LORTA Impact Insights

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GREEN CLIMATE FUND | Independent Evaluation Unit

Can Forest Conservation Work While Building Stronger Livelihoods?

Lessons from Impact Evaluation of GCF's FP026: Sustainable Landscapes in Eastern Madagascar (SLEM) Project

This summary is based on emerging findings on the results and impact of GCF's FP026 project[1], as analyzed by the Learning-Oriented Real-Time Impact Assessment (LORTA) programme of the Independent Evaluation Unit (IEU) of the Green Climate Fund (GCF).

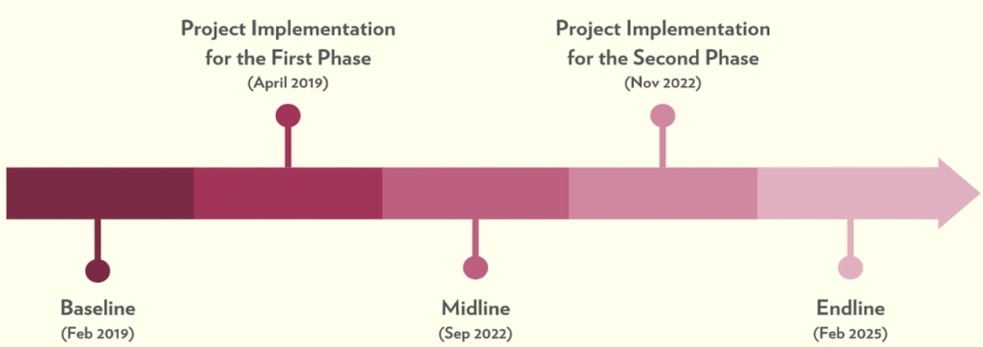
The dual challenge: Forests and livelihoods in Madagascar

Madagascar's forests are vanishing at an alarming rate – 45 per cent lost in the past 60 years. This deforestation reflects the country's underlying economic constraints: rural households depend on slash-and-burn agriculture and unsustainable forest resource extraction, with climate shocks exacerbating these dependencies. The Sustainable Landscapes in Eastern Madagascar (SLEM) project, launched in 2019 by **Conservation International-Madagascar** with GCF funding of USD 15.2 million, aims to tackle these challenges by equipping communities near protected areas with sustainable local forest management practices and climate-resilient agriculture.

Impact Assessment

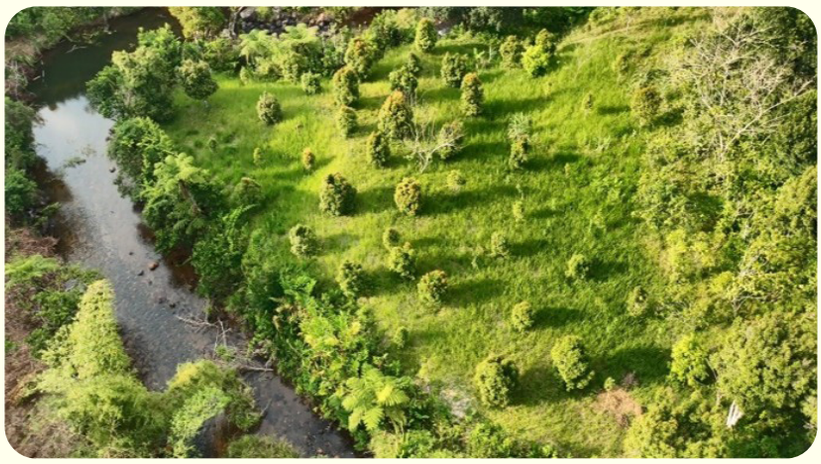
This brief examines whether forest conservation efforts can be effectively combined with livelihood support, whether gains in agriculture and income are sustained beyond the project period, and whether these improvements contribute to greater household resilience against climate shocks. It draws on a **rigorous six-year impact evaluation** that tracked 1,603 households within and outside project areas, using data from three survey rounds: baseline (February-May 2019), midline (September-November 2022), and endline (December 2024-February 2025).

