

# Restoration Cases Flagship Collection

## Case #10:

Forest and Landscape Restoration in  
Fandriana-Marolambo, Madagascar



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**In brief**

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## Overview

Madagascar's forests are unique, highly threatened, and extensively cleared. In 2005, the World Wildlife Fund (WWF) launched a program in the biodiverse Fandriana-Marolambo (F-M) region to demonstrate how restoring Madagascar's forests could also benefit local people. In F-M, most smallholder farmers were below the poverty line and dependent on forests. Forest and Landscape Restoration (FLR) seemed a good fit—the approach addresses social and ecological challenges using a mosaic of distinct but synergistic interventions across a landscape. In F-M, practitioners used active and passive forest restoration alongside improved agricultural techniques and capacity building in business and marketing. The project unfolded in four phases with complementary goals, including creating a strong foundation for work to continue after WWF support ceased. Over 13 years, the project received 1.6 million Euros of donor support, and designated 51,000 ha of land for community-based management, with 7,000 ha slated for forest restoration. Since WWF support ceased in 2017, some participants have reverted to previous practices, but many communities—especially those that were deeply engaged in decision-making from the beginning—still adhere to community contract commitments to restore forests.

## Exemplary practices

WWF used traditional decision-making processes, including oral contracts. Interventions relied on designating land to community management via “community contracts,” which secured land tenure and engaged communities. Their phased approach was flexible and allowed them to adapt to changing needs. WWF also planned an exit strategy well in advance and empowered and trained local organizations to take ownership. Engaging and training local organizations, providing viable alternative livelihood options, and training people to grow, plant, and sell native trees helped to keep forests standing and communities engaged.

## Key lessons learned

- ▶ *Recognize that FLR takes time and plan accordingly. Set expectations and develop an exit strategy early in the project.*
- ▶ *Design restoration to enhance and support conservation, and address forest cover loss.*
- ▶ *Provide 'proof of concept' to engage communities and landholders in new practices.*
- ▶ *Recognize that co-creation can mean compromise, but is essential to success.*
- ▶ *Adopt and strengthen local governance processes, and work with governments at multiple scales.*
- ▶ *Adapt to local needs, work towards landscape goals.*



*Forest and Landscape Restoration requires mobilization of all community members: school children, youth, and adults. Photo credit: A. Razafimahatratra*



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# Restoration narrative

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## Visit restor.eco

Forest and Landscape Restoration in  
Fandriana-Marolambo, Madagascar

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project's ecological analytics [here](#)

The logo for RESTOR, featuring the word "RESTOR" in a bold, black, sans-serif font. The text is contained within a yellow-outlined trapezoidal shape that is wider at the top and tapers towards the bottom.

## Background and context

Madagascar's moist forests are world renowned for their exceptional diversity. Most (80–90%) plant and animal species are endemic, including the iconic lemur (Mansourian et al., 2016). These forests are also endangered—all but 10% have been cleared (Mansourian et al., 2016). Despite high rates of deforestation, many ethnic groups practice traditional forest use and are highly forest dependent (Roelens et al., 2010). This case describes a 13-year pilot project to halt and reverse deforestation while supporting local livelihoods.

Fandriana-Marolambo (F-M) is a mountainous region in central Madagascar, ranging from 800 to 1800 masl and covering 342,700 ha (Figure 1; Mansourian et al., 2018). Its mega-biodiverse tropical evergreen forests have exceptionally high epiphyte diversity and are home to eight lemur species (Mansourian et al., 2018). In 2005, the World Wildlife Fund (WWF) launched a Forest and Landscape Restoration (FLR) program covering 200,000+ ha including 80,000 ha primary forest embedded in a production mosaic of exotic tree plantations, crops, fallows, and savanna (Roelens et al., 2010) (Figure 2).



Figure 1. Location of the Fandriana-Marolambo landscape within Madagascar. Source: Mansourian et al., 2018, p. 10

Approximately 150,000 people live in 14 communes—local governing units akin to counties or municipalities—in the F-M area. Most are farmers living well below the poverty line (Mansourian et al., 2018). Other livelihood activities include wage labor in agriculture and cattle, crafts, and forest extraction. Sugarcane (used to produce artisan rum) is the main cash crop and is quite lucrative at 0.7–1.5 million Ariary/ha (US\$175–375/ha) (Rakotondrazafy, 2007). Many farmers also produce rice and other cash crops including coffee, beans, cassava, clove, and bananas (Mansourian et al., 2018).

Over 2,700 households depend directly on forests and other natural resources for their livelihoods, and all communities with forest access use specific species for construction, tools, firewood, medicine, and other high-value forest products (Roelens et al., 2010). Forest use is both opportunistic and culturally dictated and differs among the three ethnic groups that live in the region (Roelens et al., 2010). Many tree species are over-exploited for use or sale (Roelens et al., 2010).



Figure 2. Mosaic landscape in Fandriana-Marolambo.  
Photo credit: A. Razafimahatratra



## Restoration baseline conditions

Conditions in F-M—including widespread poverty, seasonal food insecurity, and a lack of access to basic services like clean water, medical care, and electricity—are typical of many rural areas in Madagascar, where around 75% of the population earns less than US\$1.90/day (Belghith, Randriankolona, and Osborne, 2016; Harvey et al., 2014; Harvey et al., 2018; Poudyal et al., 2016). Prior to the intervention, in F-M the average annual household income was 150,000–450,000 Ariary (about US\$40–110) (Roelens et al., 2010). Most households experienced food insecurity for 2–6 months each year, exhausting any household savings.

