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Non-timber forest products – A key tool to improve food security and nutrition in the Drylands of Africa.

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Abstract

Desertification and climate change will reduce the provision of ecosystem services in African drylands, including losses in biodiversity and soil fertility. With a major part of the population in these areas relying heavily on natural resources for survival, this worsens a health situation that is already ridden by hunger & malnutrition.

Tree Aid works in Africa's drylands to unlock the potential of trees to tackle poverty and food security while improving the environment. In particular, the promotion of non-timber forest products (NTFPs) can improve the health of rural populations by enhancing food security and nutrition. Here, we present a quantitative study that explores the impacts of promoting the production and consumption of NTFPs among 33,212 households in four regions of Burkina Faso, which feature the highest malnutrition rates in the country.

This project was a partnership between Tree Aid and the Swiss Development Agency and ran from January 2017 to December 2020. Its socioeconomic and nutritional impacts were evaluated with baseline & endline assessments using the Rural Household Multi Indicator Survey¹ (RHoMIS), a well-established household survey tool designed to analyse farm systems, a nutritional survey using SMART technology (Standardized Monitoring and Assessment of Relief and Transitions²) & focus group discussions.

We find that enhancing access of women and vulnerable groups to wild & cultivated NTFPs through nutrition gardens & raising awareness of their nutritional value improves the food and nutritional security of the project rural households. Overall, the 263% increase in the proportion of calories sourced from key NTFPs (shea and baobab), which tripled daily intake per person, contributed to an 8% reduction in the number of households below the calorie line and a 42% reduction in chronic malnutrition in under 5-year-olds. These results reinforce the case for protecting & regenerating forests, which bring significant benefits to human health for rural population across the Sahel.

Keywords: [NTFP, food security, nutrition, Burkina Faso, Drylands]

Introduction, scope and main objectives

The project regions in Burkina Faso are particularly vulnerable to climate change due to their close proximity to the Sahara Desert. There, increasing temperatures, changes in rainfall patterns, as well as more frequent and extreme climate events (floods and droughts) are acutely felt: for example, temperatures across the Sahel have increased by nearly one degree Celsius since 1970, nearly twice the global average (Crawford, 2015). In addition to these climate impacts, the project regions are under a strong demographic pressure, which, combined with poverty, push local communities to resort to unsustainable land and farming practices. Together, these factors deplete natural resources and lead to biodiversity loss and land degradation, making the land unproductive and unable to sustain life.

With about 80% of the population in Burkina Faso relying heavily on natural resources for survival through agro-pastoral activities, land degradation directly threatens local communities' livelihoods, leading to increased poverty, poor food

¹ <https://www.rhomis.org/>

² <https://smartmethodology.org/about-smart/>

security and malnutrition, for which the four project regions have the one of the highest rates in the country. Poverty levels in these regions are above the national level (40.1%) and range from 41.5% (South-West) to 70.4% (in the North) (INSD, 2014). As for food security and nutrition, between 14,5% (Centre Region) and 34,6% (East Region) of children under 5 years old suffer from chronic malnutrition and a third (27,3 %) suffer from stunting (Ministère de la Santé, Burkina Faso, 2016). More intense and frequent climate impacts worsen this situation, as these populations are unable to cope and adapt to them, locking them in a vicious cycle of environmental degradation, poverty and food insecurity.

