are now interested in combining agroforestry, coffee cultivation and fisheries as an alternative to illegal mining and logging and deforestation. This has helped settle conflicts over land claims and laid the foundation for rewetting the peatlands and restoring the forest. The flexible and participatory productive restoration approach makes it scalable elsewhere in Indonesia, but land tenure conflicts continue to be a risk.*

Deforestation has been rapid in Ketapang District, in West Kalimantan, Indonesia. A large part of the district consists of peatland. Over the years, much primary forest has been lost here due to the rapid expansion of oil palm plantations and recurring fires on peatlands. In the past, canals were dug to drain water from the peatland swamp and lower the groundwater level, to prepare the land for agriculture and oil palm cultivation. Fire was often used to clear the forest in slash-and-burn agriculture. Peat soils are very susceptible to fire; also, the fire continues to burn underground and is difficult to control. In addition, peat fires are notorious for emitting large amounts of carbon dioxide, and the resulting haze has severe consequences for people's health and livelihoods. Another cause of deforestation in the area is illegal gold mining, which causes large areas of forest to be completely cleared.

In the villages of Sungai Pelang and Sungai Besar, located in the Peat Hydrological Unit of Pawan-Kepulu-Pesaguan in Ketapang District, Tropenbos Indonesia engaged in a restoration project that supports communities to counter the trend of deforestation and peat fires and restore degraded land. In addition to the two villages in peatland, Pangkalan Teluk, another village in a neighbouring area with mineral soil, is also part of the restoration project. In total the project covers more than 8,600 hectares (ha) of land, about 5,752 ha of which are still covered in forest. About 1,622 ha have either been completely cleared and degraded or have been partially deforested and lost biodiversity, and about 1,312 ha are lands that were formerly the site of illegal gold mining.

As part of the national social forestry programme in Indonesia, communities have the legal right to use and manage a part of the forest, in what are called village forests. These village forests are managed by local committees called Village Forest Management Institutions (LPHDs). People from the community have the right to utilize the area for agroforestry, collect and use non-timber forest products, and utilize environmental services, but the forest as such is protected. However, illegal gold mining, slash-and-burn agriculture, and logging do happen within and outside village forests.

"Based on a participatory approach involving the LPHDs and the community, plans were made for the restoration, including determining the type of trees used for agroforestry."
Ujang Susep Irawan

The approach taken by Tropenbos Indonesia is to seek economic alternatives to such illegal logging and mining and oil palm cultivation — so that community members are able to make a living without encroaching on the forest — while at the same time restoring degraded areas. In the project villages, an alternative was found in a combination of agroforestry, fisheries (in the canals that traverse the peatland), growing coffee and other peat-smart agriculture practices, which do not involve burning the forest to clear land.

"Based on a participatory approach involving the LPHDs and the community, plans were made for the restoration, including determining the type of trees used for agroforestry," says Ujang Susep Irawan, Coordinator of the Village Forest Programme and technical advisor on restoration with Tropenbos Indonesia. The canals draining the forest swamp were blocked so that the groundwater level could rise and the area could rewet. Nurseries were set up, involving men and women in the community. Also, local businesses were supported to process local products and improve the value chains of coffee and other agroforestry and fisheries products. A community-led monitoring system keeps an eye on the groundwater level in the peatland, to make sure the landscape is more fireproof.

Workers mark planting sites with ropes and stakes to ensure proper spacing in a restoration site, West Kalimantan. Photo: Tropenbos Indonesia.

About the landscape

Ketapang District, in the southern part of West Kalimantan, Indonesia, used to have vast forests but nowadays is severely deforested, with some remaining primary forests and a large peatland area. The rapid expansion of oil palm plantations threatens biodiversity. Every year, wildfires on peatlands emit large amounts of carbon dioxide and have severe consequences for people's health and livelihoods. The restoration project of Tropenbos Indonesia covers two villages in the Peat Hydrological Unit Pawan-Kepulu-Pesaguan: Sungai Pelang (540 ha) and Sungai Besar (6,522 ha). These villages are inhabited by people who migrated into the area from Java in the 1980s and engaged in agriculture. Additionally, farther inland and outside the peatland area, the village of Pangkalan Teluk (1,034 hectares) is involved in the project, in an area with mineral soil and forest. The villagers there are migrants or Dayak indigenous people.

The process

How was the restoration initiative established?

The process of setting up the restoration initiative started with coordination among the relevant stakeholders, such as the local Village Forest Management Institution (LPHD) and authorities at the district level, Irawan says. Subsequently, the community was informed about the purpose of and need for restoration. According to Irawan: "In this socialization activity, the community gave their input regarding what land is claimed by the community."

Some of the land they claim and use is located in the village forest. The smallholders in the community know that activities such as mining or slash-and-burn agriculture are illegal in the village forest, but nevertheless they carry them out, as they need to make a living. This leads to conflicts over land tenure between the smallholders and the village authorities. Together with the community, Tropenbos Indonesia looks for

alternative land uses in those areas over which land tenure conflicts arise. The solutions that are proposed are based on the needs of the community and on the commodities that have market value. As Irawan says: "Through agroforestry, the community can still utilize the land and earn money from it, while at the same time we can restore the area."

The areas where farmers intend to practise agroforestry are agreed on with the LPHD, who have authority over management of the village forests. It is important, says Irawan, that community members agree on the arrangement, which is made through a process of Free, Prior and Informed Consent (FPIC). Agroforestry gives smallholders an income from the forest and discourages them from encroaching further on the forest to grow oil palm or for other activities. This contributes to maintaining the forest and biodiversity.

"Through agroforestry, the community can still utilize the land and earn money from it, while at the same time we can restore the area."

Ujang Susep Irawan

In making the plans for agroforestry, the types of trees and crops to be planted are chosen in cooperation with the community. This includes local fruit trees such as durian, nangka, lengkeng and petai, as well as mango, avocado and jackfruit. Tree nurseries were set up to provide seedlings for the restoration effort. Beneath the trees, the farmers grow liberika coffee, a specialty variety from the region that has a lower caffeine content than arabica and robusta. Agroforestry is also combined with fisheries in the canals of the forest swamp.

The type of restoration work required depends on an assessment of the land cover condition and the degree of deforestation and degradation, Irawan says. In fully cleared forest, an intensive restoration with full planting is needed. Alternately, he says: "Where only some trees are cleared, assisted natural regeneration can be used, whereby natural vegetation is allowed to regrow, or enrichment planting can be done, where some trees are planted in addition to natural regeneration." Agroforestry, which takes place on about 30% of the restored land, is used where smallholders claim the land. Full restoration or natural regeneration are used in areas where no claims are made.

