

# FARM Africa and SOS Sahel International/ UK Participatory Forest Management Programme (PFMP)



*FOREST REHABILITATION & NATURAL COFFEE  
PRODUCTION ENHANCEMENT AND TRADE*

**The Goal of PFMP is to ensure environmental  
sustainability through Community based natural  
resource management systems**



A PRIVATE RURAL DEVELOPMENT & AGRICULTURAL EXTENSION AGENCY  
A Public-Private-Rural Community partnership  
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# INTRODUCTION

## 1.1 Natural (Forest) Coffee and The Bonga Forest Site

Natural forest coffee in Bonga area is restricted to the *Woina dega* AEZ that lies between 1,500 to 2,200 m.a.s.l and is part of the Upland Rain Forest vegetation climax. The higher elevation (the Dega AEZ) is too cold and the Qolla AEZ below 1,500 m.a.s.l is generally too dry for rain-fed coffee growing in the region. The birthplace of coffee (*Coffea arabica*) is in this AEZ at a location known as Mankira in Gimbo woreda of Kaffa Zone. The CBD resistant selections by the Coffee Improvement Program at JARC/EARO have their parental origin to this wild and economically harvested coffee from Bonga forest zone. The berries (cherries) of the wild coffee are typically larger than the improved coffee varieties, now being grown by large coffee plantations by big companies and in the home gardens. These two different coffee types are unfortunately mixed up during bulking by the coffee traders in Bonga and Jima resulting in lower grade (quality), hence lower price.

A typical Bonga forest site with wild coffee is a multi-strata forest, often made up of at least the following four layers and species compositions, namely:

The first top layer made up of the following important tree species:

- *Aningeria adolfi-ferderechi*
- *Olea welwitschii*
- *\*Scheffleria abyssininca*
- *Croton macrostacys*
- *Cordia africana*
- *Albizia schimperiana*
- *\*Prunus africana*
- *Syzygium guineense*
- *Polyscias fulva*
- *Euphorbia obvfolia*

The second top or middle layer is made up of the following important tree species:

- *\*Milletia ferrugiana*
- *Teclia nobilis*
- *Dracaena spp. (2 spp.)*
- *Galiniera saxifraga*
- *Bersama abyssinica*
- *Maesa lanceolata*
- *\*Phoenix reclinata*
- *Myrsine*
- *Maytenus sp.*

The Third layer is made up of the following species, namely:

- *Coffea arabica*
- *\*Rhamanus prinoides (geho)*
- *Vernonia spp. (2 spp.)*

The last or ground layer (cover) is made up

- *Coffea arabica* seedlings/saplings
- *Afromomum corriander* (false forest cardamom)
- *Pepper longum* (long pepper or timiz)
- Broad leaf weeds

Of considerable concern is the depletion of key and important tree species (both ecologically and economically) in the top or the first canopy. Those most affected are *Aningeria adolfi-fredirichi*, *Schefflera abyssinica*, *Polyscias fulva*, and *Euphorbia obavifolia*. The decline of *Aningeria* is due to excess exploitation for its excellent timber and the fact that its seed quickly loses its viability if not planted or does not find suitable site for it to germinate naturally. The case of the other tree species is the fact that they are used to construct the traditional beehives by burrowing the large trunk. In the Kaffa zone alone, there are an estimated 479,100 traditional beehives made every year of these species with a replacement rate of new beehives of 264,000 beehives each year to produce a meagre 1,318 tons of honey/year according to Africa Zeleke (per, com., 2004). The forest

rehabilitation effort and program needs to include these species as well as training farmers to use other alternative materials to make the beehives, especially bamboo.