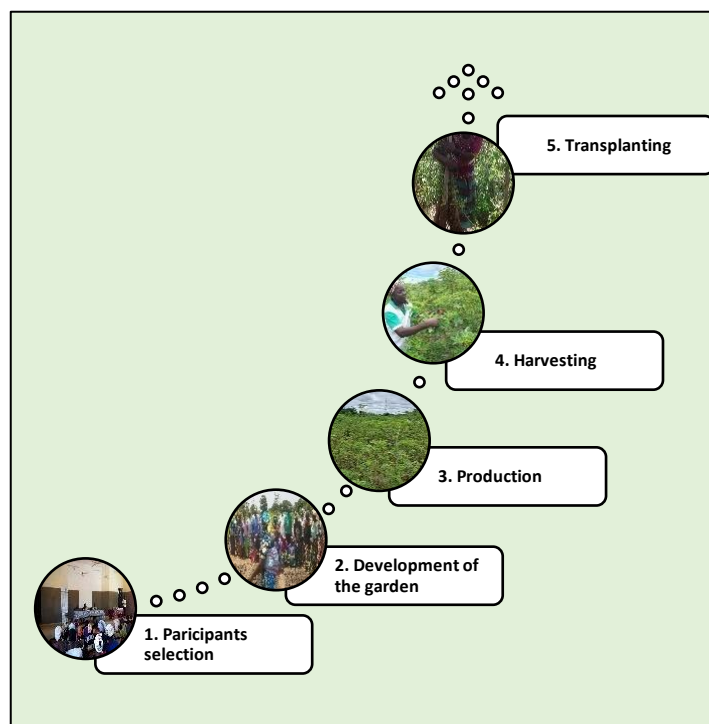
In such context of poverty and hunger, the exploitation of NTFPs constitutes an alternative for the populations to meet their food and nutritional needs while diversifying their sources of income and employment. NTFPs are the third largest source of household income in rural areas, making up 23% of those incomes after agriculture (37%) and livestock products (24%) (APFNL, 2014). NTFPs are used as supplements in areas at risk of food insecurity. The nutritional value of a range of wild fruits shows that some vitamin or micronutrient deficiencies could be avoided or corrected by their regular consumption.

This paper presents and reflects on the approach and results observed by Tree Aid during its NTFP phase 2 project (NTFP2) which was implemented between 2017 and 2020 with the financial support of the Swiss Cooperation in the South-West, Centre West, Centre North and North regions of Burkina Faso. Working directly with 98,241 project participants in local rural communities (33,212 households, 88% women and 23% youth), the project's overall aim was to strengthen the food and nutritional security of rural households (including vulnerable people, women and youth) and to improve their incomes through the sustainable management and promotion of NTFPs. In this paper, we will present the project approach, the observed results as well as reflect on the conditions needed to scale up this approach.

Methodology/Approach

The methodology uses a combination of three interventions: (1) Setting up Nutrition Gardens (NG), (2) Creating sustainably managed NTFP production sites, (3) Capacity building in NTFPs processing, sale and consumption. This approach also included a thorough monitoring and evaluation framework to measure intervention impacts (4)

(1) Setting up NG



The project helped community groups plant moringa and baobab seedlings in small communal plots surrounded by living hedges, called nutrition gardens. These were developed to raise awareness of the dietary value of NTFPs and to develop knowledge on how to process these products for household consumption and sale. The leaves of the moringa and baobab trees are regularly harvested, consumed by participating households, or sold as dry leaves or processed powder. The term NG is used because of the food and nutritional quality of the leaves and the rapid growth of the plants. The main steps of setting up NG are as follows:

Step 1: Participant selection: Participants must be organised in a group or association and must demonstrate the need to acquire the NG by sending a motivated request to Tree Aid project's local partners. The beneficiaries must demonstrate possession of a secure, accessible, non-floodable site with a water point.

Figure 1: Process of garden creation

Stage 2: Development of the garden. This stage includes the acquisition of equipment and production inputs, the cleaning and levelling of the land, the installation of

fencing (fences, hedges), and the creation of production beds. The production of the beds is preceded by practical training of the participants in situ on the techniques of installing the beds and production.

Stage 3: Production. This is the stage where moringa and baobab seeds are sown in the beds. The number of beds per species (moringa and baobab) varies according to the needs of each group. After germination, maintenance activities begin with the removal of the seedlings, followed by their transplanting into the empty trays, weeding and the addition of organic fertiliser if necessary (presence of grass, yellowing of the leaves of the seedlings), and phytosanitary treatment in the event of a parasitic attack with organic products, as the leaves are intended for consumption.