Project funding

In managing the village forest, the communities need extensive resources. Through the facilitation of Tropenbos Indonesia, the project villages get funding from Rimba Collective, through Lestari Capital. Rimba Collective is a consortium of the big oil-palm companies Nestle, Unilever, Proctor and Gamble and Pepsico. The companies provide payments for ecosystem services through the Remediation and Compensation Procedure under the Roundtable on Sustainable Palm Oil (RSPO) certification. This procedure was developed to address the unsustainable encroachment of forests in the past. The funding supports forest conservation and protection. Tropenbos Indonesia was appointed as the project operator to facilitate the sustainable management of village forests with these funds.

In non-agroforestry restoration, aimed at restoring natural forest cover, trees are selected for various purposes, depending on local needs. Criteria include the quality of timber, the value of the tree in terms of biodiversity, or the role it plays in animal conservation, such as providing habitat for orangutan.

Farmers and other community members are also facilitated in setting up social forestry business units, called KUPS. These are groups of entrepreneurs who work together to process products from the village forest. Two KUPS have been established in the area, which provide honey and freshwater fish. In the future there will be more units, which will process fruit from local trees, and provide coffee and seedlings in nurseries.

All these details are included in the discussions that are part of the FPIC process, Irawan says. "Also, from the beginning, agreements are made about sharing benefits. For example, when there will be income from agro-ecotourism, a division is made between the LPHD and the community."

How was the local community involved?

The community engaged in all stages of the restoration, says Irawan. "Starting from planning, seed selection, seed cultivation and planting, until the evaluation of the crop, the community is involved. We seek their approval through the process of free, prior and informed consent, which is very important."

Women and men participate in looking for useful seed trees in the remaining natural forest, and in collecting seeds and growing seedlings from them in the nurseries. Irawan says, "About 90% of the workers in the nursery are women." The LPHD owns the nursery. After the seedlings are grown, men participate in planting the seedlings in agroforestry systems or as part of enrichment planting in restoration of the natural forest.

"Overall, the community's response was positive, especially when they were actively involved in all stages of the restoration process."

Ujang Susep Irawan

The community is also involved in monitoring of the peatland, including the restoration areas. Community patrols regularly check how the newly planted vegetation is doing. Underground fires — which can damage the restored area — have been a major issue in the landscape for a long time. In order to tackle this threat, fire prevention activities are conducted; they involve monitoring groundwater levels. Based on this monitoring, recommendations are made to the authorities on canal blocking. As Irawan says: "Overall, the community's response was positive, especially when they were actively involved in all stages of the restoration process."

Results: just starting off, but promising

The number of hectares that have been restored so far are limited, as the first years of the programme were spent on setting up the process and building the nurseries. Actual restoration efforts started only in 2025 and so far about 15 ha have been restored. The target is to restore 1,622 ha in the next ten years. The target for December 2025 is 252 ha.

This restoration will increase biodiversity and forest cover, and reduce the threat of wildfires, says Irawan. "We hope for reduced pressure on the forest and limited encroachment."

Ten canals were blocked, raising the groundwater level and rewetting the landscape to prevent fire. Two nurseries have been set up: one with a capacity of 30,000 seedlings per year; one with a capacity of 40,000 seedlings per year. Another nursery is planned.

Many people are involved in and benefit from the restoration, says Ujang Susep Irawan. About 24 farmers were involved in planting the first 15 ha. For each of the next 10 ha that will be replanted, another 12 people will benefit. In addition, many women work in running the day-to-day activities in the nurseries. All of these people will receive a financial incentive of about USD 9 per day.

Irawan says: "Involving as many people in the community as possible creates awareness to refrain from illegal activities, and it increases the willingness to protect the village forest area. The income they get is an economic alternative to the illegal activities they were involved in."

There are not yet much data on the income that farmers generate from agroforestry in these villages. However, promising results in other projects elsewhere show that agroforestry can be an economic alternative to extractive uses of the forest. For example, liberika coffee is sold as a specialty product in Kayong Utara District, which increases its price. This could be replicated in Ketapang District.

Contributing factors and barriers

Contributing factors

The focus throughout the restoration was on providing economic benefits, in addition to ecological outcomes. This motivated the local community to engage, forming the basis for the restoration project. It was also important to strengthen the LPHDs, as the frontline implementers of restoration initiatives.

Another contributing factor was the availability of funds from the Rimba Collective, which enabled farmers and workers to receive a financial incentive. The government also provided some support in the form of technical assistance, capacity building, and providing important seedling species, as well as some of the funds related to the fire prevention activities.

Barriers

The continuing conflicts over land tenure limit the restoration effort. "Not all members of the community want to commit to what we have agreed upon. Some of them don't agree with that and they still want to utilize land based on their own interests; for example, to use land for oil palm." This underlines the importance of a thorough participatory process, involving everybody who has a stake.

Another problem is that some village borders are unclear. In the past three years, the government has defined village boundaries in many areas that do not align with the village forest areas that were designated in the past. "That means that sometimes, land that has been designated as a village forest, turns out to be included in the map of a neighbouring village. That is a major cause of failure of restoration projects." Elsewhere, Tropenbos Indonesia has had success with a participatory mapping exercise, where communities, together with indigenous authorities, determine the new village forest boundaries.

Extreme weather — caused in part by climate change and which will worsen — is also an issue, says Ujang Susep Irawan. Extreme rainfall causes floods, which damage restoration efforts. Conversely, if the dry season is prolonged, newly planted trees dry out. "We have learned to adjust our planting times," Irawan says. The planting of trees is now done long before the rainy season, so the trees are well established before a flood can wash them away.

Finally, in one village there was an unresolved conflict between Tropenbos Indonesia and another NGO working in the same village on the same kind of activities. In the end, Tropenbos Indonesia decided to withdraw from the village.

"Less land is cleared, now that the community better understands the value of the forest."

Ujang Susep Irawan

Impacts

The most important impact of the restoration project is a change of mind among members of the community in the villages, says Irawan. "The community has seen the potential of the economic benefits from restoration activities, such as livelihood diversification and the increased income potential from agroforestry-based coffee and fisheries. This has created a spirit of willingness to join agroforestry and restoration activities."

Due to this change of mind, there is less pressure on the forest, Irawan says. "Less land is cleared, now that the community better understands the value of the forest." Discussions among the community and the LPHD brought more clarity about the village forest boundaries and the responsibility of the LPHD to maintain the village forest. Through the restoration process, more awareness was created of land tenure conflicts. That reduced encroachment on the forest. This gain was amplified by the activities of the community patrol team.

The project also contributed to increased cooperation among village-level authorities and policymakers and government representatives at other levels. At the district level, a joint secretariat for sustainable natural resource management oversees activities in fire prevention and drew up a district master plan for fire prevention. The project also collaborates with related provincial agencies in supporting the province's social forestry management efforts. The project links with the national social forestry programme as well, which supported the achievements in village forest management by the LPHD.

