

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



## Fruit production in Agroforestry Systems in Bonga

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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# Fruit production in Agroforestry Systems

## 1. INTRODUCTION

### 1.1 *Fruit Production in East African Highlands*

Horticulture based on fruit tree growing is on the increase in the well-watered highlands of East African highlands, especially in Kenya, Uganda and Tanzania. In Ethiopia, some fruits are being grown in the southern and southwestern highlands. More recent efforts include the introduction of sub-temperate and temperate fruits in the cool highlands of Central and Northern highlands. Perhaps, where fruit growing by farmers has been more common in the Harar highlands.

Recently, a comparative study was made comparing income from fruit growing, vegetables, and cereals (sorghum and maize) in Harar. The annual income from fruit growing such as mango and custard apple was ETB 60,000/ha/yr, over 70,000 for a chat based farming, compared to 2,000 for maize and only 1,000 for sorghum. Fruit growing in the southern highlands in Sidama is also common and the comparative income difference between fruits and cereals is similar, particularly with the new and improved road link of this region to the Addis Abeba market. Common fruits grown in both Harar and Sidamo are banana, mango, avocado, papaya, guava and custard apple.

### 1.2 *Fruit production by smallholder farmers in Bonga*

**Banana:**(*Musa spp.*) : Fruit growing by rural farmers in Bonga has been making a slow progress during the last 40 to 50 years. The first fruit to gain importance is banana. There are currently three distinct banana types being grown and sold in the open weekly rural markets and in shops in Bonga and Jimma town. The banana types, according to farmers, are:

**Kenya**, has disease problem, 2-3 fingers/10 cents, not liked much

Mizan **dwarf cavendish**, low price, some say has disease problem

Abesha or **local type**, disease free, 2-3 fingers/25 cents, preferred taste

One cannot be certain and match these with the commercial types such as **Cavendish, Williams** (good for cooler highlands), **Grand Michel, Lady Finger** (very sweet), and **Sugar**. Once Banana is planted, does not seem to receive much management including reducing the suckers down to one or two to grow to maturity.

**Avocado:** (*Persea americana*): Avocado growing is also gradually gaining importance. The Jimma Agricultural Research Center under EARO maintains named varieties of both mango and avocado. The five commercial avocado varieties are available at the research farm. The avocado being grown in Bonga area came from Mizan some 40 years ago and does not appear to be one of these five types the research station maintains.

The Bonga Catholic Mission initially introduced avocado growing. Its spread into everybody's home garden and farm plot is reportedly due to a rumor that spread saying the Bank will give loan to individuals that have planted avocado (almost taken as loan collateral). This rumor was assisted by the government nurseries giving seedling and because of the bank rumor, private individuals made concerted effort to find seed or seedling to plant.

The highly successful commercial and export type, the **Fuerte** is available which needs to be grafted on to one of the more common types. The type that the Bonga farmers and others grow in the region is the tall variety with smooth greenish skin fruit, which is too big a tree to fit the homesteads. The avocado varieties being grown need to be identified. Effort must be made to make sure that the internationally known and widely cultivated varieties are all tested and made available to farmers and investors. The most common varieties include: **Hass, Sharwil, Fuerte** which are all self-sterile but planting pollinator varieties does ensure maximum cropping. In this regard, **Hass** and **Sharil** are compatible cross-pollinators. **Wurtz** is a smaller variety that cross-pollinated by Sharwil.

**Mango:** The commonly grown mango is from Mizan. This fruit does seem to do well at a glance but farmers complain of problem of fruit set and cracking which leads to fruit rotting on the tree. But in terms of plant growth, mango performs well. But the need to replace the existing one with better type is clear. Good varieties of mango are available elsewhere in the country. The recently published, **Mango Growing in Kenya** is a good source to get information. At any rate, mango needs to be confined to the warmer lower highlands and upper Qollas.