Forests in F-M have been cleared rapidly for decades—in the 1990s, annual rates averaged 2.6% in Fandriana (FAO, 2010; Mansourian et al., 2018; MINENVEF and USAID, 2007). The forest administration had top-down control over all native forests, and throughout the 1970s and 1980s the national government provided incentives for farmers to clear land for agriculture, leading to rapid deforestation across the country (Figure 3). High deforestation rates combined with growing global interest



Figure 3. A recently cleared and burned moist forest in Madagascar.  
Photo credit: A. Razafimahatratra

conserving Madagascar's forests led the government to reverse this policy in the 1990s to protect forests. Traditional land tenure often conflicted with government control over forest lands. Rapid policy change, tenure issues, and inconsistent rules led to conflict, confusion, and mistrust between communities and the state (Mansourian et al., 2016).

Although dependent on forests, people in F-M were clearing them rapidly. Approximately 80% of forests in F-M were cleared for slash-and-burn agriculture. Wildfires, gathering firewood and non-timber forest products, producing illegal sugarcane, and illegal logging also contributed to forest loss (Roelens et al., 2010). These practices were driven by underlying conditions: a combination of political instability, high poverty levels, unclear land tenure, and rapid population growth (about 3%/year) collectively led to a downward spiral of unsustainable resource use, including shorter fallow times, degraded soils, poor production, and rapid forest clearing (Roelens et al., 2010). Declining environmental conditions further exacerbated poverty, leading to more forest clearing. An estimated 50% of household income came from forests or land cleared of forests for slash and burn agriculture (Roelens et al., 2010).

At the time of implementation, some people had experience with tree planting. But the nearly 200 nurseries nationwide produced mostly fast-growing exotics, pine and Eucalyptus, that tolerated degraded conditions. They were used with limited success in early attempts to restore degraded hillsides (Mansourian et al., 2018). Planting native trees for multiple purposes was rare.

## The turning point : From slash-and-burn to forest restoration

Deforestation was occurring amidst a culture of forest use and appreciation (Mansourian et al., 2018). As one project implementer put it: “For the Betsimisarakas (a major ethnic group in the region), life simply wouldn’t be possible without forest, as their livelihood depends on it. Their perception of the forest is paradoxically illustrated by a famous proverb, ‘Rahoviana no ho lany ny àla atsinanana,’ which means that the eastern rainforest will never be exhausted, and will always be there to provide their needs” (A. Razafimahatratra, 2021, personal communication, 24 October). Other ethnic groups, including the Betsileo and the Vakinankaratra are less forest dependent but also have a forest culture and history (Roelens et al., 2010).

But the inexhaustible forest was quickly becoming exhausted. Actively protecting and restoring forests to sustain them was a significant departure from current practice. Slowing deforestation and restoring forests amid high poverty rates required addressing social and ecological problems in a holistic way that integrates culture, markets, government and technical innovations.

FLR explicitly promotes restoring ecological integrity and delivering social and economic benefits as a pathway to a restored landscape. Local facilitators were hired to bridge the state and local communities and build trust. Using local means of communication (including songs), facilitators explained the project and how it would improve farming and livelihoods. They also recruited “innovative” farmers to test and demonstrate agricultural and restoration methods (Roelens et al., 2010). They emphasized how community contracts would help meet pressing needs, including resolving tenure issues and legitimizing traditional claims to land (Mansourian et al. 2016). Implementers used traditional decision-making processes (Mansourian et al., 2018), and participants received training to both entice and allow them to participate.

Over 6,500 farmers from 10 villages signed up for the program initially. But when capacity building started, only 2,000 were still on board, and by the time of implementation 1,100 people were participating (F. L. Razafy, 2021, personal communication). Community engagement requires incorporating local governance, knowledge and practices into the project at all stages. The more these aspects are significantly integrated into the project, the more committed local communities are. At the beginning of the project, the project

team did not have enough knowledge of just how important this was (A. Razafimahatratra, 2022, personal communication). However, implementers speculate that some quit because of the work commitment, and the misperception that they would receive financial benefits. Once it became clear that the only compensation was training, many left the program, but those who stayed were motivated by the potential of the work, building a dedicated participant base (F. L. Razafy, 2021, personal communication). As people began to see results— higher agricultural yields, increased income, control over their land—the project became more widely accepted. “The successes of the first restoration actions clearly demonstrated the technical feasibility of restoration and helped communication and awareness actions to adapt the local vision. The existence ... of conservation initiatives established by local conventions prior to the FLR work was reinforced and also helped the progressive awareness of the members of the communities” (A. Razafimahatratra, 2021, personal communication).

## Actors and arrangements

The project was initiated by four offices of the World Wildlife Fund: WWF International, WWF France, WWF Madagascar, and WWF US. WWF was responsible for planning, implementing, and securing long-term funds for the work. Different funding bodies provided support for different phases (Table 1). Madagascar National Parks was responsible for setting up the Marolambo National Park in the FLR project boundaries. Other international organizations, including Conservation International and the Durrell Wildlife Conservation Trust were active in F-M and involved in initial stakeholder meetings. Local organizations were trained and established to eventually take over project operations (Appendix 1; Mansourian et al., 2018).