## 1.2 The Place of Forest Coffee in the Coffee Trade

Government leaders of the area give coffee, especially forest grown coffee a high ranking (#1 rank) amongst 9 important ones for the area. The others are: **honey/beeswax, fuelwood, cardamom, timber, charcoal, wild pepper, bamboo and medicinal plants** listed in their order of economic importance (Taye Bekele, 2003). There are an estimated 3.5 million forest coffee trees (Mateos Ersado, 2001) but their yield appears to be low. Green Coffee Co. estimates that the yield per tree of coffee grown under natural forest shade to be much less than 1 kg/tree/year compared to its semi-forest improved coffee plantation of 3,400 trees/ha (1.75x1.65 m) yielding an average of 3 kg/tree/year. This new coffee growing company has used coffee seeds from the research station to produce seedlings in its nursery. Other coffee planting efforts by the private firms and farm households also use improved coffee seed from EARO/Jima to produce coffee in forest like environment.

## 1.3 Growing Forest Coffee is "Going Forest wise"

There is an over emphasis of the need to grow coffee under natural forest shade to get that newly discovered tasting quality by the European (Germany) market sold at a premium price. But one would like to ask if this distinct market quality is due to the shade effect, or due to its wild purity not even taken care off until harvest. It is understood that the berry from the wild coffee trees is relatively large. The new and improved coffee released by the Jimma based Coffee Improvement Program is uniformly short (208 cm) while the wild in the forest is variable but generally longer. The wild and natural coffee is seldom managed such as cutting back when the coffees get old as well as cutting lianas to free the wild coffee. Hence, one will often find old and tall coffee trees, young trees and seedlings and saplings under the forest canopy. But under semi-forest and plantations, coffee is managed by alternatively cutting back old stems to get a new vigorous branch or new tree.

Generally, growing coffee under natural forest shade reduces the need for weeding and replanting as these two items are done by the forest eco-system itself. Too much shade can and does suppress coffee growth and yield, In a study in Chiapas, Mexico to determine the effect of shade on the yield of Arabica coffee (*C. arabica*), with similar strata as in Bonga, it was found that shade increases coffee yield (Soto-Pinto et al. 2000). In this study, shade of 30-45 % gave the best coffee yield (835.8 g/tree/year over a three-year period of study. Coffee yield decreased with shade over 50%. The average coffee density was 2,000/ha. A similar long-term experiment in Wondo Genet College farm (under natural *Acacia, Cordia*

shade) is yielding similar results as well. It appears therefore that management of the forest has direct positive impact on yield and health of the wild and domesticated coffee. The argument to rehabilitate the natural forest is not just to only conserve biodiversity but also to conserve the coffee habitat without which wild coffee cannot thrive and yield better economically.

#### **1.4 Linking Production with Processing and Markets**

The suggested mode of managing the natural forest, including its rehabilitation, will result in increasing the wild coffee yield while increasing the over all biomass and economic yield of the forest itself. But much of this gain may be lost, at least for the farmers if they are not linked and have access to coffee processing facilities and markets (grading, certification, storage and transport). Many coffee traders have become rich in the business at the sacrifice of farmers. In order to make farmers keep the benefit (marketing margin), it is necessary to do the processing, grading and certification of th harvested coffee in Bonga itself. It should be branded as coffee grown under natural condition (organic) added to its contribution to the protection of the forest ecosystem and species diversity. Bulking and mixing of Bonga coffee with others and naming it as Jima coffee should be stopped in favour of a unique Bonga brand. Steps should also be taken to empower Bonga community through production and marketing cooperatives and/or associations. In addition, a rural microfinance facility should be provided to improve the financial and other resource requirement of farmers and entrepreneurs of Bonga.

#### **1.5 The Way Forward and the Next Steps**

This strategy document has established that the rate of forest depletion (including the diversity of tree species) process is too rapid to allow any time to wait and see. The document has identified the tree species most affected by active wood extraction and expansion of agriculture and settlements. Some of the tree species are relatively easy to carry out replanting in the forest proper and in the Buffer zone as proposed here in the area lying between the agricultural lands and the forest proper. Quite an extensive list of economic trees and NTFPs has been identified especially for the ground layer, the coffee layer and the middle layer. Many of the species are new to the area and need to come via the research and on-farm trial route. This latter activity must also be supported by strong seed procurement and germplasm support services, including operating tree and NTFP crops.