Figure 1: LORTA Impact Evaluation Timeline for the SLEM Project



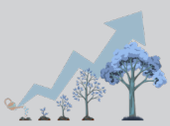
1 Green Climate Fund. "FP026: Sustainable Landscapes in Eastern Madagascar." Green Climate Fund. https://www.greenclimate.fund/project/fp026

The evaluation uses a **difference-in-differences approach combined with matching** to compare changes over time between project and non-project households, helping to isolate project effects from other factors. To complement the quantitative findings, the evaluation incorporates insights from qualitative research conducted by Conservation International. This endline impact assessment offers a unique opportunity to examine long-term sustainability by tracking households that received support between 2019 and 2021, allowing impacts to be assessed up to four years after project support ended.

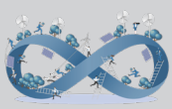


Source: © Clarck Rabenandrasana
Note: Cloves plantation in CAZ.

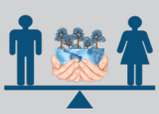
Key highlights at a glance



1. Forests are better protected, and behaviours are changing: Deforestation rates in project areas fell from 3.2 per cent to 0.8 per cent, with a significant reduction in deriving income from unsustainable sources.



2. Livelihood practices shifted towards sustainable practices: Farmers are adopting year-round sustainable farming strategies instead of relying on short-term coping activities.



3. Adoption of conservation agriculture practices dropped after project support: Simple practices, such as soil conservation, persisted while complex ones declined, with female-headed households facing greater challenges in maintaining resource-intensive techniques.

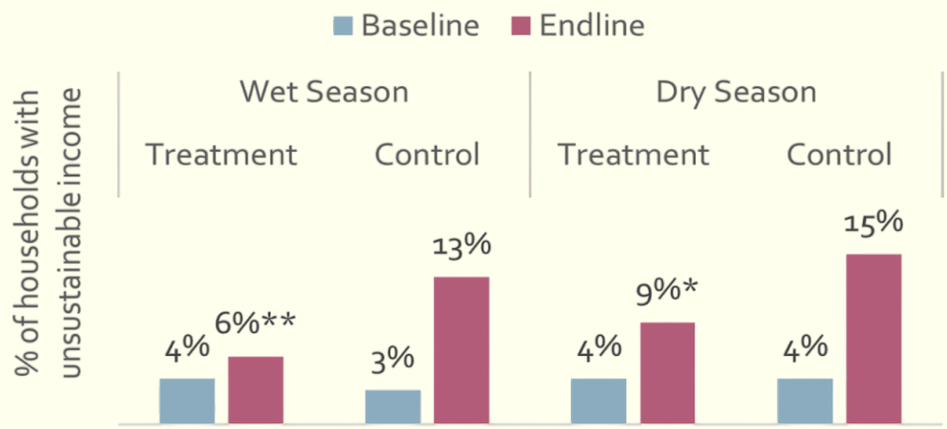
4. Crop yields, market engagement, and household income increased: Households experienced improved crop income, mainly driven by the production of key climate-resilient crops, such as ground nuts, Bambara peas, and white beans, along with stronger market engagement.

5. Increased income directed to long-term investments over food: Households prioritized education and asset investments over immediate food needs, suggesting a focus on long-term resilience.

I. Reduced deforestation and decline in unsustainable forest use

Annual deforestation rates in project areas fell sharply from **3.2 per cent to 0.8 per cent between 2018 and 2023** due to community forest patrolling, reforestation activities, and a shift away from unsustainable activities. Communities participating in the project were significantly less likely to derive income from environmentally unsustainable activities, including tree-cutting, charcoal production, gold mining and the extraction of other forest resources. According to difference-in-differences (DID) analysis, the **proportion of households engaging in these activities was 8 percentage points lower in the wet season** and **7 percentage points lower in the dry season** compared to non-participating communities.

Figure 2: Proportion of households deriving income from unsustainable sources



Source: LORTA team analysis using data from the Madagascar baseline (2019) and endline (2025) household surveys.
Note: Although raw percentages increased in both groups, the difference-in-differences estimate shows a significant project impact by slowing the growth in unsustainable activities.

Learning 1: Conservation and Income Growth Are Compatible

LORTA findings on the impact of FP026 indicate that forest conservation and agroforestry development efforts can coincide with improved economic outcomes for local communities. Project participants experienced both reduced deforestation rates and increased household incomes. This suggests that thoughtfully designed interventions can support communities in enhancing livelihoods while also reducing pressure on forest resources.