## Planning and engagement

Project planning began at the national level when WWF used a highly participatory process to select an implementation region. At a workshop in 2003, national-level stakeholders, government officials from the forestry sector, international NGOs, and private sector representatives defined site selection criteria based on ecological, social, and economic characteristics and created a “shortlist” of candidate regions (Figure 4) (Mansourian et al., 2018). WWF implementers visited these and selected one for the FLR pilot. Based on the criteria, F-M seemed a good candidate: there were many cleared and degraded areas to restore, and relatively high levels of education (in the southwest), forest dependency, political support for restoration, and preparedness to adopt new practices (Mansourian et al., 2016). After the workshop, a multi-stakeholder national working group was formed to oversee high-level restoration actions (Mansourian et al., 2018).

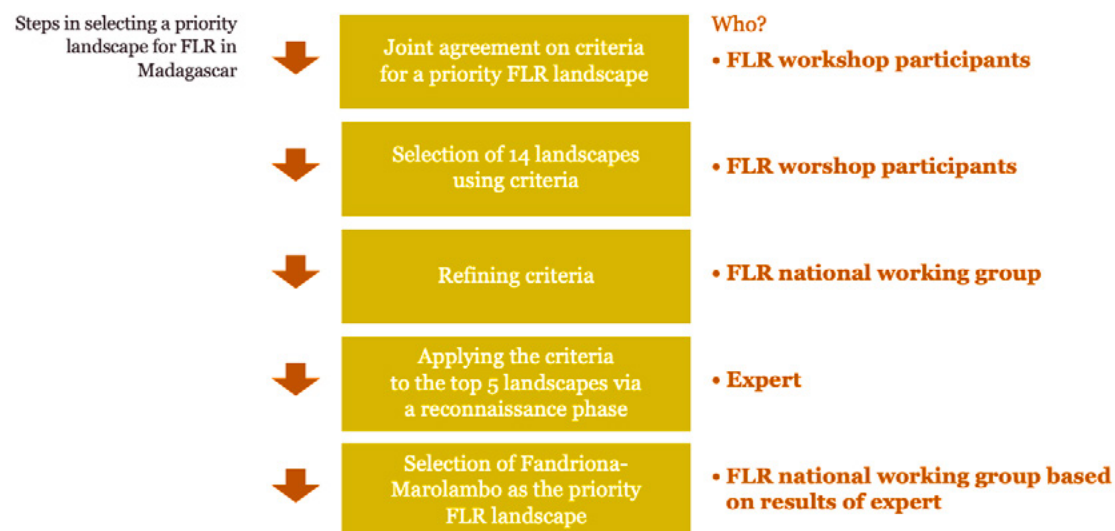


Figure 4. The process of selecting a priority landscape for FLR in Madagascar.  
Source: Mansourian & Vallauri, 2012, p. 22

In F-M, implementers convened key stakeholders to develop a common vision—including community needs, wants, and ideas for alternative livelihood strategies—through debate and discussion. Next, implementers helped build capacity, including developing governance structures, conducting surveys on forest resource needs, and planning for sustainable resource management (Mansourian et al., 2018).

State and customary tenure systems were not aligned, and tenure insecure communities often cleared forest to claim land (Mansourian et al., 2018). The forestry service controlled all “native forests”, and so forests planted with native trees became part of the national forest, while plantations of exotic species were classified as “productive” systems and used to claim land (Mansourian, 2021). This policy created a disincentive for native forest restoration.

Empowering local governance was a major component of the project. Implementers worked with communities to develop community-based associations (COBAs) to give communities control over resources. COBAs signed community contracts that legitimized claims to land, gave communities “the necessary authority to engage in restoration,” and rewarded them for forest-positive actions

(Mansourian et al., 2018, p. 22). It also elevated communities culturally: “Thanks to contracts negotiated through COBAs, forest restoration by communities also served to improve their status, empower them, and give them greater recognition as the rightful guardians of the forests” (Mansourian et al., 2018, p. 22).

Contracts stipulated the area of land dedicated to different uses—conservation, forest use areas, agriculture, and forest restoration—via a community development plan that included forest conservation and restoration, and alternative livelihood strategies (A. Razafimahatratra, 2021, personal communication). Elders, notables, provincial and regional chiefs were all consulted. Mayors also served as bridges between communities and project leaders and played a key role in inserting project activities into communal development plans (Mansourian et al., 2018). Plans were approved by the forest administration department prior to implementation (A. Razafimahatratra, 2021, personal communication).

Participation in the project was unpaid and voluntary, but participants received training and material support. They also received meals during communal work days, and those responsible for running tree nurseries received an allowance. Because the region

is culturally diverse, WWF hired and trained local facilitators from a range of different backgrounds to work with communities. Communities and implementers—including WWF and the regional forest service—often respected local decision-making practices and customs. For example, sometimes plans and decisions were made using “*kabary*,” a traditional oral decision-making process where contracts are verbal, not written (A. Razafimahatratra, 2021, personal communication). During engagement, local facilitators communicated key messages using fact sheets, reports, posters, and traditional oral means of communication including stories, radio shows, and songs (Mansourian et al., 2018). Implementers organized events, including festivals and sport events, for both local communities and the forest service (Mansourian et al., 2018). An annual walk called the Diabe celebrated the importance of forests and of stopping the fires, illegal logging, and deforestation. People chanted slogans including, “*Arovy ny ala fa lova hoan’ny Taranaka*” (Protect the forest because it is our legacy to future generations) and “*Doro Ala, Loza hoan’ny Taranaka, Ala voaaro, Lova hoan’ny Taranaka*” (Burnt forest, danger for future generations. Protected forests, heritage for future generations) (Mansourian et al., 2018, p. 25).