Step 4: Harvesting and drying the leaves. In general, depending on the amount of organic fertiliser and the quality of the soil, moringa and baobab leaves are harvested from the 40th day.

Step 5: Transplanting the plants to a final planting site. After 2 to 3 years, or even 4 years depending on the area, the seedlings should be transplanted to a site such as a field, production site or other suitable area.

(2) The creation of sustainably managed NTFP production sites

These are natural areas with a high potential for NTFP-producing forest species and of varying size depending on the region. These areas, which can be agroforestry parks, plantation sites, or assisted natural regeneration (ANR) sites, are identified by the communities with the support of environmental technical services according to a certain number of criteria in order to be secured and enriched by reforestation actions. These sites are used for the production of NTFPs for the local population.

To ensure a secured and improved access to the sites by vulnerable groups especially women and youth, local communities are supported in developing and agreeing a Community forest management plan for each site. For each of these forests, a management committee is set up by the population with the mission of ensuring their sustainable management and the establishment of inclusive forest governance where decision-making processes are more decentralised and promote the rights and duties of local forest users who depend on these resources for food and nutritional needs. It also creates a dialogue platform involving all stakeholders. These committees also organise the involvement of the population in the restoration activities carried out on the sites (fighting bush fires, planting seedlings, etc.).

The creation of the production sites follows these steps:

1. Analysis of the technical feasibility of the site's development in terms of a conservation park (enclosure areas, ANR, individual plantation, agroforestry park). This activity is carried out by technical environmental services in collaboration with the communities and involves identifying, at the level of each commune, potential sites (enclosure, ANR, individual plantation) that could be subject to production and producing a directory of the best production sites in the region.
2. Selection of production sites by region: On the basis of the directory of the best production sites, the environmental technical services will assist each commune to identify its production sites. The choice is made on the basis of criteria such as the abundance of priority species, the size of the site, and the security of the land.
3. Negotiation and definition of the land for these new sites: This is done by the town hall of the commune (local authority) with the local communities, notably the landowners and customary leaders, and with the support of local partners. This step includes the consensual delimitation and geo-referencing of the sites, the elaboration of the development and management plan and charters, the establishment of management committees, and finally marking the boundaries of the sites with markers.

(3) Building capacity in NTFP processing, sale and consumption

The promotion of NG and the setting up of production sites encourages domestic consumption of NTFPs. To strengthen the optimal use of food derived from NTFPs and to reduce the vulnerability of poor communities to famine and malnutrition, an approach based on awareness-raising and training of local communities on the nutritional value of NTFPs was implemented. For example, local recipes or meals based on NTFPs were promoted, and tasting sessions were organised. In order to effectively reach the target group (children and women of childbearing age), awareness-raising activities were done in collaboration with primary health centres, primary schools, nutritional education centres and local community radio stations. Other partners from the private sector and research institutions were also key in the success

of this capacity building. For this project, CEAS Burkina (Centre Ecologique Albert Schweitzer du Burkina Faso) and IRSAT (Institut de Recherche en Sciences Appliquées et Technologies) in Burkina Faso were involved to provide food processing equipment, promote products for consumption, and develop local and improved NTFP-based meals.

Capacity building also focused on the processing and sale of NTFP products through the development of viable and community led village tree enterprises (VTEs) based on the collection, transformation and commercialisation of NTFPs. The project provided financial, organisational and technical support to improve production processes, product quality, business and financial skills, as well as materials to improve packaging and labelling. VTEs consist of groups of 20-30 people where the benefits are shared equally. VTEs can support each other, run savings and loans schemes and trade as one entity, which helps negotiate better prices for all their members.