Lessons learned

Offer the community something they need

"The main lesson is that the involvement of community is crucial," Irawan says. "Through the national village forest programme, it is the community and the LPHD that have the authority to manage the land." Lessons were learned about the participatory productive restoration approach. "In the past, in the very beginning, it was Tropenbos who decided what kind of trees to use for restoration. But we learned that doing so creates a conflict with the community. We may choose tree species that are good for conservation, but not good for livelihoods. People will not maintain these trees. So we changed our approach and let them select the trees."

It proved important to offer the community an economic alternative, Irawan concludes. "If the community does not benefit, they will not see why they should cooperate and get involved in restoration. When they don't get an alternative, they will continue with the illegal activity in the forest. So we need to strike a deal with them and give them an economic alternative." Therefore, the restoration needs to be carried out in a way that combines ecological and economic goals.

"If the community does not benefit, they will not see why they should cooperate and get involved in restoration."
Ujang Susep Irawan

Develop a thorough process

Though it takes time to invest in socialization and involvement of the community, it is better than the top-down approach that was common in the past, Irawan concludes. It is also important to build cooperation with various levels of government, as well as with the private sector, to put in place the incentives and policies needed for the restoration.

The overall lesson is that participatory productive restoration has clearly emerged as the preferred approach of Tropenbos Indonesia. It seeks to address ecological, economic and social needs in a balanced way by positioning communities as the main actors throughout all stages of forest restoration.

Upscaling: a lot of potential

There is a lot of potential for upscaling this approach, says Irawan. Community involvement, institutional cooperation and policies, and infrastructure such as the nurseries have been set up. The capacity of LPHDs has been strengthened. Tropenbos has documented restoration practices and lessons learned, which serve as valuable references for developing restoration efforts in other Tropenbos-supported areas. Now more hectares can be restored. There is a lot of peatland in West Kalimantan with similar conditions that faces the same problems, such as illegal gold mining and illegal logging.

What contributes to this scalability is the flexibility of the approach. Irawan says, "We can choose the type of restoration depending on the situation assessment and the needs of the people."

What is also helpful, he says, is the involvement of partners and policymakers at various levels of government, leading to the master plan at the district level that combines fire prevention with restoration activities. This lays the foundation for more restoration elsewhere in the region.

Key findings

- **Restoration of peatland in West-Kalimantan benefitted from a participatory approach, involving communities from the start. Settling conflicts over land tenure was essential.**
- **Offering agroforestry, coffee growing or fisheries as economic alternatives to illegal forest activities such as gold mining or oil palm cultivation proved crucial, in an approach of participatory productive restoration.**
- **The flexible and participatory approach makes it scaleable, with the potential to restore degraded peatlands elsewhere in West Kalimantan and Indonesia.**

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Chapter 6
Viet Nam

An agroforestry field trip in Krông Bông District. Photo: Tropenbos Viet Nam

Nature-friendly coffee agroforestry restores degraded land

Joris Tielens, Tran Huu Nghi, Tran Nam Thang and Nguyen Thi Quynh Thu

***In the central highlands of** Viet Nam, expansion of monocrop coffee plantations caused deforestation and loss of productive land due to erosion and depleted groundwater. Agroforestry practices that combine shaded coffee with productive trees — based on the needs of local people — allows people to grow coffee in a sustainable way, while also restoring degraded land and improving water availability. Collaboration with government extension agencies and coffee sourcing companies helps to scale up these efforts.*

The forested hills of Srepok River Basin landscape, located in the Central Highlands of Viet Nam, are home to communities of various ethnic minorities. The landscape is one of the country's most forested regions; almost half of it still has forest cover. However, the rate of deforestation is high. Forest is rapidly being encroached on, mostly by farmers who have moved to the area from elsewhere and established coffee monocrop plantations. Monocropping non-shade coffee — a field with only coffee shrubs in it — often leads to erosion and to depletion of groundwater levels, leaving the land unfertile and degraded. Climate change is expected to increase the water needs of coffee and other crops.

To secure a future for coffee farming while at the same time halting deforestation and restoring degraded lands, Tropenbos Viet Nam has been promoting diversified coffee-based agroforestry. The agroforestry systems are developed based on the needs of the local communities and in cooperation with local extension officers and government agencies. These methods are applied both in existing non-shade monoculture fields and on degraded land. A cornerstone of the initiative is improving the livelihoods of local communities, based on sustainable coffee production in agroforestry production systems, and linking farmers to responsible coffee sourcing companies. A recent cost-benefit analysis across two districts shows that diversified coffee-based agroforestry cuts irrigation needs while raising farmers' net annual revenue by 35 to 50% compared with monocrops.

The process

How was the restoration initiative established?

The promotion of diversified coffee-based agroforestry practices in Srepok River Basin is part of the Working Landscapes programme of Tropenbos Viet Nam. The initiative started by observing the needs of the local communities, says Nguyen Thi Quynh Thu, who is Programme Officer at Tropenbos Viet Nam. "We observed that the local people, especially the ethnic minorities, are the ones who put the forest first. They want to take good care of the forest. But their livelihoods are so poor. So we started looking for a way to improve their livelihoods while at the same time restoring the forest. That was the starting point."

Tropenbos Viet Nam, in collaboration with two universities, carried out research on how to do this. The studies were done with the participation of local people, Thu says. "Local people give us their input and we share the research findings with them for their feedback, so that we can develop solutions together."

The first study was done with Thuy Loi University on how agroforestry could reduce water shortage and forest loss. The research found that shifting from non-shade coffee monocultures to diverse coffee agroforests helps to restore a healthy water cycle in the landscape and has great potential to restore degraded lands, improve the microclimate, provide alternative sources of income, and increase the resilience of coffee farmers. These findings were used to convince stake-holders in the landscape to embrace coffee agroforestry for restoration.

"We observed that the local people, especially the ethnic minorities, are the ones who put the forest first."

Nguyen Thi Quynh Thu

The next study, with Tây Nguyên University and the provincial Department of Agriculture and Rural Development (DARD), looked at what kind of agroforestry systems would be suitable for degraded lands. The assessment resulted in a recommended model of shaded coffee combined in layered agroforests with indigenous fruit trees, timber trees and medicinal herbs and mushrooms.

The outcomes of the assessment were discussed with provincial and district government agencies. As a result, the DARD offices in two districts — Lak and Krông Bông — signed decrees that formally endorse the recommended model. That opened the door for Tropenbos Viet Nam to work with local DARD extension officers in the villages, who are trusted by the local people.

Carrying a seedling in Yang Tao commune, Lak district, Dak Lak province. Photo: Tropenbos Viet Nam.