## Costs, funding, and other support

The project was initially funded by the French Ministry of Foreign Affairs (MAE) for 4 years. Based on the initial success, and the need for additional time and funding to meet its goals, the project ended up receiving 1.6 million Euros over the course of 13 years (Table 1). All funding was supplied by private donors. The final phase of the project focused on creating independence from external funding, including investing in local capacity building and strengthening local institutions and organizations (see Implementation)

Phase	Funding Source	Amount
Phase 1: 2005-2009	French Foreign Ministry	EUR 756,000
Phase 2: 2010-2012	GoodPlanet Foundation and Air France	EUR 259,000
Phase 3: 2011-2013	WWF Switzerland	EUR 312,000
Phase 4: 2014-2017	Swedish aid agency	EUR 298,400
Total: 2005-2017		EUR 1,600,000

Table 1. Project phases and major sources of funding for each. Source: Mansourian et al., 2018

## Implementation

Project activities began in 2005 and continued through 2017 in four phases, each with specific objectives and activities (Table 2). Phase 1 (2005-2009) focused on restoring forests for native biodiversity and local ecosystem services and introduced forest-friendly agriculture. Implementers worked to secure community contracts, undertook planning and engagement activities, and began restoring forests using passive and active restoration and implementing improved agricultural activities (Mansourian et al., 2018).

Phase 2 (2010-2012) worked on halting deforestation (Romero et al., 2013). A key goal was communicating that forest conservation was urgent, important, and more effective for climate change mitigation than planting trees. Transferring management rights to local communities and organizations was another priority (Mansourian et al., 2018; WWF, 2011), a process that required years of training and preparation (Figure 5). When the first two contracts were signed, Fandriana project lead Appolinaire Razafimahatratra said, “This is a big day for these communities. It took two years of raising awareness in the villages, sustainable forest management training for resource users and paperwork to get the official contract signed today” (WWF,

2011). The project also continued restoration and agriculture activities from Phase 1.

Phase 3 (2011-2013) integrated activities from phase 1 and 2 with the newly formed Marolambo National Park. The park created opportunities for restoration to support conservation measures, and activities aimed to halt deforestation and relieve pressure on native forests by reducing poverty and providing alternatives to forest destructive activities (Mansourian et al. 2018).

Phase 4 (2014-2017) established project longevity by building capacity, providing alternative income-generating activities, and transferring project management to local organizations and institutions. Connecting organizations to work together at local and national levels was also important for continuity once WWF funding ceased (Mansourian et al., 2018) Figure 5. Communities committing to and celebrating Forest and Landscape



Figure 5. Communities committing to and celebrating Forest and Landscape Restoration in Fandriana-Marolambo. Photo credit: JB Roelens

Phase	Period	Goal	Main implementation activities
Inception	2003-2004	Preparing the FLR concept and selecting a region	Engaging stakeholders at the national level; selecting a pilot site.
Phase 1	2005-2009	Restoring trees and forests to the landscape.	<ul style="list-style-type: none"> <li>• Agreeing on a joint vision for the landscape;</li> <li>• Clarifying land status and tenure;</li> <li>• Introducing the FLR concept and integrating it into local development plans;</li> <li>• Undertaking studies;</li> <li>• Adapting agriculture practices;</li> <li>• Forest restoration activities</li> </ul>
Phase 2	2010-2012	Halting deforestation and climate change adaptation.	<ul style="list-style-type: none"> <li>• Educating communities about the links between forests and climate change;</li> <li>• Supporting communities to obtain management rights for forests;</li> <li>• Ongoing active and passive restoration actions.</li> </ul>
Phase 3	2011-2013	Relieving pressure on natural forests by improving livelihoods	<ul style="list-style-type: none"> <li>• Identifying alternative income-generating options for farmers;</li> <li>• Ongoing technical support;</li> <li>• Identifying sustainable financial mechanisms;</li> <li>• Ongoing active and passive restoration.</li> </ul>
Phase 4	2014-2017	Preparing communities to continue work once WWF support concluded.	<ul style="list-style-type: none"> <li>• Empowering local people to engage in alternative income-generating activities and improving market access;</li> <li>• Capacity building, communications and advocacy;</li> <li>• Supporting for long term sustainability;</li> <li>• Ongoing active and passive restoration actions.</li> <li>• WWF progressively hands over project management to local associations</li> </ul>

Table 2. Implementation activities and funding by project phase (adapted from Mansourian et al., 2018).

## Forest restoration

Implementers selected forest restoration techniques to fit local ecological and social conditions (Roelens et al., 2010). Both active (involving tree planting) and passive techniques were used. Active techniques were primarily used when natural regeneration potential was limited (e.g., highly degraded areas), and where there was sufficient labor and interest. Tree planting required more training, which deterred some participants but attracted others interested in the technique. Tree planting was also prioritized to generate income, as people could choose high value species. People also strategically planted trees to demonstrate land use.

Active techniques were implemented by community associations, and members typically volunteered one day a week. They collected seedlings from nearby forests, established nurseries, planted trees, and prepared and maintained sites. Transplanting “wildings” from nearby forests to nurseries prior to planting in the field outperformed other methods (including sowing collected wildings directly, germinating seeds in nurseries, direct seeding, and using plant cuttings) (Figure 6). Planting trees required working together and specific training, so to encourage participation implementers sometimes paid people (F. L. Razafy, 2021,

personal communication). Local nurseries were established near (<3 km) restoration sites.