II. Uneven adoption of conservation agricultural practices

The data reveals important patterns in the sustainability of different conservation agriculture practices. Between 2019 and 2021, the project promoted a range of techniques, including soil conservation, agroforestry, terracing, irrigation, and off-season rice cultivation. It delivered training through lead farmers in each community and provided support in the form of small agricultural equipment, seeds, and fertilizers. However, not all conservation agriculture practices were equally adopted or sustained. Two key patterns were observed:

1. **Soil conservation practices** were more widely adopted and maintained over time, likely due to their low cost and minimal labour requirements. These included mulching, composting, and organic pest management.
2. In contrast, **resource and labour-intensive** practices, including irrigation and terracing, had lower adoption rates, with uptake declining further once project support ended.

Project participants identified several reasons behind these patterns. After project support ended in 2021, households in remote villages faced difficulties accessing **agricultural inputs** such as seeds, tools, and fertilizers, often due to poor road conditions. Sustaining more **complex techniques** required ongoing training and support, which were no longer available. Finally, **extreme climate events**, particularly a major cyclone in 2022, severely damaged crops, undermining farmers' trust in and perception of the effectiveness of promoted practices.

Learning 2: Sustained Uptake Requires an Enabling Environment Beyond Training and Inputs

Sustained adoption of climate-smart agriculture (CSA) practices requires more than training and inputs. To ensure CSA practices last beyond project support, complementary enabling systems must be developed in parallel, especially in remote areas where market access is limited and climate risks are high.

1st **Market access and connectivity** are critical for sustained CSA adoption. Road infrastructure connects farmers to affordable inputs and enables the transport of produce to markets, while commercially viable markets ensure reliable input supply and stable demand. Without this connectivity, CSA remains inaccessible and unsustainable in remote areas.

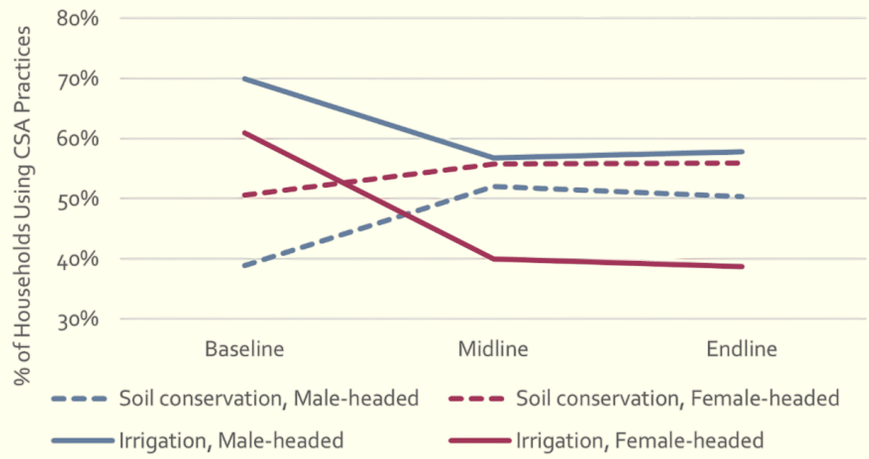
2nd **Climate information systems** enhance the effectiveness of CSA interventions. Access to timely and localized climate information helps farmers anticipate seasonal variability, apply CSA techniques more strategically, and cope with shocks while maintaining agricultural activities.

3rd **Infrastructure across the production cycle** supports long-term adoption. Irrigation systems, post-harvest facilities, storage infrastructure, and processing units all help farmers reduce losses, improve returns and sell more strategically.

Gender influences sustained adoption

The impact evaluation revealed clear gender disparities in both the adoption and sustainability of conservation practices. **Female-headed households** consistently demonstrated a lower uptake of **resource- and labour-intensive practices**, with the gap widening further after project support ended. By the endline, only **39 per cent of female-headed households** continued to use irrigation, compared to **58 per cent of male-headed households**. In contrast, for lower-input practices such as mulching and composting, female-headed households were slightly more likely than male-headed households to adopt and sustain these techniques.

Figure 3: Gender Gaps in Sustained Adoption of Climate-Smart



Source: LORTA team analysis using data from the Madagascar baseline (2019), midline (2022) and endline (2025) household surveys.