The present trend of both the government (woreda and zonal) and FARM Africa withdrawing from supporting seed and nursery support may not be in the right direction, particularly under the expanded program of Agroforestry and NTFPs. The alternative and parallel development option is to encourage the private sector, including the PFMs to enter the seed and nursery seedling production and marketing business. Both of them require to be supported by the government and the NGO community during the start up phase. This seed and seedling enterprise option includes organized groups for development such as Women and Youth groups in urban, peri-urban and rural areas. Schools and churches are ideally suited for these kinds of activities as it is relatively easy to provide hands-on training and distribute tools and materials needed. With the private sector and progressive farmers, donor partners should explore contract seed growing and marketing on a task accomplishment basis.

Presently, the local government in Bonga has accepted PFM as a development strategy and tool and has plans to establish some 30 PFMs. Community spirit in this scheme is very high. The PFM program assures full application of the community's participatory and empowerment process allowing core stakeholders to be accountable for a sustainable forest-coffee interaction and benefit from the positive economic and environmental impact of such effort. The knowledge gap in economic tree farming is lacking both in the government and at community level. Certainly, technical staff coming to work in the area of PFMs has to learn and improve by doing, as there are no institutions offering such area of training.

There is a considerable body of technical information coming out through the PFMs field initiatives. This information needs to be collated, processed and put into training and field guide manuals. The establishment of demonstration farms and on-farm experiments and the data that is being generated can facilitate field training including field secondment of trainees who are in the final semester of completing their technical and vocational training. Therefore, FARM Africa needs to consider in expanding curricula of the existing Technical Skills Training institutes and other Technical and Vocational Training Centers. If these institutions do not exist, the government, i.e. Ministry of Capacity Building and Ministry of Rural Development & Agriculture could be asked to plan on establishing a Centre of Excellence in Bonga for Agroforestry Technology and PFM including the area of R&D, enterprise development, international Trade and Marketing of NTFPs originating from the sub-region.

## **2. PROJECT RATIONALE**

Coffee is an important national cash crop for both domestic consumption and as a major foreign exchange earner. Forest coffee is the major NTFP in Bonga and the South-western highlands - both in area coverage, and socio-economic benefit. In the past, it has not been receiving the attention and concern it deserves from the local government and the community. The Bonga forest coffee is not only grown wild but also is organic with no application of chemical fertilizer and pesticide. There is therefore the need to designate the Bonga forest coffee as both wild and organic, and market it as such to attract and receive high market price in the world market, especially in Europe. The local and regional government accepts coffee to be an important commodity and this project lays the foundation for improving the production and marketing of quality forest coffee from Bonga. The product will need to be graded and packaged close to the production site and leave the area with certification and brand packaging.

## **3. PROJECT OBJECTIVES**

- Improve the production/yield of wild and organic coffee through better management and effective tree-coffee interaction.
- Improve the quality of the coffee through better harvesting, drying, packaging and storing techniques and practices.
- Support farmers to get better prices by linking them to better processing and marketing
- agents and facilities

## **4. SPECIFIC ACTIVITIES**

- Select appropriate coffee shade tree species at different forest layers in Bonga
- Train farmers and extension agents in the management of high yielding forest coffee along with the appropriate shade trees.
- Train farmers, private traders and processors of coffee in harvesting, drying, handling and storing techniques.

- Marketing Research

Support the private sector to enter into processing and marketing of Bonga coffee

Work with research institutions to improve on yield and quality of Bonga coffee

Network and leveraging support from collaborative partners.