**Guava:** Guava or Zeitun (*Psidium guajava*) is relatively common but is not being sold in the markets much. The Swedish Mission reportedly introduced it to Bonga. Both the red and white-fleshed types are grown. The red-fleshed type has more insect damage. One sees guava growing in the wild along the main road where much of the forest cover has been removed. Here too, there does not appear to have been a formal effort to choose suitable variety and cultivars for the region and the market. Guava

needs to research on, as its ecological adaptability in the Bonga area is clearly evident. Farmers plant one or more guava trees in their compounds, but most of it is a volunteer tree. It is therefore possible to introduce the other species, (*P. cattleianum*) which is reported to be more suited for highland (cool) areas. Although not commonly done, guava does from cutting and one does not need to go through seed and nursery costs.

**Papaya:** (*Carica papaya*) Papaya growing, like avocado is quite common in Bonga. Both the dwarf and the tall types are grown. The tall type is more common and yields high but is not always sweet. The papaya grown in the Gojeb valley is more *preferred* as it is sweet. The potential to grow papaya appears to be high but one needs to control bird damage (feeding) on the leaf and *mature* fruits.



**Picture 1: Yield potential of some selected fruit tree species in Bonga**

**Green apple:** (*Casimorea edulis*) One of the most recent arrivals of fruits in Bonga appears to be the green apple or Casmir. The growth of this fruit is very impressive but it is allowed to continue to grow tall and out of reach for fruit harvesting. The need to graft or cut back young seedlings and saplings (after planting in the field from nursery) is clear. This fruit tree deserves more attention from both the research and extension staff of the districts (woredas).

**Passionfruit:** (*Passiflora edulis*) The Passion fruit is seen growing in the wild in Bonga forest. There is no difference with the ordinary cultivated type. So it is possible that it is an escape. But this seems unlikely, as the source is not nearby. Farmers are not aware of its potential value as a marketable fruit. This fruit is widely grown by Kenyan farmers and is highly profitable. The fruit is not difficult to handle between the farm and the market. The fruits can be allowed to start to dry and can still be sold as fresh fruits as it is only the inside that is scooped out and squeezed out to get the juice minus the little flat blackish seeds. **Purple** (*P. edulis*), the most commonly cultivated has many varieties available to choose from: **The golden passion fruit** (*P. edulis flavicarpa*) - a stronger vine but more susceptible to cold; Passion fruit (*P. mollissima*) - yellow fruit is also suitable for tropical climates; **Grandulla** (*P. quadrangularis*) - has very large fruit, and has wide climatic growing range.

**Gishta** (*Anona spp.*): This is a relatively less common fruit in the Bonga region. But it is doing well and the government is currently encouraging farmers. But this drive is constrained by lack of seed and seedling supply. There are not many trees to supply seed at

present. Few individuals that have gishta trees such as Ato Gebyehu (Homestead fruit grower) are letting the family eat as much gishta to collect the black seeds to sell to the Woreda Agriculture Office.

**Other Fruits:** There are other minor fruits in the Bonga area including the wild **enjori** (*Rubus* sp). Again, farmers only see it as part of the forest plant, doing well where there is an opening in the forest or in the forest age. Young children enjoy both enjori and the passion fruit. So there is no effort to harvest, bulk and sell in the market.

### **1.3 Fruit production in the homesteads**

In general, very little effort is being made by the farmers and government to increase the economic and environmental benefits of growing more fruits in the homesteads and the agricultural fields. Fruits cannot be grown in the natural forest because of wild animals, especially monkeys get to them first as they do with most of the fruits of the native trees. There is also the element of theft and damage by domestic animals. But both the perimeter fence of the homestead and the area making the compound farm can take in more fruit trees. Fruits and high value tree crops can replace the relatively large area, in the lower end of the compound taken up by sugar cane.

