



STRENGTHENING FOREST MANAGEMENT TO PROTECT BIODIVERSITY AND ALLEVIATE POVERTY IN MALI, WEST AFRICA

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Figure 1. Project participants on the Strengthening Malian Forest Management project with Tree Aid country manager, Amadou Tangara.

Strengthening forest management to protect biodiversity and alleviate poverty in Mali, West Africa

SUMMARY

Mali ranks among the ten poorest countries in the world and is highly dependent on natural resources. Over the last three decades, the West African country has seen a devastating decrease in its forest area, with nearly two million hectares of forest lost.

The Duwa and Sutebwo forests in the Ségou region have been severely degraded through unsustainable tree felling, overgrazing, and agricultural expansion. Communities here depend heavily on tree resources as a source of food and income. As a result, tree loss has severely intensified the levels of poverty in the region.

In this learning paper, we conduct a review of Tree Aid's Strengthening Malian Forest Management project in Ségou, funded by the Darwin Initiative and supported by local partner, Sahel Eco. The project aimed to protect and restore the biodiversity of the Duwa and Sutebwo forests, promote a move towards sustainable forest management practices, and enhance shea and honey enterprises to increase household incomes.

Using tailored data collection and analysis through the Rural Household Multi-Indicator Survey¹, combined with focus group discussions and cooperative assessments, we found that the project not only empowered the community to restore land and protect their vital forest resources but it also helped them increase their income from Non-Timber Forest Products by 1,673% and lift themselves above the poverty line.



Figure 2. Project participants planting trees through Tree Aid's Strengthening Malian Forest Management project.

¹ RHoMIS is a household survey tool designed to characterise farm systems. It is managed by the International Livestock Research Center (ILRI). Development of the tool has been supported by the Consortium of International Agricultural Research Centers of the CGIAR (Consultative Group for International Agricultural Research) and CGIAR Research Programs.

KEY PROJECT ACHIEVEMENTS:



The average cash income for participant households increased by an average of \$1,169.34 (270% increase) over the life of the project.



905 households lifted themselves above the poverty line, with an estimated 2,444 people now living on more than \$1.90 a day².



Household income from Non-Timber Forest Products (NTFPs) increased by an average of \$531.60 (1,673% increase) over the life of the project, with NTFPs accounting for more than one quarter (26%) of their entire income base, compared to 3% before the project.



75% of project participants now believe they have fair and equal access to local forest resources.



The number of households using Farmer Managed Natural Regeneration techniques (managing and encouraging tree regeneration and growth on farmland) has tripled to 86.4%.



87% of women now report a moderate or equal ability to choose how to spend their own income.

The learnings demonstrate that, with successful integration of forest management and livelihood approaches in the drylands of Africa, the impact is twofold: we protect forests and ensure natural resources are managed sustainably and, at the same time, we help people lift themselves out of poverty in ways that protect, not harm, their environment.

² Based on our household survey the average number of people per household in the community was 11.98 compared to a national average of 5.81.

INTRODUCTION

Located in the heart of West Africa, Mali is a fragile state facing drought, food insecurity, and terrorism. 58% of the country lives below the poverty line, with 90% of the very poor living in rural southern areas where the population density is highest. In the project region of Ségou, there have been sharp population increases from internal displacement and migration from the Saharan north of the country. This, alongside poverty, poor farming practices, and the effects of the climate crisis, have led to over-exploitation and degradation of the natural resources that local people depend on to survive. In particular, there has been an expansion of agriculture over the past three decades, resulting in the clearing of natural habitats, including forests. This is having devastating effects on biodiversity, while the loss of natural resources is pushing people deeper into poverty.

However, there are solutions that can help break this negative cycle of poverty, land degradation, and loss of forest resources. The use of prevalent and indigenous Non-Timber Forest Products (NTFPs) is a proven approach to this. The shea tree (*Vitellaria paradoxia*) is a naturally growing tree in the Savannah and Sahel belt of West Africa. Known as the “green gold” of the region, the shea tree provides a livelihood for millions of people in Mali, especially for rural families where it is culturally familiar and valued. The fruits of the shea trees can be eaten and the sun-dried kernels can be boiled down over a period of days, producing a vegetable fat known as shea butter, used both in the food and cosmetics industries. Mali is the world's second-largest producer of the shea nut and accounts for approximately 20% of the global supply chain³.