Trees were planted in different ways to meet specific goals (Roelens et al., 2010): 1) Indigenous trees were planted in agricultural land and fallows to connect remnant forests and create ecological corridors. 2) Trees were planted around existing forest fragments to increase forest area. 3) Enrichment planting was used to restore threatened or exploited species in degraded forests to conserve biodiversity. 4) Later successional species were planted in young or severely degraded forest to accelerate forest succession. 5) Fast-growing exotics and fruit trees were planted in degraded farmlands and savannas for food and fuelwood.

Passive techniques were used where forests could regenerate unassisted and involved assisted natural regeneration to protect young forests using firebreaks and/or fencing. Practitioners also cleared ferns and weeds to reduce competition. Because tree planting generally required more resources, where possible natural regeneration was used instead or in combination. It was crucial to spell out clear plans, regulations, and penalties for passive restoration in the community contracts as regenerating land could be mistaken as abandoned or unproductive.



*Figure 6. Transplanted “wildlings” were found to be the best method for active restoration. Photo credit: A. Razafimahatratra*

Existing plantations of exotic trees (*Eucalyptus*) often acted as nurse trees and thus were not typically removed prior to other restoration activities (Roelens et al., 2010).

### **Agricultural innovations**

Implementers introduced techniques to increase food security, diversify farms, and compensate for lost income from forest exploitation. Agricultural associations in each village recruited farmers to pilot and demonstrate the techniques—including market gardening, improved rice cultivation, beekeeping, raising specialty vegetable crops, fish farming, fruit arboriculture, small animal husbandry, and agroforestry—to higher levels of government and others outside the associations. Eighty farmers also participated in a tour of different agricultural demonstration sites around the country. Techniques worked so well they eventually spread farmer-to-farmer without explicit intervention. Other alternative livelihood options included setting up tree nurseries, and processing and marketing essential oils.

Participants adopted new crops, and new farming practices (Roelens et al., 2010). Compost proved beneficial as soils often lacked nitrogen and phosphorus and were quickly depleted. Compost systems used cow manure, fallow plants, and hedgerows

of nitrogen-fixing trees and shrubs (e.g., *Crotalaria grahamiana* and *Tephrosia vogelii*). Cultivating crops under plant cover, an alternative to slash and burn, involved planting seeds on a layer of dead plants to prevent erosion, reduce plowing, and replenish soils. Live nitrogen-fixing covers were also adopted by some. Terracing and live fences were installed to reduce erosion, improve soils, and diversify crops (Figure 7).

### **Capacity development**

Many WWF staff had worked in conservation, but FLR required a larger range of technical skills (agriculture, trees, finance) and thus additional training. Staff were also trained to negotiate with different stakeholders and bring diverse groups of people to a common table (Mansourian et al., 2018). Implementers trained the national forest service to plant indigenous tree species, which they applied during the project and elsewhere. Capacity building for communities included training in alternative agriculture, basic management, accounting, project development, financial management, and forest restoration (Mansourian et al., 2018). Training for livelihood opportunities was adapted to community needs and focused on locally relevant activities (Mansourian et al., 2018). Communities also developed natural resource management plans based on local conditions and community resource use.

### Exit strategy

WWF proactively told communities they would eventually cease support. In the final 2–5 years, implementers prepared to exit by training and connecting local community associations and organizations. WWF created a national network of COBAs to exchange knowledge, open opportunities for collective funding, and have a voice at the national level (Mansourian et al., 2018, p. 27). In the final years implementers also urged local communities via radio, local festivals, and other means to invest in the livelihood opportunities and agricultural alternatives offered by the program (Mansourian et al. 2018).



Figure 7. Terraced farming, one of the agricultural techniques used during the project.  
Photo credit: A. Razafimahatratra

## Outcomes and impacts

Over 13 years, project activities slowed deforestation rates, restored forests, secured and validated local land tenure rights and resource governance, and helped farmers adopt forest-friendly agricultural practices and diversify livelihoods (Ratsimbarison and Burren, 2009; Mansourian et al., 2018). A major outcome was helping people realize the forest is finite and will disappear with overharvesting or clearing. This message, communicated through capacity building, education, and training, opened the door for concrete action, such as replanting useful native species in degraded forest to use in the future, or planting trees in degraded farmland for fuelwood to alleviate pressure on forests (F. L. Razafy, 2021, personal communication).

Governance arrangements changed over the course of the project, from top-down state governance to more collaborative processes involving community management. Collaborative processes proved important for adopting the technique, and having people stick with it (Mansourian et al., 2016). Five years after WWF left, some communities ceased project activities, but others built a coalition to pursue livelihood alternatives and restore forests (F. L. Razafy, 2021, personal communication). Many still operate under the

community contracts developed during the project. Implementers note the best examples of project longevity - where agriculture and restoration activities persist- are communities that were involved in project planning from the beginning, and where local governance regimes were based on local conventions (for example, by lineage) were used (A. Razafimahatratra, 2021, personal communication). In contrast, where the forest administration initially had a heavier hand, implementers observed less continuity. “Even before the FLR project, forest areas that were put under protection by local structures and local leaders continue to be protected,” says project implementer Appolinaire Razafimahatratra. “During the project, monitoring showed that areas conserved and placed under restoration with similar procedures are also more protected.”