## **5. EXPECTED OUTPUTS**

- Capacity of targeted beneficiaries on better farm management of coffee increased
- Yield and total production of forest coffee increased resulting in increased household income.
- Market condition for Bonga coffee improved due to better harvesting, handling packaging and brand advertising.
- Overall economy of Bonga improved significantly because of coffee

## **6. STRATEGY**

- FARM Africa organizes stakeholder workshop to build partnerships
- Partnership develops a strategy/project to support Bonga coffee improvement
- A Bonga coffee improvement centre established in Bonga/Jimma/Addis
- A Brand name created and sets of packaging for Bonga coffee made
- Bonga coffee publicized nationally and internationally
- A public-private-community partnership established to improve relationships between the private sector, farming community and public agencies.

## **7. BENEFICIARIES**

- PFM groups
- Local communities
- Women and youth groups

- Private sectors
- Local government
- Coffee traders

## **8. IMPLEMENTING PARTNERS**

- FARM Africa
- SuPAK
- EU-funded NTFP project based in Mizan Teferi
- Kaffa Zone Finance & Economic Development Dept.
- Jimma Agricultural Research Centre
- EARO
- MoA
- GTZ
- Coffee and Tea Authority
- Coffee Producers Association
- Coffee Producers Union
- Agriculture & Natural Resources Office (Region, Zone, Woreda)
- Jimma University
- PFM Coops.
- ICRAF
- Private sector
- Other Relevant NGOs and Gos

## **9. PROJECT SITE**

All PFM sites established in Bonga area.

## **10. DURATION (5-8 years)**

- Coffee and shade trees Seed/Germplasm supply and nursery Development
- Capacity building of farmers, private entrepreneurs, and local government staff in improved coffee farming practices, technologies, and management.
- Work with relevant R&D institutions
- Networking with and leveraging resources from collaborative partners

## **11. INDICATIVE BUDGET (1, 000, 000 ETB)**

- Capacity Building of communities, coffee traders, and local government staff (250, 000)
- Coffee and shade trees Seed/Germplasm supply and nursery Development (100,000)
- Networking with relevant institutions and individuals (60, 000)
- Establish Farmers Field Schools (90, 000)
- Establish demonstration plots on forest coffee farming management (100, 000)
- Monitoring and evaluation (80, 000)
- Marketing research (120, 000)
- Project Document Development (200, 000)
- Source of funding (EU, SuPAK Netherlands Govt.), OXFAM , Germany Govt.,UK, World Bank, UNDP, private Sectors & other NGOs/donors

## Appendix1: TECHNOLOGY OF FOREST COFFEE PRODUCTION

### Building on Existing Forest Coffee Production system

There are no data from the Bonga area itself on comparative yield, economic return and impact on final quality of the three coffee production systems, namely; (a) Natural wild coffee, (b) semi-forest, and (c) modern coffee plantations. The first production system uses both wild coffee and natural forest to grow coffee where the management is reduced to just picking the coffee and some slashing to reduce tangled vegetative mass. The semi-forest coffee may use a mix of existing indigenous tree and planted small trees and shrubs, while plantation coffee can be without tree shades.

Based on the market demand and the positive relationship of natural forest and coffee growing, it is envisioned that the **Participatory Forest Conservation and Management Groups or Co-operatives** that **FARM Africa** is helping to establish and strengthen will embrace this age-old practice to accomplish the dual purpose of **conservation and development**. Important in such efforts are: a) selecting species that have more positive effect through shade and leaf fall, b) soil enrichment properties, c) economic value of the tree species themselves, and d) compatibility with coffee tree. Some trees that have been researched on for coffee shade included *Erythrina spp.* and *Cordia* both of which are found to produce too much shade and other competitions (soil moisture and nutrients) and failing to effectively shade out or suppress (control) weeds. It must also be recalled too that such coffee shade trees are also economic crops in themselves for timber, charcoal, fuelwood as well as source for NTFPs such as medicine and fodder for livestock.