In Mali, shea products are generally viewed as a female commodity and shea production is typically done in low-income households. These two factors make it an appropriate intervention for households living in poverty and for women, who, because of gender inequality in Mali, are significantly more disadvantaged and affected by poverty and environmental degradation than men. The income from shea butter can be invested in nutritious foods or provide a buffer against climate shocks, such as floods and droughts. Yet, the process of extracting butter from the raw shea nuts still remains rudimentary and very laborious, with risks including snake bites during the collecting stage, and exposure to smoke and heat in the highly inefficient processing stage.

Shea tree resources are depleting across the region and the work continues to provide vital income at a high risk for those working at the primary producer level. Therefore, there is a clear need to improve the sustainable management of shea resources, enhance profitability, and encourage safer harvesting and processing techniques.

³ CBI. (2018) 'The European Market potential for Shea Butter'.

PROJECT SUMMARY

The semi-arid Ségou region is home to two forests, Duwa and Sutèbwo, which have been degraded through overgrazing, wood exploitation, hunting by the use of bush fires, and rapid agricultural expansion. Consequently, tree diversity has been severely reduced and the biodiversity loss deeply affects local communities, whose livelihoods are dependent on natural resources like shea and honey.

In July 2017, Tree Aid and Sahel Eco secured funding from Darwin Initiative to support the community to build upon previous work completed in developing participatory Forest Management Plans. Over three years, the project successfully protected and restored 11,619 hectares of forest through a series of best practice Natural Resource Management (NRM) techniques, planting of indigenous tree species, and building the capacity of local communities and authorities to effectively manage the two forests.

The project also supported the communities to set up 44 small-scale enterprises (known as Village Tree Enterprises) based on NTFPs to improve livelihoods and increase incomes, focusing primarily on shea and honey value chains. The project also worked with two existing local cooperatives, Farakunna and Hirosin, to increase their support for their members and the communities, as well as their stewardship of the local forest resources⁴.

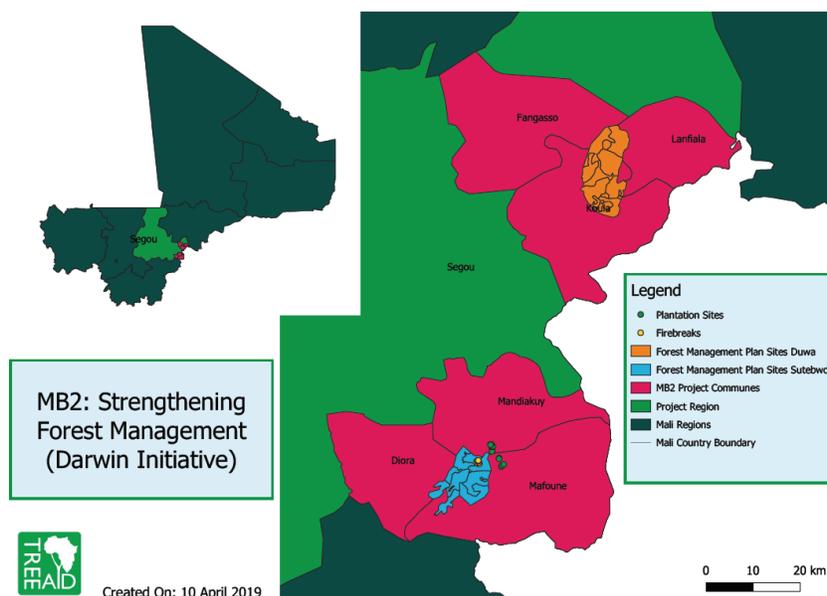


Figure 3. Location of Tree Aid’s Strengthening Forest Management project in Mali.