For some people, the choice to keep or clear restored forests came down to profitability. As project implementer Fara Razafy put it, “If people still earn money without logging the forest, this shows that the livelihood alternatives WWF implemented were more or less sustainable and they will want to continue with them. Logging forest (for wood, fuel wood, and non-timber forest products) provides income. It is not an easy task. If people find alternatives next to their villages (note that forests are always located far

from the villages) that provide income in a sustainable way, they will invest in them. People are aware that forests are life, as they provide many services which are destroyed by irresponsible logging. They just need to be supervised, to be linked with the market for a sustainable use of their environment.”

Land use and tree planting outcomes. From 2005 to 2017, deforestation rates within the project region dropped from 2.2% to 1% per year (Mansourian et al., 2018). In the west this was attributed to improved rice cultivation, but in the east drivers (extracting rosewood and producing sugarcane) persist and the situation is less stable (Mansourian et al., 2018).

Communities were re-organized from 70 associations into 35 COBAs tasked with managing forests (Mansourian et al., 2018). Collectively, these formed a federation with presence at the national level. Each COBA integrated FLR into their land use plans via community contracts. Community contracts were secured for 51,000 ha of land, of which nearly 7,000 ha was slated for active (73 sites) or passive restoration (50 sites) (Figure 8; Table 3) (Mansourian et al., 2018).

The community contract model resolved many local tenure conflicts and legitimized community control over land, allowing them



Figure 8. Regenerating forests in Fandriana-Marolambo. Photo credit: A. Razafimahatratra



to make choices according to local context and needs. Many people previously thought planting native trees was not worthwhile—they grew slowly and planting them would put lands under state control. But after seeing how well they grew (they had a 75% survival rate) and with the freedom of controlling their own resources, project participants began planting native trees on community-managed land (Mansourian et al., 2018). Communities planted about 100 native species, many with local uses and/or cultural value. On average, 25 native species were planted in each plot. In Fivoarana /Ambohimanarina, for example, nearly 20,000 trees of 32 native species were planted in an area of 38 ha (A. Razafimahatratra, 2021, personal communication). Enriching fallow lands was the most popular, and easiest, mode of active restoration. Planting in fallows was thus used to introduce tree planting, showcasing good results and allowing gradual learning and adoption. As people's tree planting skills and knowledge of different species increased, they planted more in the savanna, where up to 90% of the trees survived (Roelens et al., 2010). WWF helped communities, schools and families set up 50 tree nurseries, which collectively grew 100 species of native trees. Nearly 1,000,000 saplings were planted in the landscape, of which just over half were native (Mansourian et al., 2018) (Figure 9).

Agricultural practices, livelihoods and wellbeing. In total, 1400 households (~8400 individuals) benefited from alternative income-generating activities, and 481 projects received direct support through microcredit schemes (Table 3; Mansourian et al., 2018). In total, over 550 farmers received training (Mansourian et al., 2018). By 2010, 40 agricultural demonstration sites had been established (Roelens et al., 2010). Improved agricultural techniques helped bring people on board with the project and proved profitable—many farmers saw higher yields, diversified production, and improved soil quality, increasing both income and local food security (Mansourian et al., 2018).

Intensive rice cultivation systems increased yields by 2–3 fold using fewer seeds (Roelens et al. 2010), and could bring in additional income of 1.2 million Ariary/year (roughly US\$300/year) over 20 acres (Figure 10). Adoption rates were high, ranging from 50–80% with the associations. Specialty vegetable crops were also introduced—carrots, tomatoes, peas, leeks, etc.—and were often grown collectively by women's groups, bringing in up to 150,000 Ariary (US\$30) per harvest. Arboriculture systems using citrus trees produced more than 50 kg of fruit per year per tree, improving local nutrition and providing additional income (Roelens et al.,



Figure 9. Planting trees in degraded farmland.  
Photo credit: A. Razafimahatratra

2010). In total, about 160,000 fruit trees were planted, including citrus, apples, and others produced for essential oils (Mansourian et al., 2018). Beekeeping also proved profitable, with improved hive structures increasing productivity by about 25%, to 3-4 liters per year. The technique quickly spread by word of mouth, and many villagers who previously kept bees in the forest switched to this method (Roelens et al., 2010). The project also helped to improve literacy by providing courses, which were attended by nearly 200 people (Mansourian et al., 2018). They also constructed 22 community work areas and community houses, and five places to store grain (Mansourian et al., 2018). Collectively, adopting new crops, agricultural practices, and engaging in alternative livelihood enterprises improved food security and increased income.



*Figure 10. Intensive rice cultivation systems more than doubled yields and helped to slow deforestation. Photo credit: A. Razafimahatratra*

Key Indicators	Results by end of project
Deforestation rate (per year)	Reduced to <1%
Area protected (in a National Park)	95,063 ha
Number of hectares managed by community-based organizations	51,743 ha
Area under active or passive restoration	6,786 ha
Number of trees planted	999,370
Number of locally-run nurseries	50
Number of native tree species planted	100
Survival rate for indigenous tree species planted	75%
Number of community-based organizations formed	35
Number of households trained in agricultural techniques	554
Number of households benefiting from income-generating activities	1,400

Table 3: Key outcome indicators by the end of the project. Source: Mansourian et al., 2018

## Key challenges

Many of the major challenges to planning and implementing FLR were cultural and social, including poverty, a lack of interest in the project initially, cultural norms around forest clearing, and a history of interactions around forest use with the national government. Restoring over a large area also posed logistical and financial challenges. A history of deforestation policies meant that people were accustomed to deforesting land (Figure 11). Policies in the 1970s–1980s promoted clearing trees for agriculture, but these policies were reversed to promote forest protection in the 1990s (Aubert et al., 2003). The FLR project took this one step further by asking farmers to replant trees, which required a complete shift in thinking about trees on farms.