(4) Impact monitoring and evaluation

The project's socioeconomic impacts have been measured through the following methods:

- The Rural Household Multi-Indicator Survey (RHoMIS), a well-established household survey designed for farming communities living in poverty and food insecurity that 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 December 2017 involving 1,068 randomly selected households from the project communities. An endline survey was conducted with 275 households in October 2020, sampled directly from those surveyed at baseline. The size of the endline sample was calculated to support results with 90% confidence with a 5% margin of error.
- Focus group discussions held in 2020 in 10 communes in random groups of 6–12 project participants in 'all women' groups, 'all men' groups and 'mixed' groups. This participatory method allows participants to voice their experience and point of view with their peers.
- A baseline & endline assessment of local enterprise groups. Data was collected from 179 organisations at baseline and 99 organisations at endline, with 73 of these organisations being directly comparable between the two.

The project's ecological impact was evaluated using 22 permanent monitoring plots on 13 sites of planting and regeneration which were established in 2018 and revisited in 2021.

Finally, nutritional impact was evaluated through an independent nutrition survey in 2018 and 2020 using SMART methodology. This collected data on household dietary diversity and the prevalence of chronic malnutrition among children aged 0 - 5 years.

Results

These three approaches resulted in the following outcomes:

- The set-up of 212 Nutrition Gardens which over 6000 people benefit from directly, including 200 for vulnerable households, 6 for internally displaced persons and their hosts and 6 to respond to the Covid-19 emergency. During the project, these gardens produced 243,637 kg of moringa and baobab leaves of which 76,594 kg were consumed directly, 11,343 kg sold and 21,801 kg processed.
- 93 NTFP production sites, covering over 9,000 hectares have been created and are now under sustainable management through the set-up of 79 community driven forest management plans with local authorities and forest users.
- In terms of capacity building in nutritional and business skills:
 - A total of 38,296 households participated in awareness-raising activities on the nutritional value of NTFPs.
 - 179 enterprise groups have been set up and now each produce an average of 770Kg of NTFPs per year with a commercial value of \$1,491. The project has also promoted the marketing and sale of NTFPs in rural and urban areas through the creation of 19 NTFP kiosks, 60 shop shelves and 4 shop windows

These outcomes contributed to improving food security and nutrition, nutritional awareness as well as incomes, which were, in turn, largely reinvested towards improved health and wellbeing:

- Improved food security and nutrition: over the life of the project, there has been an 8% reduction in the number of households below the calorie line (2,500 Kcal male equivalent/day) a 42% reduction in chronic malnutrition among children under the age of 5. When we analyse the source of calories amongst project households, we can see a dramatic increase in the proportion of calories sourced from NTFPs. The average calorie intake from shea and baobab more than tripled, rising from 30 Kcal per person/day to 108 Kcal per person/day (+263%). If we include all NTFPs consumed at the end of the project, the average calorie intake from NTFPs rises to 299 Kcal per person/day. This has reduced the dependency of households on agricultural crops for food, and the proportion of households who experienced moderate to severe food shortages decreased from 72% to 62%. Furthermore, the average food diversity scores improved by 0.7 to 2 points in the four regions.
- Improved nutritional awareness: Through focus group discussions, women reported the project as having helped them improve their knowledge of the nutritional value of different NTFP products. They also identified nutrition gardens of vegetables and tree leaves as a key change in their diet.

In Arbolle, the nutritious garden of Goubi makes a hundred women happy

Green leaves of moringa and baobab, aubergines and onions all year round... the nutritious garden in the village of Goubi in the commune of Arbolle in the North region, set up by the NGO Tree Aid, offers substantial income to a hundred women and improves their food and health conditions. "Thanks to the nutritious garden, we eat and share green leaves with our neighbours all year round and we are able to treat our children," said Minata Ouédraogo, President of the Tegtaabmalgré women's group in Goubi.

She praised the therapeutic and nutritional values of moringa (Arzand Tiga) and the essential vitamins contained in baobab leaves.