⁴ The legal status of cooperatives in the Malian context entrusts them a certain degree of decentralised delegated authority to uphold overall management oversight for forest areas, addressing a critical governance gap.

PROJECT HIGHLIGHTS:

- **1,435 farmers participated in NRM training** and were supported to implement these techniques across 41 communities.
- **Over 345,000 new trees were planted and 327,000 trees restored** using the Farmer Managed Natural Regeneration technique to promote tree growth from tree stumps and shrubs.
- **Soil and water conservation restored 8,300 hectares of degraded forestland**, using stone bunds to reduce water runoff and zai pits⁵ to improve soil fertility.
- **192km of firebreaks were established** around restored areas to stop the destruction of existing forests and new trees.
- **Capacity of stakeholders (municipal authorities, technical services and communities) was strengthened** to manage the forests in a more equitable way. This included a decentralised decision-making processes that promotes the rights and responsibilities of local forest users and communities who depend on the forests.
- **The two inter-communal cooperatives of Farakunna and Hirosin were supported** to have overall stewardship of the two forests, in accordance with Malian law reform.
- **A forest dialogue group and a steering committee involving all local stakeholders was set up for each forest.** This provides an open forum for discussion and addresses any conflict over forest use.
- **44 Village Tree Enterprise (VTE) groups, based on shea and honey, were set up.** They received



Figure 4. Community members in the Ségou region of Mali, where Tree Aid's Strengthening Forest Management Project was implemented.

⁵ Water retention and composting pits to grow crops.

organisational and technical support to improve production processes, product quality, and business and financial skills.

- **The two cooperatives received modern shea and honey processing units and training** on how to use them. They also took part in marketing skills training and learning exchanges and utilised the 'Market Information System' on local radio, providing a flow of information between producers and buyers about available products and prices offered.



Figure 5. Hirosin cooperative women's enterprise group with a shea processing unit that was provided through Tree Aid's Strengthening Forest Management project.

METHODOLOGY

The project was evaluated using the Rural Household Multi-Indicator Survey (RHoMIS), focus group discussions, and an organisational capacity assessment of the Hirosin and Farakunna cooperatives. This was supplemented with project progress reports and GPS data, including georeferenced photos, collected during regular field visits.



Figure 6. Project evaluation using RHoMIS.

RHoMIS is a well-established, household survey tool carefully designed for farming communities living in poverty and food insecurity. The 60-90 minute digital survey gathers data on agricultural practices, livelihoods, food security, and dietary diversity, as well as gender roles. For this project, a baseline survey was conducted in 363 randomly selected households from the project communities. A repeat end line survey was conducted with 349 households, 290 (83%) of whom were in the baseline survey.

KEY RESULTS

1. Reduced poverty and increased wellbeing

The project achieved a 34% reduction in the proportion of households below the poverty line from 86% at baseline to 52% at end line. This represents 905 households (in a project of 2,672 households) lifting themselves above the poverty line (\$1.90 day), primarily because of their increase in income from shea and honey production. On average, participants increased their overall cash income by 270% from \$432.60 in 2017, to \$1,601.94 in 2020.