Their lower adoption of labour- and input-intensive techniques was **not due to a lack of interest** but rather to a set of structural barriers. Female-headed households faced greater labour constraints due to fewer adult household members, and time limitations stemming from the dual burden of caregiving and farm work. These findings highlight the importance of **gender-responsive programme** design that actively addresses these barriers.

***Learning 3*: Sustaining CSA Requires Gender-Responsive Project Design**

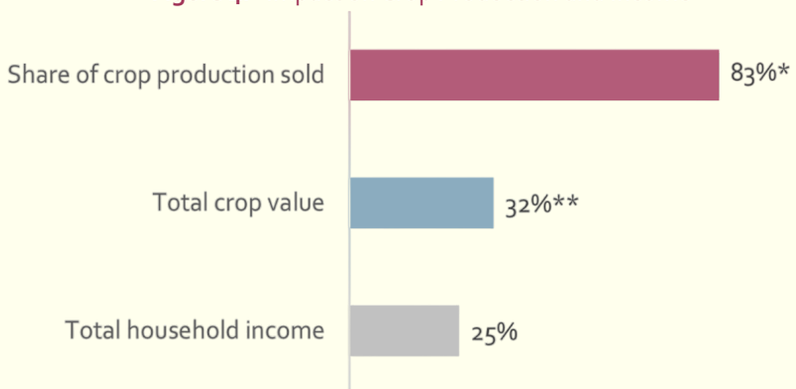
Based on a separate qualitative study conducted by Conservation International

A qualitative study by Conservation International underscored the important role of **women's associations** in sustaining climate-smart agriculture. These groups helped female farmers overcome specific barriers, including labor shortages and limited access to project resources, by providing collective support that individual farmers could not access alone. Through **shared labor arrangements**, access to training and inputs, and **joint marketing efforts**, associations enabled members to pool harvests, meet the bulk demands of buyers, and negotiate better prices. Their continued motivation was fueled by the **tangible production gains and livelihood improvements** they experienced firsthand.

III. Production, income, and food security

Despite the declining adoption of some conservation agriculture practices, the project contributed to **promising gains in crop income**. At endline, the total value of crop production was **32 per cent higher** among participating households compared to similar households that had not received support. These improvements were driven by the promotion of key climate-resilient crops, such as ground nuts, Bambara peas, and white beans, along with stronger market engagement. The full income impact may be **underestimated**, as returns from high-value cash crops like **vanilla and coffee** had not yet been realized at the time of data collection.

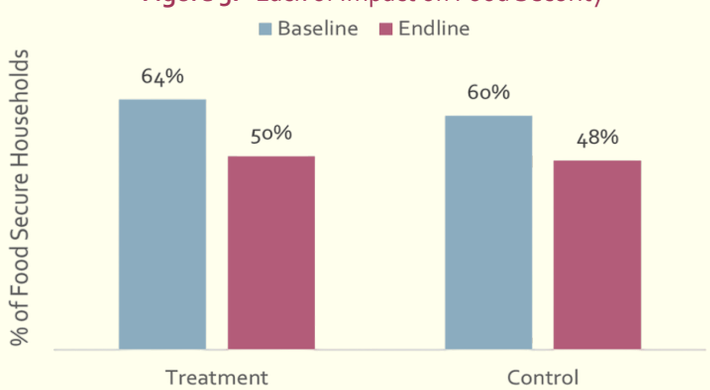
Figure 4: Impact on Crop Production and Income



Source: LORTA team analysis using data from the Madagascar baseline (2019) and endline (2025) household surveys.
Note: Estimates reflect the percentage change in outcomes for project participants compared to a control or matched comparison group. The effect on the share of crop production sold was estimated using a DID approach. Estimates for total crop value and household income were calculated using nearest-neighbour matching at endline and are based on inverse hyperbolic sine-transformed values. Asterisks denote statistical significance: $p < 0.1$ (*), $p < 0.05$ (**).

At the same time, these gains did not automatically translate into improved food security.[2] Despite higher earnings from crop sales, household food security indicators showed no significant improvement, and the percentage of food-secure households declined across both participating and non-participating households since the baseline.

Figure 5: Lack of Impact on Food Security



Source: LORTA team analysis using data from the Madagascar baseline (2019) and endline (2025) household surveys.
Note: Food security was measured using the Consolidated Approach for Reporting Indicators of Food Security (CARI). DID estimates indicate no statistically significant difference in food security between treatment and control groups at endline.