In this pilot garden of half a hectare, a hundred or so women are nurturing young baobab and moringa shoots that they can later transplant elsewhere. But in the meantime, they eat their leaves and sell them on the local market. In the same garden, the women grow onions and aubergines, which provide them with an important income.

Source: Agence d'Information du Burkina. <http://news.aouaga.com/h/120744.html>

Figure 2: Case study – nutrition gardens in Goubi

- Improved incomes and wellbeing: Over the life of the project, enterprise development around non-timber forest products and improved access to resources for women contributed to reducing the number of households living in extreme poverty by 12% (278,952 people³) and to increasing the average annual household income by 161%. As women make up the vast majority of VTE members (73%), they developed an economic activity which helped increase household income. This income was then invested into improved food availability and quality, as women are at the frontline of nutrition, disproportionately taking on responsibility for providing food to their families and communities (ILO, 2019).

Discussion

These results establish a strong link between forests and trees and human health and wellbeing through the cultivation, transformation, consumption and sale of NTFPs. However, it is important to highlight important conditions necessary to this link. Here, we have identified three success factors:

³ Based on an average household size of 7 people

1. Locally-led, participatory forest governance: The project established more participatory and inclusive forest governance, where decision-making processes are decentralised and promote the rights and responsibilities of local forest users who depend on the forests. Local communities were supported to take on stewardship of land through the 79 community driven forest management plans agreed with local authorities. These also provided an open forum for discussion and addressing conflicts that may arise over natural resource use. This type of governance ensures that the people who directly depend on forest resources are the ones in charge of managing it in a way that secures a sustainable production of NTFPs for long term benefits to the community.
2. Access to land for all: Through these local management plans but also through the increased access to natural resources for traditional marginalised people (e.g. women, youth and displaced people), the project ensures that the poorest, most vulnerable people can reap the health benefits from NTFPs and reap the health and wellbeing benefits. Stable and inclusive access to land and natural resources in a crucial pre-existing condition to forests delivering benefits to vulnerable rural communities.
3. Women's participation and empowerment: The project increased women's access to natural resources, forest governance and economic activity. For example, in 2019, 28% of women reported having as much control over trees and their products as their male counterpart; a percentage that increased by 18% to reach 46% in 2020. This opened the way for women from poorer households to generate their own incomes. This is a crucial condition for forests to provide health benefits to the community, since women are more likely to invest in the long-term well-being of their households, for example by building up savings that can provide a buffer against climate shocks (ILO, 2019).

Conclusions/ Wider implications of findings

The NTFP 2 project in rural Burkina Faso has delivered significant impacts that showcase how non-timber forest products can be a key tool to improve food security and nutrition in the Drylands of Africa. Working with local communities, it set up 212 nutrition gardens, created over 9,000 hectares of NTFP production sites and built local capacity towards the development of NTFP enterprises and better nutritional awareness. This contributed to improved food security, nutrition and incomes, which in turn were invested in health and wellbeing.

A follow up Tree Aid project aiming to scale up the approach presented in this paper in Burkina Faso started in January 2021 and will run until December 2024, funded by the Swiss and Dutch Agencies for Development Cooperation. It will continue to support the development of the non-timber forest products sector through the promotion of consumption via nutrition gardens and enterprise development, reaching a much larger group of project participants, including internally displaced people as a result of a worsening security context. The project will also aim at influencing policies and legal frameworks to be more favourable to NTFPs.

This influencing and advocacy work is necessary to ensure that forests and trees provide food security and nutrition benefits to local communities. This virtuous cycle requires crucial pre-existing conditions such as local and decentralised forest governance, secure and equal land access for all and women's rights and empowerment. These conditions need to be embedded in project designs, but also recognised and supported by all levels of government. There is still a long way to go to ensure these conditions become a reality in most African Dryland countries.

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Economy and Climate Change, Ministry of Industry and Commerce, Ministry of Higher Education, Scientific Research and Innovation, and the Albert Schweitzer Ecological Centre Association).

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