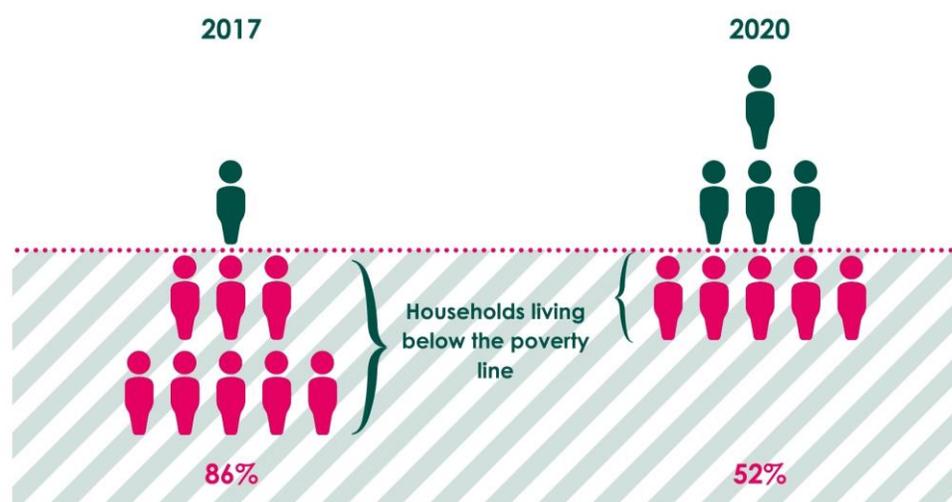


Figure 7. Proportion of households living below the poverty line before and after the project.

Such a dramatic rise in cash income has significant importance to the make-up of the household economy. This income means households have an opportunity to save and invest financially and have greater absorptive and adaptive resilience to economic or climactic shocks.

2. Increased income from Non-Timber Forest Products (NTFPs)

Overall, household income⁶ from NTFPs increased by 1,673% over the lifetime of the project. In addition to an increase in the income sourced from shea and honey, which remain the two largest NTFPs in the area, other NTFP products have reportedly brought new income to households. This includes income from baobab leaves, arabic gum, and tamarind fruit.



⁶ Measured in cash income.

Focus group discussions with women have confirmed that there is now more production of different NTFPs thanks to the strengthened cooperatives.



Figure 8. Increase in household income from Non-Timber Forest Products over the lifetime of the project.

Critically, NTFP income has shifted for households from an average of 2.95% of total income to an average of 26%. This means that over a quarter of total household income is now coming from sustainably sourced tree products, placing significant value and incentive in the maintenance and restoration of forest resources. In addition, in an environment so susceptible to climate variability and change, the clear increase in the relative importance of NTFPs after the project intervention also indicates a diversification of livelihoods strategy away from one dominated solely by the sale of food crops and livestock.

3. Increased dietary diversity

Dietary diversity is a quantitative measure of food consumption that reflects household access to a variety of foods and a way of assessing the nutritional adequacy of a person's diet. Among project participants, the dietary diversity per household has improved in both good and bad growing seasons.⁷



This shift in dietary diversity is a sign that, not only is Tree Aid's mainstreaming of nutritional awareness approach making an impact on household dietary decision making but furthermore, by increasing cash income, we are enabling families to buy in a more diverse diet than they are able to produce.

⁷ Climate variability can affect the level of crop yields per year, with bad and good seasons defined by the participants.

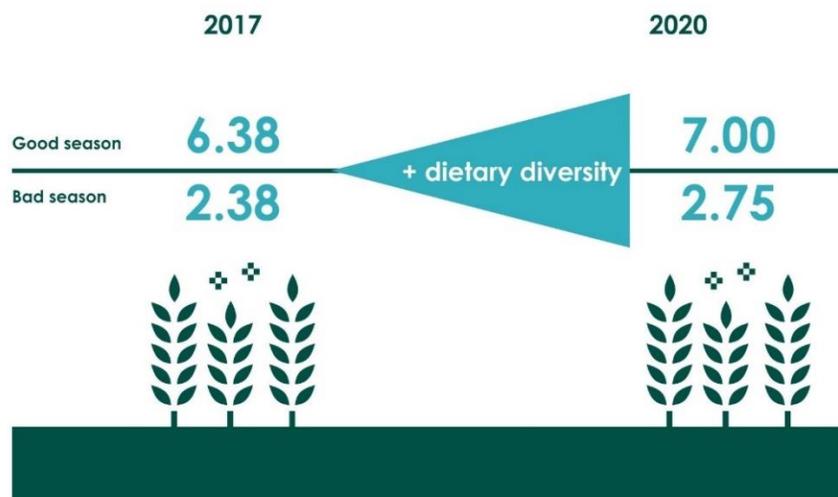


Figure 9. Increase in dietary diversity in good and bad seasons over the lifetime of the project.