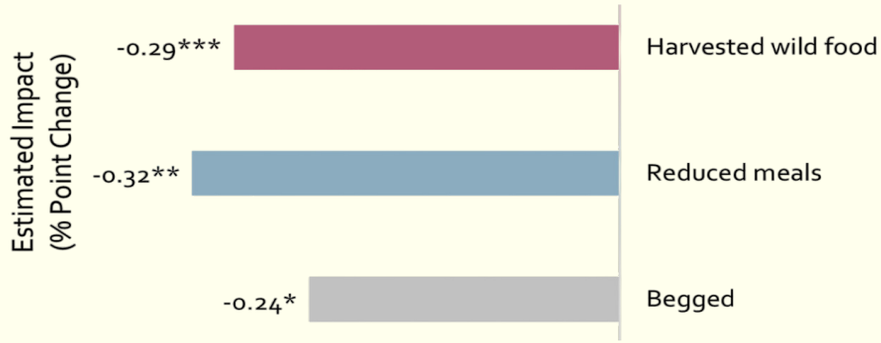
The explanation for this disconnect partly lies in household spending patterns. Rather than increasing food consumption, households directed their income towards **long-term investments**, with **female-headed households** more likely to invest in **education** and **male-headed households** in **durable assets**. These spending patterns suggest that households prioritized long-term well-being over immediate consumption – a strategic choice potentially yielding broader development benefits over time.

2 Household food security was assessed using the World Food Programme's Consolidated Approach for Reporting Indicators of Food Security (CARI). The CARI index classifies households into four categories – food secure, marginally food secure, moderately food insecure, and severely food insecure – based on three key indicators: (1) Food Consumption Score (dietary consumption, considering both the quantity and quality of food intake); (2) Food Expenditure Share (proportion of household budget spent on food); and (3) Livelihood Coping Strategies (extent to which households adopt strategies to meet basic food needs in response to shocks).

IV. Improved household resilience to climate shocks

Despite no measurable gains in standard food security indicators, the impact evaluation found clear signs of improved resilience during extreme climate events. When a major cyclone struck in 2022, households in project areas were significantly less likely to resort to negative coping strategies, such as skipping meals, harvesting wild foods, or begging, compared to similarly affected households outside the project. This difference suggests that the SLEM project strengthened household capacity to absorb and recover from climate shocks, likely through more diverse livelihoods, higher income, and improved readiness.

Figure 6: Impact of SLEM on coping strategies after the 2022 cyclone



Source: LORTA team analysis using data from the Madagascar baseline (2019) and endline (2025) household surveys.
Note: Estimates reflect differences in coping strategies between project and non-project households affected by the 2022 cyclone, using a triple difference (DDD) model. Asterisks denote statistical significance: p < 0.1 (*), p < 0.05 (**), p<0.01 (***).

Conclusion

The SLEM project shows that forest conservation, when combined with rural livelihoods development, can deliver meaningful economic benefits, strengthen household resilience, and reduce environmental degradation. However, they also reveal that achieving lasting resilience requires more than short-term income gains. As climate shocks intensify, future programmes must go beyond promoting specific practices. They should combine support for sustainable livelihoods with investments in rural infrastructure (roads, transport, energy), market systems, targeted food security program, and tools that help households manage climate risks. To sustain and scale early gains, programmes should address structural barriers from the outset, particularly those faced by female-headed households.

About the IEU

The Independent Evaluation Unit (IEU) ensures that GCF is accountable, effective and continuously learning. It conducts independent evaluations of GCF's activities and operations to guarantee its ***accountability*** *and enables informed decision-making of the GCF Board on policies, structure, performance, processes and strategies. The Unit identifies, synthesises and disseminates lessons learnt to support the GCF's effectiveness as a* ***learning*** *institution. It facilitates* ***dialogue*** *on the lessons learnt within the GCF ecosystem and in the international climate space. Independent evaluations serve the functions of accountability, learning and dialogue.*

About the LORTA programme

The IEU's Learning-Oriented Real-Time Impact Assessment (LORTA) programme embeds theory-based impact evaluations into GCF projects to build real-time feedback loops. By determining the causal effects of interventions, LORTA helps identify what works, what doesn't, and what should be scaled up—strengthening evidence in climate adaptation and mitigationning evidence in climate adaptation and mitigation.

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