People distrusted the government after rapid forest policy shifts and erratic rule enforcement. Many even saw the government as a threat to their livelihoods (Horning et al., 2012) and were reluctant to participate because the national forestry service was involved in the FLR project. Engaging local facilitators, having stakeholders—including the forestry service—integrate communities into decision making, and negotiating with communities to adapt to their needs



*Figure 11. Forests and regenerating fields in Fandriana-Marolambo. Photo credit: A. Razafimahatratra*

helped build trust and collaboration. This process required additional staff, including several local-level facilitators and two extension officers (Mansourian et al., 2016).

Limited participation forced implementers to prioritize where and how to work within the landscape. Maintaining motivation was a major challenge: of the initial 6,500 people interested in the program, only 1,100 continued on through implementation (F. L. Razafy, 2021, personal communication). This left one person for every six ha to be restored. But those that did participate were on-board, motivated by the potential benefits to their households and communities (F. L. Razafy, 2021, personal communication). Poor, dispersed communities could have been a significant barrier to project participation. Generating long and short-term livelihood benefits—through improved agriculture, marketable goods, and planting fast-growing trees—was essential (Mansourian et al., 2018).

The national government often failed to recognize traditional governance over natural resources. The project effectively used traditional communication and governance practices, but this remains a challenge for this and other projects moving forward (A. Razafimahatratra, 2021, personal communication).

Maintaining key resources (funding, labor, technicians) at the landscape scale was challenging. For training, capacity building activities, and ongoing technical support, implementers often had to travel long distances, sometimes walking a day between villages which incurred additional costs.

## Enabling factors and innovations

F-M was selected as a region where FLR was likely to succeed using a methodical and participatory process. A history of forest use and dependence meant that people did not need to be convinced of the value of forests and were more ready to try activities aimed at making forest use and restoration economically viable. A high degree of forest fragmentation meant more receptivity and opportunities to restore forest. The project fit well with existing national and local policies on environmental conservation and poverty alleviation (Mansourian et al., 2018) and with Madagascar's restoration commitments under the Bonn Challenge (4 million ha) and AFR100 initiatives.

The phased approach was a key innovation that allowed implementers to adapt practices based on experience. Preliminary phases focused on forest restoration and agriculture, while subsequent phases on addressing the social issues to make the project sustainable.

The project also promoted environmentally friendly practices and alternative income sources (Mansourian et al., 2014). Alternative agricultural practices required less land

than traditional slash-and-burn, freeing up land for restoration, and created livelihood opportunities and market connections. Interventions ran in parallel to forest restoration activities. Project leaders recruited early adopters—locally respected “innovators”—to demonstrate how forests, native trees on farms, and new methods could benefit local farming systems. Livelihood alternatives, greater food security, and increased income coupled with forest restoration made for a successful “win-win.”

Implementers built trust with local communities by employing local facilitators and respecting traditional decision-making processes (Box 1).

Local facilitators used local norms and traditions to raise awareness, and WWF and their partners respected local procedures which gave villagers agency and showed respect.

Community contracts granting use rights cemented people's commitment and legitimized customary tenure claims to land. Centralized forest governance was largely ineffective in rural Madagascar. The FLR project helped communities gain autonomy and capacity to govern the restoration, and the forest service gradually

ceded control (Mansourian et al., 2018). This helped engage people and keep activities in place post-WWF (Figure 11). The process was supported by two national policies: Gestion Locale Sécurisée (1996), a law that provided a legal framework (Pollini et al., 2010), and Gestion Contractualisée des Forêts (2001), which provided a tool that produced better governance outcomes (Mansourian et al., 2018; Pollini et al., 2010).

### **Box 1: Pay it forward: Farmer-to-farmer learning and benefit-sharing**

Implementers found that many people adopted new agricultural techniques after seeing positive results from other community members. Most people in rural areas liked to see the success of an activity before investing in it themselves (F. L. Razafy, 2021, personal communication). For example, “if they find . . . a species that we use is very interesting, like for the production of essential oils, they try also to plant this species,” said Fara Razafy. One of the successes of the project was disseminating stories not just about planting fast-growing species for supplying firewood but also all of the other alternative livelihood activities that they promoted (F. L. Razafy, 2021, personal communication).

Implementers took this idea further: in some cases, farmers who received capacity building were required to then train other farmers and share the benefits. This structured support encouraged farmer-to-farmer learning and reduced the resources needed to support communities. For example: implementers would provide one household with 10 chickens and training to care for them, with the understanding that once the chickens reproduced, they would give 10 to another community member. Or, if a community member tried a new rice variety, they would pass on a sample of the seeds to a neighbor to experiment with. This type sharing was already part of the culture and was easily integrated into the project.