About the landscape

The Srepok River Basin landscape is the catchment of the Srepok River, which flows into the Mekong River. The forested hills are home to communities of various ethnic minorities. The basin spans about 1.53 million hectares, approximately 45% of which is still forested. It is one of the country´s most densely wooded regions, with a high level of biodiversity. The expansion of coffee growing on the basin's slopes has accelerated deforestation, however, draining groundwater and stripping topsoils. Most of the project area is in the buffer zone of three protected areas: Chu' Yang Sin National Park, Nam Kar Nature Reserve and Lak Lake Nature Reserve. The restoration work carried out by Tropenbos Viet Nam was done in two districts — Lak and Krông Bông — that both have large areas of degraded lands. There is one town and ten communities in Lak District, with a population of 81,000 people, and one town and eleven communities in Krông Bông District, with 100,900 people.

Together with the extension officers and based on the research, a range of forest restoration models and agroforestry models were tested in the field. In workshops, this research was validated with the community.

Various approaches are used, Thang says. "In the upper part of the watershed we have forest restoration, where we work with the whole community. In the lower part we work on a household level. To improve biodiversity, we use native tree species from the forest." The aim is not only restoration and greater water availability, but also reducing the use of chemicals, Thang says. The next step is to train farmers in these diverse coffee agroforestry systems. Government extension officers and people working for coffee-buying companies participate in this training.

How was the local community involved?

The approach of Tropenbos Viet Nam is participatory, involving local communities, with a specific focus on women of ethnic minorities. "Ethnic minority women should take a leading role in agroforestry restoration," Nguyen Thi Quynh Thu says. "The women do a lot of things, like planting trees, taking care of the nursery and the trees and harvesting fruit," she adds. "But they benefit only a little from it. Therefore, they should have a role in this process, raise their voice, and improve their livelihoods."

Though women do much of the work, restoration efforts and planting trees are considered tasks for the men. When meetings are organized with local policymakers and managers of companies, only men attend as the representatives of their household. As Thu says: "At first the women are so timid and so shy to speak about themselves and their practice. When we would just invite them for multistakeholder meetings, it would look like a participatory approach, but due to the imbalance in power, this would not be meaningful. We first have to encourage women to speak more freely."

"Ethnic minority women should take a leading role in agroforestry restoration."
Nguyen Thi Quynh Thu

Tropenbos Viet Nam learned from this, Thu says. The approach is to first involve the women in the research. "We interview them, and make them familiar with the way we talk and what we want to share. Then we continue to engage them in small groups. And we help them to rehearse what they would like to say in larger meetings. So they get to feel secure and familiar with this way. They learn how to raise their voices. Then later, when they come to meet policymakers in larger meetings, they feel more confident. We do it step by step." This approach was appreciated by the university researchers, who confirmed that they actually learned from and applied this approach and shared it with other communities and their students. Also, as of 2023, district extensionists have continued the women-centred agroforestry training on their own initiative, following Tropenbos Viet Nam's pilot efforts.

Likewise, there are groups of local farmers who learn from each other. In the meetings, female and male farmers get a say in what kind of tree species are to be planted and in what areas. This helps makes sure that they will benefit from the agroforestry restoration.

Representatives of local women and farmers' organizations also engage in the process. "This encourages women and others to participate in our process," says Thu. Veterans and youth are also involved, which is important since young people will be the leaders in the future.

In addition to local stakeholders, the government is involved in many ways, says Tran Huu Nghi, who is director of Tropenbos Viet Nam. "In Viet Nam, the role of government is very strong, from the top to the local community level." The provincial and district DARD offices were involved in developing the agroforestry model.

Tropenbos Viet Nam also facilitated the efforts of DARD and the Department of Environment and Natural Resources (DONRE) to host restoration dialogues at the provincial level. These involved a wide range of stakeholders from the Srepok River Basin landscape, including representatives of farmers, womens' groups, NGOs, companies, universities and local government agencies. The outcome of these dialogues was the joint identification of areas where coffee agroforestry could be used for restoration. This culminated in a GIS map of priority restoration micro-catchments prepared by Tây Nguyên University, now used by DONRE and DARD for participatory land-use planning. Tropenbos Viet Nam provides input to this map with scientific inputs from its studies.

The role of private companies is increasing in the landscape, Nghi says. "In the past the government extensionists were very important, but now more and more companies are engaging with farmers as well. They provide training on farming to local communities." Companies that purchase coffee or other products from the farmers want to meet consumer demands in high-end markets such as the EU and the US. There is a market for sustainable and nature-friendly coffee and other products. This requires guidance for farmers on farm practices, such as not using pesticides or herbicides. Companies have attended training sessions and workshops held by Tropenbos Viet Nam, including those on a gender-responsive approach.

Results: improved water balance and diversified income

One of the main results is the improved water balance in agroforestry systems. Diversified coffee-based agroforestry uses much less water compared to monocrop coffee plantations, Nghi says. "We have conducted research on the volume of the water streams in the landscape. In a catchment with enough forest cover, more water runs down the streams, compared to a catchment with less forest and more agriculture. Forest cover directly relates to water availability." Groundwater monitoring shows that mature monocrop coffee typically needs 200 mm of water per month of dry-season irrigation, whereas intercropped plots stay productive at 100–150 mm per month. Irrigation demand is lower in intercrop systems thanks to the crops' deeper roots and the shade-driven microclimate. Soil moisture is more evenly distributed, reducing erosion-prone runoff. As water access will be limited in future due to climate change, agroforestry is a way to make coffee production climate proof and to sustain production and income for farmers.

Another result is the diversified income that results from coffee agroforestry in combination with trees and crops. Nghi: "We apply a model with many kinds of products. This reduces risk. If the coffee price drops, the farmers have other products to sell."

Farmers are inter-planting non-timber forest products such as mushrooms *(Ganoderma lucidum)* and medicinal herbs *(Codonopsis* spp., *Panax notoginseng* and *Coscinium fenestratum)* as well as trees, with coffee. These species can be harvested within one to three years, providing early cash flow while timber species mature, and they fetch premium prices in district markets. The production model has also shown that shade can enhance Robusta bean quality and price premiums in older stands. Although coffee yields per hectare drop (2.5–3.7 tonnes per hectare in monocrop versus 1.5–3.0 tonnes per hectare in intercrop), the additional products such as black pepper *(Piper nigrum)*, durian *(Durio zibethinus)* and giói *(Elsholtzia ciliata)* increase total annual revenues and drive the highest annual incomes in all districts. FarmTree projections show that intercrop farms in Buon Ma Thuot and Krông Bông generate annual net income exceeding VND 300 million (USD 11,387) per hectare, roughly double the best-performing monocrop.

> *"We apply a model with many kinds of products. This reduces risk."*
> Tran Huu Nghi

Since 2021, roughly 350 ha of degraded land and monocrop fields have been converted, engaging about 200 households across Lak and Krông Bông districts. Biodiversity has increased by using native tree species from the forest, including rare species.