4. Greater access to forest resources

Now, 91% of respondents know of and access the local forest, confirming the crucial role of the forest as an important livelihood support source for the community. 75% of respondents believe that, after project activities, they now have fairer and equal access to local forest resources.



Focus group discussions revealed that women and livestock owners are now able to visit the forest more often as a result of the project, with collecting NTFPs given as a primary reason for doing so. Women also mentioned that men and woodcutters were said to visit the forest areas less often, a reason being the “restrictions and the bylaws put in place by the project.”

Significantly, 99% of participants believe that their behaviour, and that of their community, has improved as a result of trainings received. All focus groups also acknowledged the work done by the project to provide training on existing NRM systems and by-laws. These have clarified access rights for household fuel wood and have restricted the cutting of green wood and the production of charcoal. They also reported less forest fires due to the firebreaks.



Figure 10. Respondent's perception of their access to local forest resources at the end of the project.

5. Improved management of natural resources

There have been some important changes in the way in which people are using trees, with sharp increases in the number of households using trees for NTFP incomes (+255%) and identifying trees for their land fertility and water retention benefits (57%).



Focus group discussions reported that immature fruit is no longer gathered and that now only dead wood is cut for fuel. There has also been a substantial increase (+24%) in the use of sustainable, low-tech NRM techniques and a small increase (+6%) in soil and water conservation practices.

Percentage of Households using FMNR techniques in 2017 (%)	Percentage of Households using FMNR techniques in 2020 (%)
33.8%	86.4%

By far the most prevalent NRM technique is Farmer Managed Natural Regeneration. This was reported by almost 90% of households, reflecting a key activity of the project. Tree planting (18.5%) and the establishment of firebreaks (9.7%) are also both reported by an increasing number of households.

6. Gender equality

Women rely on forests for income, food and biofuel, yet management often remains with men. For the RHoMIS end line survey, a module focusing on women's comparative voice, choice, and control was included. There was no baseline data to make comparisons but, in 2020, 87% of women reported a moderate to equal ability to choose how to spend their own income (compared to 29% from a control group of households as measured in the baseline of a new project based in a neighboring region of Mali).



Figure 11. Women's perception of their status and control over income in 2020 at the end of the project.

56% of women also reported that their suggestions are taken into account in the household and 59% in the community. 75% of women said they had moderate to equal control over household savings (compared to 29% from a control group of households as measured in the baseline of a new project).

From this, we can ascertain that the project appears to have supported women to have more say and control over their resources and is likely to have improved the status of women in the communities.

7. Co-operative assessments: Products and value chain

At the beginning of project activities, neither Hirosin nor Farakunna cooperative reported any access to national or international markets. However, in 2020, both co-operatives reported access to national markets due to project support. Farakunna reporting 50% of its honey sales at national level, while 25% of Hirosin's sales of shea and 7% of its honey sales were made at a national level. Hirosin also reports 3% of its honey sales at an international level.



The project has assisted in these sales through the use of radio as a means of raising the issue of NTFP production and connecting producers, through their co-operatives, with buyers. The radio programme focused on honey and resulted in the formation of a WhatsApp group. This provided a platform by which buyers and sellers of honey communicate and gives the cooperatives access to the national market.

CASE STUDIES

Bernadette's story: enhancing her family's income

Bernadette, a 47-year-old mother living in Kona village in Mali, relies on the land for survival. Supporting her family in a changing climate is no simple task. Over the last three decades, the forests in the Ségou region of Mali have seen severe degradation through unsustainable tree felling, hunting, overgrazing, and agricultural expansion. As a result, nearly two million hectares of Mali's forest cover has been lost and there has been a sharp decline in forest biodiversity.

Bernadette said, *"Before, the environment wasn't as degraded as we see today when we look around us. Now, big trees are scarce. The people from here and elsewhere took advantage of it in a haphazard way as a source of income by making charcoal. This destroyed our environment."*

Since joining Tree Aid's Strengthening Forest Management project, Bernadette has become a member of an enterprise group and been supported by the project to increase their income from sustainably-sourced shea and honey.