An observational plot of growing coffee under shade in SuPAK's Guesthouse Campus (Bonga town) shows that it is possible and may even be desirable to design and plan the species composition in the four strata with few scattered naturally occurring trees and woody perennials described above (Part 1.1). In this observational coffee plot, some existing natural trees such as *Cordia africana*, *Erythrina abyssinica* and *Ficus spp* have been retained but the shade immediately above the coffee has been planted *Sesbania sesban*. The coffee density is about 3,000 trees/ha and one *Sesbania* tree has been planted for 4 coffee plants and some compost has been applied to the farm. The result is a good harmony of minimal shade of the top layer on the *Sesbania* and coffee layer as well as ground layer. This design has resulted in each layer to have gap for lateral light (morning and afternoon) to reach the coffee and providing defused and reduced direct. All coffee bushes receive reduced light or get just the right amount of shade resulting in high coffee bloom which will translate in good and high coffee Yield. The *Sesbania* trees will

eventually start to age after 5-7 years and will be used for fuelwood and mulching of the coffee crop.

The new Private Coffee Plantation (Green Coffee Plc.) is also using this model of planting *Sesbania sesban* and having retained few naturally occurring trees including *Milletia ferrugiana* and *Schefflera spp.* The company is also replanting *Mellettia ferrugiana* as a middle or top story shade tree above the Sesbania canopy. The company is looking for solution to reduce ground weed, now mostly dominated by *Lotus corniculatus* (a nitrogen fixing legume).

Both of these attempts and trials need to be duplicated in as many locations as possible, established as on-farm trials and demonstrations in which FARM Africa is endeavouring with the Forest Conservation and Management Cooperatives in process of establishment.

But the new demonstrations and field trials (on-farm trials) should include more innovations into the composition of the multi-layers. Based on the species listed occurring presently in natural forests where wild coffee is an integral part, the trials should attempt to include the species indicated below for each of the layers, namely:

1. Top layer

- *Grevillea robusta*
- *Aningeria adolfo-fredirichi*
- *Euphorbia obvatifolia*
- *Schffleria spp.*
- *Polyciacias fulva*
- *Prunus africana*, omo, tikur inchet
- *Milletia ferrugiana* (M, dura) birbira
- *Cordia africana* (with right provenance)
- Kerefa spice tree (new introduction from Gimbo woreda demo farm)

2. Second (middle) layer

- *Rahmunus prinoides*, Wild geho
- *Sesbania sesban*, and/or
- *Calliandra callothyrsus*, and or

- *Cajanus cajan*, and/or
  - *Tephrosia spp* (new introductions, i.e. *T. vogelei*, *T. rostrata*)
  - *Persea americana*, Avocado dwarf and grafted (Fourte var. from JARC/EARO)
3. Coffee layer with:
- *Flamingia macropylla* (new, from Tam Agribusiness)
  - Dwarf cavandish banana
  - *Carica papaya*, papaya (dwarf Hawaiian vars. from EARO)
4. Ground layer
- *Pepper longum*, Long pepper
  - *Aframomum corrorima*, wild cardamom
  - Zingibil (new)
  - Erd (new from Gimbo woreda demo farm)
  - Hel Allspice (from Gimbo woreda demo farm or Wacha community)
  - Sweet potato (for weed control, tuber for food, leaves for fodder, var. to use from Winrick x on-farm trials sites in Gimbo woreda)
  - *Cymbopogon spp.*, Lemon grass (available in the region and area)

In addition to the enrichment planting on disturbed sites and making each layer more productive, there is a need to consider establishing and managing a Buffer Zone between the heart of the natural forest and the agricultural farms outside the homesteads. This agricultural area is rapidly expanding to feed the bulging labor force being imported and collected by large plantations companies and the fact the region is attracting more settlers both naturally and through the currently government inspired rural settlement drive. This settlement program allots 1,000m<sup>3</sup> homestead area and a 2 ha farm land, both of which are extracted from existing forest areas with coffee and NTFP products. Land clearing for maize planting is the first act of this settlement program. One needs only see both new and older settlement schemes to see the disappearance of trees from the landscape. Ato Getachew who did forest inventory for the GTZ-supported IBCR project cannot believe what four year interval can do as he is currently in the area collecting tree seed for ex situ conservation program of IBCR.