Intercrop plots also sequester more carbon. Modelled carbon stocks are about 40 tonnes of CO2eq per hectare higher in intercrop plots than in monocrops over a 20-year horizon.

Contributing factors and barriers

Contributing factors

"Local communities are keen to participate in the restoration. That's an important contributing factor," Nghi says. "They are convinced of the importance of maintaining good soils and improving the water cycle to be able to give their children a good future." Farmers are interested in selecting tree species to plant in their farm, and they expect to earn extra income from that, Nghi says. "In the past, in restoration, the trees were selected by the government. Now, local farmers do that. That is very good."

What is contributing too, is the involvement of government at various levels, and the promise that agroforestry can play a role in achieving the country's Nationally Determined Contribution (NDC). NDCs are national climate action plans submitted by countries under the Paris Agreement, outlining their commitments to reduce greenhouse gas emissions and adapt to climate change. As Nghi says: "The government wants to achieve these goals and there is a clear signal that agroforestry can contribute to it."

"Women and farmers not only talk about climate smart practices, but they also actually apply them in practice."

Nguyen Thi Quynh Thu

Another contributing factor is that exporting Vietnamese and international coffee companies increasingly want to source nature-friendly coffee. These companies are training farmers in nature-friendly production, including agroforestry. If farmers follow that model, they can sell their coffee for a better price under a sustainability label. "Our initiative aligns with these requirements from the market," Thang says. As 90% of the coffee production in the region is for export, those sustainability labels are a real driver for change. What helps is that farmers are very responsive to the requirements of companies and quickly adopt new production methods.

A potential contributing factor would be including coffee agroforestry in the national system of Payments for Ecosystem Services (PES). The Ministry of Agriculture has asked Tropenbos Viet Nam for detailed water and carbon data to justify including coffee agroforestry in the national PES scheme, which would exempt shade-grown coffee from the fee while charging non-shade plantations.

Barriers

In terms of contributing to the NDC, simulations indicate that the scarcity of available soil nutrients and of on-farm management capacity are the key constraints to biomass growth.

A critical risk is the market volatility of intercrop species. Pepper and durian prices have historically halved when supply surged, so species choice must balance agronomic and market considerations.

Impacts

The most important impact of the agroforestry initiative is the change in the attitude and mindset of farmers, all three interviewees say. According to Thu: "Women and farmers not only talk about climate-smart practices, but they also actually apply them in practice." Not only local people do so, but also people from other provinces who are coming to Srepok River Basin to set up diversified coffee-based agroforestry, Thu adds. Farmers and district officials increasingly cite carbon revenue potential and improved farmer income as reasons to adopt shaded systems.

The change of mindset is also seen among representatives and trainers of farmers from companies, who want to serve markets with strict requirements, says Nghi. "Many companies convince local people to apply environmentally friendly production."

Now, more and more, local and district policymakers also have this change of mind toward agroforestry and climate-smart production systems, Nghi notes. Policymakers were involved in the multistakeholder processes set up by Tropenbos Viet Nam, and in this way were convinced of the new production methods. The push for sustainability from companies and the opportunities to contribute to national policy goals added to this.

Through the multistakeholder process, both policymakers and companies became more and more interested in a participatory approach, says Thu. "During the process, we inform policymakers and companies about our participatory approach and the importance of taking into account the needs of the people. So when they hear the stories from the local people themselves in the multi-stakeholder meetings, they will be more willing to accept that."

The landscape approach — of involving whoever is working or living in the landscape in the process — is more and more recognized, Nghi concludes. "And though other organizations now adopt this approach, Tropenbos is the pioneer of the approach in Viet Nam."

"We document our work and produce technical manuals on agroforestry, community forestry management, forest restoration and climate-smart coffee production."

Tran Nam Thang

Lessons learned

Adapt the model to the needs of farmers

The main lesson from the process is that restoration should be participatory and should be based on the needs of the local people, especially women. According to Thang, "In the past there was a lot of encroachment into natural forest from farmers planting coffee cash crops. Converting coffee plantations into natural forest is almost impossible. The way to go is agroforestry that on the one hand meets the needs of the farmers, while on the other hand also contributes to restoration."

The trees and crops included in the agroforestry model should meet the demands of the local farmers, Thang continues, including species that yield benefits in the short term. At the same time intercrop species should be selected for both ecological fit and steady supply to avoid boom-and-bust cycles.

Gender-responsiveness is vital

An important lesson is that a gender-responsive approach is vital. Women-centred training rounds piloted by Tropenbos Viet Nam are now being repeated by district staff, even without external funding. This approach should be institutionalized, to spread good practice faster than project grants alone can.

Involve other stakeholders

It is important to develop the agroforestry models together with district government representatives and extension officers, as well as with companies and other stakeholders, because extension officers and company trainers provide the training for farmers.

Another important factor for success was basing the approach on research and simulations. The studies involved local community members and other stakeholders, and the outcomes of the studies informed the agroforestry models.

Upscaling: spread the word

Adoption of the approach elsewhere in the country is expected. Apart from the direct impact of the work on communities, enterprises and local extension agencies, there is a plausible indirect impact, through spreading the idea elsewhere to be adopted by other farmers, extension officers or companies. According to Thang: "We document our work and produce technical manuals on agroforestry, community forestry management, forest restoration and climate smart coffee production." These documents are shared with stakeholders such as extension officers, and government representatives, who also take part in training.

Moreover, local people have voluntarily formed cooperatives and groups, and shared lessons with others on effective agroforestry models. "For example, a local enterprise in Dak Lak's Cu'Mgar District showed their interest in upscaling the approach. Local authorities referred to our approaches as good examples." Knowledge is shared both in English and Vietnamese. In addition to manuals and reports, the word is also spread through video clips and community television.

Thang says: "There is talk about the model created by Tropenbos in the landscape. That is a signal that it is shared among communities. We believe there is considerable indirect impact, replication and upscaling."