"I became a member of the women's group for shea processing. The gathering of women in working groups has encouraged mutual support. We have benefited from training in shea butter processing. Before we sold the butter for 250-300 CFA per kilo. Today we sell it for between 500-1000 CFA. The project provided us with equipment and training in soap making techniques. Now the butter that we don't manage to sell will be made into soap."



Figure 12. Bernadette, a 47-year-old mother, participated in Tree Aid's Strengthening Forest Management project.

Delila's story: restoring her environment

Delila is a 35-year-old mother of four, living in Mankoina village in Mali. After the death of her husband, she found herself at the head of the family, solely responsible for her four children. Determined to give her children opportunities, she works hard to keep her children in education. Delila has been working with Tree Aid on the Strengthening Forest Management project.

She said, "Before, we would have four months of the lean, hungry season. Since I joined the project, I am with other women. We give each other ideas, and we sell butter, almonds and other forest products together. It really makes it easier for me to take care of my children."



Figure 13. Delila, a 35-year-old mother, participated in Tree Aid's Strengthening Forest Management project.

We have been trained in planting, natural regeneration and erosion control techniques. I have used these techniques and it is starting to have a positive effect on my field. Previously we weren't aware of composting techniques and assisted natural regeneration.

We don't cut the shea trees anymore. Before there were more trees but we didn't make a lot of money. Now, shea and other fruits have become valuable sources of income... us women make the maximum profit thanks to the support of the project. If we continue to make a profit from trees the trend of deforestation will be reversed. There are fewer bushfires and the animals have enough to eat for the whole year."

CONCLUSION

The findings overwhelmingly demonstrate the significant impact that relatively low-cost, community focused projects can have on the development outcomes for both individual participants and groups directly involved, as well as an overall impact on the community management, oversight and value held in communal forest resources.

This evaluation shows that communities in such contexts as Ségou – faced with increasing vulnerability, poverty, and exposure to climate uncertainties – can, through a participatory and coordinated project, adapt effectively to reverse the trend of environmental decline in a way that dramatically enhances their socio-economic status.

More broadly, the findings illustrate that coordinated efforts to address both environmental decline and extreme poverty can have widespread and lasting impact when responsibility, ownership and management rights are transferred to the broader community.

Assisting rural communities in unlocking the potential of NTFPs and doing so in an institutionally and environmentally sustainable way is a major challenge for policymakers and development practitioners. Remoteness and the usually low educational level of rural communities, especially women, creates an uneven balance of returns and power within the global value chains into which they are increasingly integrated. Nonetheless, important opportunities are available and a range of strategies, as highlighted in this project, can help communities take advantage of these prospects.

As our Mali project has shown, to increase the income of indigenous women by adding value to their forest resource base, Tree Aid needs to plan projects that help women increase their incomes from their forest resource base on a site – and product-specific – basis and in consultation with the women themselves.

Looking to the future, the impact of a low-scale initiative such as this demonstrates the viability and need for a significant increase in investment in pro-poor, environmentally sustainable initiatives that create a skills transfer and incentivisation for local communities to have ownership and agency in both local environmental management and in livelihood creation and development.

Some additional conclusions to the work carried out can be drawn that can serve as guidelines for future work

Producer groups and cooperatives show that, when rural communities form their own democratically run and inclusive organisations, they become better able to access credit, technology, training and markets. They are also better able to voice their needs and to increase their bargaining power within the value chain.

Financial literacy and an understanding of basic accounting, bookkeeping, and issues such as risk management are key areas that underpin any successful business. Without the development of financial understanding within the enterprise, it is virtually impossible to undertake planning with clear annual objectives regarding production and profits, including cost–benefit analysis.

Governments have a major role to play in natural resource management. The legal status of cooperatives in the Malian context entrusts cooperatives a certain degree of decentralised delegated authority to uphold overall management oversight for forest areas. Decentralised forest governance can ensure that stakeholder engagement is inclusive and collaborative.

PARTNERS

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