## Parting shot

*“All the approaches—  
kabary, raising  
awareness during the  
market days—the  
team used are linked  
to the cultures of local  
communities with the  
aim of profoundly  
engaging them in FLR.”*

—Fara Lala Razafy,  
project implementer





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## Key lessons learned

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- ▶ *Adopt and strengthen local governance processes.* Strengthening local governance allows people to make decisions appropriate for local contexts (Mansourian et al., 2018), and is key for engaging communities and having them take ownership. Projects with more local participation early on were more likely to persist post-WWF (Mansourian et al., 2018). Secure land tenure via community contracts was essential to project success.
- ▶ *Adapt to local needs, work towards landscape goals.* Over 150,000 people belonging to different ethnic groups and communities across many small communities meant there was no “one size fits all” approach. Interventions must adjust to local needs and context while contributing to landscape-level objectives.
- ▶ *Co-creation can mean compromise but is essential to success.* Trade-offs are inevitable, but involving communities in decision making made the project more effective and attractive to communities (A. Razafimahatratra, 2021, personal communication).
- ▶ *Work with governments at multiple scales.* WWF mobilized the forestry department at national and regional levels as well as commune mayors to integrate community agreements into regional plans and promote FLR in national policy.
- ▶ *Provide “proof of concept” to engage communities and landholders.* People in rural areas liked “to see the success of one activity before . . . investing in this kind of activity,” notes Fara Razafy, consultant and project implementer. Early successes demonstrated that activities were feasible, beneficial, and worth investing in.
- ▶ *Recognize that FLR takes time and plan accordingly.* The initial 4-year term was insufficient to show benefits, integrate ideas into local practice, gain national buy-in, and produce lasting outcomes. It takes time to lay the social groundwork prior to implementation and to see the ecological outcomes after—trees and forests need time to grow. Restoration takes longer than the typical 4-5 year donor cycles. “The long-term nature of both social and ecological dimensions must be recognised and the organization leading the project should plan accordingly” (Mansourian et al., 2018, pg. 29).
- ▶ *Address forest cover loss as part of a restoration program.* Because deforestation was high, the FLR program in F-M worked to identify the drivers of forest cover loss. Restoration is not effective if native forests are still being lost or restored areas are cleared.

- ▶ *Set realistic expectations and develop an exit strategy early in the project.* Implementers intentionally built the capacity, connections, and relationships for communities and organizations to continue the work, and many communities have continued project activities.
- ▶ *Use restoration to enhance and support conservation.* Restoration was intentionally used to complement measures to prevent deforestation, conserve biodiversity, connect remnant fragments, and provide opportunities for alternative livelihood strategies (Mansourian et al., 2018).
- ▶ *FLR requires mobilization of all community members.* Commitment and support from the whole community is essential. Bringing restoration into the culture of the communities by engaging a range of different people—from school children to village chiefs—helped it gain traction and persist (Figure 12).





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Learn  
more

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## Further information and resources

SER, Madagascar: The Fandriana-Marolambo Forest Landscape Restoration (FLR) Project

<https://www.ser-rrc.org/project/madagascar-the-fandriana-marolambo-forest-landscape-restoration-flr-project/>

Panorama Solutions, Restoration of Moist Tropical Forest (Fandriana-Marolambo Landscape in Madagascar)

<https://panorama.solutions/en/solution/restoration-moist-tropical-forest-fandriana-marolambo-landscape-madagascar>

Video, Exclure les Communautés de Base de la gestion des ressources naturelles est impossible

<https://youtu.be/p90hj8b97zQ>

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## Appendix 1: Actors and arrangements

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Area of focus	Local partner Organization	Role/Activity
Environment	Madagascar National Parks (MNP)	Establishing the Fandriana National Park. Workshop on deforestation, sharing of information on park management and awareness raising activities.
Nursery	Silo National des Graines Forestières (SNGF)	Growing and providing seeds, seedlings, and saplings of native trees.
Agriculture	Fafafi Spafi	Training community organizations, providing technical support, and capacity building.
	Pharmacie & Cabinet Veterinary Zay Manina	Supplying various inputs.
	Amoron'i Mania Voasary	Supplying citrus saplings.
	NGO Sahavo	Supplying <i>arachis pintoï</i> , <i>brachirria</i> and <i>stylosanthès</i> .
	Association Kintana	Supplying ravintsara. Buying <i>Arachis</i> , <i>Kikiuyu</i> , <i>Avoine</i> , <i>Ray grass</i> . Supplying citrus saplings.
	Fifamanor	Providing Ray Grass seeds and potatoes.
	Centre Technique Horticole de Tamatave (CTHT)	Teaching farmers to plant and collect pink peppercorn.
	Otiv Fanantenana Fandriana	Microcredit accounts of associations.

Finances	Caisse d'épargnes de Madagascar	Microcredit accounts of associations.
	Otiv Antanifotsy	Training on use of stills for aromatherapy and on sustainable trade.
	Aroma forest / Homme et Environnement	
Capacity building	Consulting Plus	Undertaking a study and training on microcredits.
	Fonds Régionaux de Développement Agricole (FRDA) / Centres des Services Agricoles (CSA)	Sharing information and experiences in product chains.
	Société Aromania	Support for essential oil markets (Ravintsara).
	Société Jaccarandas	Training and commercial partnership for pink peppercorn.
	ATDR	Support to establish and train community organizations.
	Tsiry Mada / Tsiry Parm	Support to establish and train community organizations.
	Articom	Teaching people to distill essential oils, producing stills





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Authors: Sarah Jane Wilson and Sophie McCallum, Forestation International

Contributors: Appolinaire Razafimahatratra, World Wildlife Fund-Madagascar and Fara Lala Razafy, Project Implementer

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