Key findings

- **Agroforestry delivers a clear double dividend: water security and higher profits. Scaling this model across the Srepok River Basin therefore offers a cost-effective route to simultaneously relieve groundwater stress and raise household incomes.**
- **Carbon and biodiversity gains strengthen Viet Nam's NDC case. Formal recognition of these services in PES schemes would unlock a new revenue source for shade-grown coffee while rewarding smallholders for ecosystem stewardship.**
- **Early-harvest non-timber forest products such as medicinal plants and mushrooms make it favourable for farmers to adopt agroforestry.**
- **Gender-responsive, district-led extension is important. Women-centred training rounds piloted by Tropenbos Viet Nam are now being repeated by district staff without external funding.**
- **Price volatility remains the chief risk. Diversification of products, cooperative marketing, crop insurance and market intelligence are shields against this.**

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Chapter 7
Synthesis

Tree planting in Krông Bông District. Photo: Tropenbos Viet Nam

Restoration that works for people and nature: lessons in PPR from six countries

Humberto Gómez and André Brasser

Across six very different *landscapes — savannah–forest interfaces in Bolivia, frontier forests in Colombia, cocoa farms in Ghana, dry-forest mosaics in Ethiopia, peat swamps in Indonesia, and coffee hillsides in Viet Nam — local partners have tested and put into practice participatory productive restoration (PPR). Practitioners and local communities in all six countries found that restoration cannot be reduced to tree-planting targets; it must be a co-created effort where local people regenerate ecosystems and earn a living from them.*

Local concerns — water security, stable incomes, cultural values, and peace — are included in these restoration actions, making them a community-driven investment rather than an externally imposed project. Because the six initiatives had different biophysical, political and market conditions, their collective experience offers a broad evidence base. Drawing on the six country chapters, this synthesis traces their successes, the barriers they faced and the requirements for developing a restoration approach that is simultaneously social, economic and ecological.

Participatory productive restoration

Participatory productive restoration is based on three propositions. **First:** nature and livelihoods rise or fall together; land will stay "green" only if people can make a living from it. **Second:** many kinds of knowledge count; local worldviews, women's plant knowledge and farmers' hands-on experience stand alongside formal science. **Third:** process matters; talking through rights, roles and benefit-sharing is part of the planning process, not an add-on. In practice this means allowing enough time for consultation, inclusive local bodies, a flexible choice of field options, and learning by doing.

Every case begins with dialogue in the places where people live and work. The type of dialogue varies — roundtables with Indigenous and peasant leaders in Solano (Colombia), water-user meetings on the Tigray-Afar border (Ethiopia), mapping with village forest groups in Ketapang (Indonesia) — but the aim is the same: agree on what to restore, who does what, and how it pays.

The outputs differ (watershed revegetation with Chiquitano almond in Bolivia, cocoa–timber intercropping in Ghana, coffee-fruit agroforests in Viet Nam), yet the design approach is the same. Species choice, planting density, labour organization and benefit-sharing are decided locally. Techniques run from assisted natural regeneration (ANR) to more intensive agroforestry, depending on soils, water and tenure. Consideration of markets is built in from the beginning, whether through ecosystem-service payments or product premiums. Each country sets up simple learning loops — peer field visits, farmer champions, nursery groups or district learning hubs — so practice and policy can improve together. When these elements align, degraded forests turn from liabilities into community assets, and restoration gains a durable social base.

The process

How the restoration initiatives were established

Restoration processes in the six landscapes consistently **began with local problems** and interests rather than with predetermined planting targets. In Caquetá, Colombia, workshops identified drought, collapsing riverbanks and compacted soils as immediate community concerns; peasant and Indigenous neighbours met to discuss grievances and co-plan around springs and riverbanks. The focus on restoring water sources, informed by local knowledge, helped turn mistrust into collaboration. In Ghana's cocoa belt, project teams first consulted chiefs, elders and interested villagers to map degraded sites — about 110 hectares of river-banks and community forest — then planned phased restoration year by year, pairing farmer training with site selection, based on what people valued. Viet Nam's Srepok River Basin initiative started by observing that ethnic minority households were committed to forest care but trapped in poverty, then commissioned participatory research to find a livelihood-restoration approach to diversified coffee agroforestry.

Early legitimacy came from building inclusive platforms before deciding on practices. In Ghana, resto-ration was anchored in community authority and then broadened to include government extension officers and cocoa companies, aligning messages and incentives across the actors who shape farmers' choices. Indonesia convened Village Forest Management Institutions (LPHDs) to socialize the purpose and rules of restoration, and made consent and benefit-sharing explicit through a process of Free Prior and Informed Consent (FPIC); this is crucial in landscapes with overlapping claims and a history of extractive activities.

Viet Nam secured district-level decrees from the provincial government that endorses the recommended agroforestry models, opening the doors for trusted government extension officers to work alongside communities.

Technical choices were co-designed to match site conditions, rights and market realities, rather than being imposed on communities. In West Kalimantan, Indonesia, the team used a varied approach: full planting on deforested sites, assisted natural regeneration or enrichment where partial canopy remained, and agro-forestry where households held use claims, often combining fruit trees with liberika coffee and agro-silvo-fishery in canal networks. Viet Nam's three-layer coffee systems — timber/fruit over coffee over herbs — emerged from collaborative studies with universities and were tailored to upper watershed restoration with native species. Ghana's shift back to shaded cocoa addressed black pod disease through spacing and pruning while restoring tree cover and riparian buffers, linking agronomy to landscape goals.

A community member evaluating the PPR of Chiquitana almond seedlings in Lomerío, Bolivia. Photo: Miguel Manchego Chavez. IBIF

Where **ecology was combined with economics** from the beginning, participation and maintenance endured. In Indonesia's village forests, restoration plans were coupled with funding from Payments for Environmental Service (PES) via the Rimba Collective and clear benefit-sharing rules, while livelihood options such as coffee, fruit and fisheries reduced incentives for further encroachment. Ghana paired community restoration with Village Savings and Loans Associations (VSLAs) to make cash available early on, and complemented this with REDD+ proceeds that funded tools and community projects; these tangible near-term benefits made long-term tree care feasible. Viet Nam linked farmers to company extension and markets through agroforestry, ensuring that "nature-friendly" products had a buyer. Colombia explored restoration-aligned finance — from carbon and water bonds to debt-for-nature swaps — to scale incentives beyond project cycles.

Capacity building was continuous, with roles for women and youth. In Ethiopia's Arato watershed, a war-damaged nursery was restored and handed over to a women's cooperative; women-led homestead agroforestry increased food security and income; and a youth group received a 10-hectare hillside to restore and manage. Each step embedded skills with ownership. In Indonesia's peatlands, women ran most nursery operations while community patrols and groundwater monitoring institutionalized local stewardship. Ghana's training efforts were co-delivered with government extension services and cocoa companies, reinforcing changes in farm practices. Bolivia adapted coaching to women's schedules, even arranging childcare so women could participate and lead producers' committees — an operational detail that made inclusion real.

Barriers were remarkably similar across contexts and were navigated through participation and changes in policy. Overlapping claims and tenure frictions were explicit in Indonesia's village forests; socialization and FPIC led to negotiated land-use solutions, with agroforestry offering use without encroachment. Damaging legacies of top-down restoration — area exclusion, weak coordination and little community say — were addressed in Ethiopia's national strategy process, which focused on local participation and livelihoods. Social mistrust was a barrier in Colombia, where peasant–Indigenous tensions and confusion over FPIC were addressed by convening neutral dialogues to discuss histories and rights before co-designing restoration around water sources. Climate and fire risks were ongoing in Indonesia's peatlands; community monitoring and canal blocking were used to protect young plantings.

Perverse incentives also had to be addressed; in Ghana, state ownership of naturally occurring timber depresses farmers' interest in nurturing trees, an issue that requires advocacy alongside fieldwork.

Taken together, these experiences suggest practical ways to establish similar restoration initiatives in other places:

- start by listening to what people say about problems — water scarcity, erosion, food insecurity — and map priority sites with local leaders and interested farmers;
- formalize a multiactor platform that blends customary authority with statutory backing and obtains FPIC where relevant;
- diagnose ecology and rights together to match methods to place — from ANR and enrichment to agroforestry or riparian buffers;
- co-design for co-benefits so near-term incomes (e.g., from diversified cocoa, coffee, fruit, fisheries) complement long-term tree functions;
- provide finance for early stages via savings groups, PES/REDD+ and municipal or company funding;
- embed extension services and inclusive facilitation so women and youth can lead and learn in ways that fit their lives;
- monitor what matters with communities and adapt to changes; and
- codify what works through decrees, manuals and plans so it can be adopted by other districts and regions.

How was the local community involved?

Across the six landscapes, communities were not just consulted — they co-piloted design and decision-making through structures and efforts that reflected local authority, social diversity and everyday realities.

Restoration initiative in Resguardo Teófila La Arenosa, Solano, Caquetá, Colombia. Photo: Sofía Cumaco. Courtesy Tropenbos Colombia

In **Bolivia**, communities requested support after the 2019 fires, defined which communal forest blocks and *chacos* to restore, chose fruit and native tree species and — across more than 40 communities — elected representatives to a producers' committee that coordinated training and interfaced with municipal authorities.

In **Colombia**, an intercultural platform drew in municipal officials and regional environmental agencies — helped by a court mandate requiring municipalities to submit anti-deforestation plans — while Indigenous elders, youth and peasant families co-designed actions around water sources and farmlands, with each group contributing distinct knowledge.

In **Ethiopia,** community-level consultations brought together forest user groups, pastoralists, women, youth and Abogerebs ("fathers of the trees," whose authority in conflict resolution and natural resource management helped anchor an inclusive national strategy). Representatives gathered feedback, and a range of people set priorities, aligned indigenous soil and water practices and synthesized a shared vision — underpinned by community volunteer labour.

In **Ghana**, community agency in two ways catalyzed efforts: women mobilized around protecting riverbanks and springs — where water scarcity was first felt — and a network of climate-smart agriculture "champions," trained by Tropenbos Ghana, then trained peers across neighbouring settlements, expanding from an initial cluster of 17 communities to dozens more.

In **Indonesia** village forest communities went beyond formal consent: after a reset in approach, species choice moved from NGO-driven lists to farmer-chosen mixes that fit household economies; people organized social business units (KUPS) to process honey and fisheries products, and they co-managed nurseries and restoration schedules with the Village Forest Management Institutions — binding livelihoods to stewardship.

In **Viet Nam** efforts complemented village-level groups with province-level restoration dialogues convened by the provincial government, bringing together women's unions, veterans, youth associations, companies, universities and local officials so farmers could influence both land-use zoning and company training agendas.

Where community involvement faltered, the sticking points were practical rather than philosophical and teams navigated them by making changes to governance and incentives. By doing this constraints were met, lessons were learned, approaches were adapted and practical solutions were found.

Freshly harvested cocoa pods. Photo: Envato

In Indonesia, lingering ambiguity over village borders occasionally compromised planning, while overlapping NGO efforts in one village created confusion severe enough that one actor withdrew. The remedy elsewhere was participatory boundary work and clearer division of roles. Ghana's informal share-cropping agreements between landowners and tenants made many farmers wary of long-term investments in trees and of adopting agroforestry; formalizing customary arrangements and clarifying benefit-sharing reduced the perceived risk. Bolivia's prolonged droughts threatened seedling survival and undercut household confidence, while the lack of robust value chains for processed foods limited market influence; both issues pointed to the need for climate-smart timing and enterprise support.

Colombia's regulatory frame still treats "productive" restoration awkwardly — in some cases authorizing planting, but not harvesting — which discourages community investment. Also, local agencies tend to see restoration only as protection, not as a livelihood strategy, which constrains programme support. In Ethiopia post-conflict recovery and the sheer resource intensity of reversing severe dryland degradation meant that communities needed time, tools and bridging finance to translate enthusiasm into implementation.

A practical way to gain support from communities is to combine local leadership with multilevel institutions and near-term benefits.

- Begin where requests and responsibility already exist — as in Bolivian communities that asked for help and then selected sites, species and layouts — so people see the impacts right away.
- Build a process where different authorities can meet as equals. Colombia's intercultural roundtable shows how municipal mandates and Indigenous/peasant organizations can co-own restoration agendas and align them with statutory planning.
- Base choices on participatory evidence so farmers shape both the "what" and the "where" — Viet Nam's university-backed work with DARD/DONRE demonstrates how local research can be incorporated into zoning decisions and company curricula that reach far beyond a single project.
- Make participation durable by embedding it in local rules, budgets and forums. When dialogues, decrees and municipal plans support community-authored models, involvement moves beyond being a workshop topic to the way the landscape is governed.

Lessons learned

Co-create around locally defined problems and knowledge

Restoration persists when it is designed with — not for — communities, and is anchored in the issues they name and the know-how they trust. Ethiopia's strategy process was built on community consultations (including pastoralists, women, youth and the Abogerebs) and then incorporated in policy. This explicitly shifts the focus away from top-down tree planting to an approach that couples conservation with livelihoods. In Colombia, previous experience explicitly put indigenous knowledge on an equal footing with science, with choice of species, spacing and site logic following what elders knew about water, soils and shade, rather than generic prescriptions. Bolivia had the same insight after field evidence showed strong natural regeneration: the most effective restoration was not more trees, but locally owned, productive practices that communities asked for and co-led.

Combine ecology and economics from day one

Across contexts, participation endured when early, tangible livelihood gains were built into the ecological design. In Ethiopia, the project initially paid women to repair a war-damaged nursery; this evolved into a women-run cooperative that earns income from seedling sales. In addition, women-led homestead agroforestry improved food security and cash flow, making care for trees viable even in the lean months. Ghana's pairing of restoration with Village Savings and Loan Associations (and periodic REDD+ proceeds used for tools and community projects) gave households the liquidity to establish and maintain trees before long-term benefits arrived. Indonesia's social business units (KUPS) for honey and fisheries, alongside nurseries and agroforestry, linked stewardship to revenue streams that reduce the pressure to encroach on forests.

Clarify rules, roles and rights early on

Clarity on tenure and benefit-sharing unlocks support. Indonesia embedded FPIC into village-forest planning and made benefit-sharing explicit, a practical antidote to overlapping claims and past extractive uses. Ghana's teams learned that without formalizing customary sharecropping agreements — and addressing disincentives from the state ownership of naturally occurring timber — farmers were reluctant to nurture trees; tying restoration to clearer contracts and incentives boosted adoption of agroforestry. Viet Nam's district decrees for coffee-agroforestry show that when authorities formally recognize models, extension services can back them consistently across villages.

Work through multilevel governance to make change routine

Successful teams didn't stop at pilot projects; they institutionalized the results. Ethiopia's nationally adopted strategy, followed by six regional strategies, provided a coordinated scaffold for local implementation, so agencies, researchers and NGOs could pool resources and act in concert. Ghana's model was normalized through COCOBOD and district plans, aligning public, private and customary actors around shaded cocoa and riparian restoration. Indonesia moved beyond projects via district-level master plans for rewetting, revegetation and revitalization, tying community action to monitoring and budgets.

Design participation that fits people's lives

And let women and youth lead. Inclusion wasn't just a workshop; it considered logistics, roles and ownership. In Indonesia's nurseries, about 90% of workers were women and their day-to-day leadership in propagation made a technically demanding task locally controllable. Bolivia learned to schedule coaching around women's routines and provide childcare so women could organize producers' committees and drive municipal change — small operational changes with outsized governance effects. Ethiopia's youth-managed hillside plot showed how assigning tangible assets to younger cohorts turns engagement from a theory to intergenerational commitment.

Learn by doing, measure what matters and adapt quickly

The most resilient efforts closed the loop between research, practice and policy. Viet Nam's collaborations with universities generated data that was translated into field models and technical manuals, then scaled up via extension efforts. Ghana's climate-smart agriculture champions trained their peers, while Indonesia's community monitoring of groundwater levels triggered canal blocking and shifts in planting times that protected new vegetation from floods and fires.

Upscaling

Scaling up these initiatives is less about copying a specific project and more about institutionalizing a way of working. All the initiatives described initially started small, but they began with a multistakeholder landscape approach. Where governments endorsed locally co-designed models, diffusion accelerated. Ethiopia's inclusive strategy — built from community consultations and expert task teams — was adopted nationally and then cascaded to six regions, giving practitioners a common framework and coordination to build from at the site level. Viet Nam paired university-backed evidence with district decrees and hands-on extension, so diversified coffee agroforestry could scale up from pilot plots; advice and training, along with manuals and media outreach, helped the model move beyond the initial project sites.

Measuring planting distances at a restoration site, West Kalimantan, Indonesia.
Photo: Tropenbos Indonesia

Indonesia embedded restoration in national social forestry architecture and district master plans, anchoring community action to monitoring and public planning. This is an approach that can be replicated across peatland districts with similar risks. In Ghana, scaling up is propelled by alignment: COCOBOD and district plans now incorporate agroforestry, while an agroforestry learning and reflection platform helps actors across dozens of communities sync their approaches. Colombia shows another approach: social appropriation. Once peasant and Indigenous groups saw springs recover and soils improve, they replicated efforts on their own. A local measurement later found that the number of restored hectares far exceeded the original proposals. Bolivia's women-led committees, and a municipal law promoting agroecological production, made replication politically and economically attractive.

What makes these approaches scaleable is their blend of simplicity and fit. Techniques such as assisted natural regeneration, riparian buffers and multilayer agroforestry were matched to local tenure and market realities, allowing families to see both ecological and economic benefits. Viet Nam's decrees legitimized a coffee agroforestry system that farmers and buyers had already found practical. Indonesia's plans tied

rewetting and planting to village-forest mandates, so the same approach can be used wherever LPHDs hold rights. Ghana's coordination platform achieves uptake through peer-to-peer champions and company training. A notable distinction is Ethiopia's fiscal signal: Parliament created a special fund that earmarks federal revenue for restoration.

When the primary obstacles to upscaling are identified early on, they become manageable. Legal and incentive mismatches reduce farmer motivation: in Ghana, for example, state ownership of naturally occurring timber on farms discourages tree care, requiring policy fixes alongside fieldwork. In Colombia, rules that treat restoration solely as protection complicate harvest rights from restored plots and keep agencies focused on conservation rather than livelihood-oriented restoration. Practical examples and engaging educational institutions helped address this problem.

Restoration in in Lak District, Viet Nam. Photo: Tropenbos Viet Nam.

The continuity of finance is fragile. Colombia's push for carbon, water and biodiversity bonds — and for integrating participatory productive restoration into NDC accounting — highlights the need for predictable multiyear instruments to carry households through long tree-maturity cycles. Coordination costs increase with scale: Ghana's lesson is to harmonize NGO models and donor requirements so farmers can follow one coherent approach.

Uncertain boundaries and rights can derail momentum if not settled up front. Indonesia saw newly fixed village limits clash with borders in earlier plans, underscoring the value of participatory mapping and clear role division. And climate volatility magnifies risk at scale — Bolivia's prolonged droughts and Indonesia's flood/drought swings forced changes in planting calendars. Scaling up needs climate-smart timing and buffer financing. Finally, building capacity and developing markets are needed. Viet Nam's models are sound but constrained until PES mechanisms fully recognize coffee agroforestry, and Bolivia's gaps in value-addition and transport limit how far community production can increase without parallel investments in processing and logistics.

Scaling up PPR therefore hinges on four strategic moves. **First**, clarifying tenure early on through participatory mapping and legal support can give communities the confidence to invest in restoration. **Second**, blending finance streams — public budgets, private investment and payments for ecosystem services — can bridge the cash-flow gap until trees and agroforestry systems mature. **Third**, institutionalized coordination, with landscape platforms and integrated district plans, can provide the arenas for public, private and community actors to align their efforts. **Fourth**, sustained investment in learning infrastructure is needed, from nursery cooperatives and field schools to local champions and media, so that successful practices can replicate and adapt across landscapes.

Key findings

- **The six pilots reveal a simple insight: ecological recovery endures when it is connected with social empowerment and economic rationale.**
- **Restoration is not merely about planting trees; it is about renegotiating the relationship between people, profit and place.**
- **Scaling up PPR means institutionalizing the contributing factors and neutralizing or managing the barriers.**

In the end, the experience across these six countries shows that restoration succeeds when it is not an external prescription but a shared challenge that is rooted in local realities. Participatory productive restoration proves that degraded landscapes can be renewed when communities, institutions and markets work together, aligning ecological recovery with human well-being. The lessons documented here are not final answers but guidance: they point to the importance of trust, inclusion and persistence, and show that scaling restoration is as much about governance and rights as it is about seedlings and hectares. As the world strives to meet its ambitious restoration pledges, these experiences demonstrate an approach that is both practical and positive — one that keeps people and nature at its centre.

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