Growing fruits in Bonga could be economically profitable and is environmentally sound indeed, given the prevalent steep slope aspect of Bonga. Trees on farm agroforestry technology advocated in other strategy documents in this series can be made popular, especially those that serve as bee forages and whose fruit set is facilitated by bees. The strategy document on multi-story home gardens has strongly

recommended beekeeping in the homesteads too. The above 8 types of fruits have been carefully selected as sure bets to start or expand the fruit growing as business in the Bonga area. This has been largely based on the fact that all of them are tropical fruits and have done well elsewhere, including in East Africa (Kenya, Uganda and Tanzania). Sub-tropical and temperate fruits such as Kumquat, Apple, Apricot, Cherry, Peaches, Pear, Persimmon, etc. are not included as there is no field evidence and the area may not give them enough chilling effect. Grape fruit, lime, and lemon have been excluded from the above recommended list as field evidence show that they need more care (fertilizer, disease and pest control) which may be beyond the reach of the smallholder farmers.

## **2. PROJECT RATIONALE**

The growing of banana is already considerably significant. The market is still imperfect. But local banana consumption is on the increase. Banana can be planted to serve as windbreak and on conservation structures in the crop or agricultural lands. Banana can be grown with coffee as well, be it in the compound or the field farms or in buffer zone (between the forest and the agricultural and settlement area). Banana resembles mature enset trees too and it can be more closely associated with this key and important food crop

largely grown in the homesteads too.

The other fruit trees reviewed above are best grown in the compound area or by extending the compound area as is being done elsewhere where the need to intensify food, feed and fuel wood/pole is paramount as in most Sidama, Hadiya and Guraghe highlands of the southern highlands. In the southern highlands some or part of the cereal farm and grazing land is enclosed to be part of the original homestead by putting up new perimeter fence. But increased fruit growing by farmers by intensifying the compound farm, extending/enlarging the homestead and by selecting fruit trees for on-farm tree planting needs to wait other rural development initiatives, including farmers training, value adding processes and the market growth for fruits and fruit-derived products through fruit processing (juice, dried fruits, etc.).

## **3. PROJECT OBJECTIVES**

The major objectives of this project indicated as follows:

- a) Improve the livelihood of the communities through integrating fruits in the farming system.
- b) to contribute the food security situations of the rural communities through fruit production at household level.
- c) To increase quality fruit production and income level of households ??

## 4. SPECIFIC ACTIVITIES

One generally observes that fruit trees are improperly planted and allowed to grow freely without obvious planned management. The story of failed attempts to grow citrus in Bonga may have some relationship to this situation. The citrus trees planted (oranges in particular) were not given adequate care and management resulting in gradual death of the trees from pests, disease and general neglect (no adequate weeding and fertilizer application). The result is the common statement "oranges do not do well here". Certainly the more hardy limes and lemon can do well and they are not readily available in the market and are expensive to buy compared to other places in Ethiopia. All of these issues could be resolved through Research and Demonstration initiatives in the woredas and at the research center and sub-centers. There has been attempts made to contract out research on spices to the Jimma Agricultural Research Center, but frequent staff changes has frustrated this arrangement. Perhaps the research contract could specify the researcher and hold him/her responsible.

At present, the knowledge base of both the farmers and the woreda extension staff is low. One has to only look at the package documents of the zonal and woreda agriculture and natural resource departments to gauge this technical knowledge of the extension staff. And if they are not well equipped, then how could they teach farmers? The demonstration sites are further evidences of this low level of technical training of extension staff. Of course,

one logically goes back to the institutions teaching these subject matter areas and one will find that hands-on training is little used.

Major activities are listed as follows:

- Selection of appropriate fruit species/germplasm for Bonga area
- Seed/Germplasm and nursery Development
- Seed collection and handling techniques
- Seedling production, grafting and planting techniques
- Training of farmers and experts in fruit production and management
- Fruit handling, transporting and storage techniques
- Market research and development
- Involve and encourage private sectors

- Collaborate with research institutions
- Networking with relevant institutions and individuals

## **5. EXPECTED OUTPUTS**

- At least 25 fruit trees planted and established per household
- Income from fruit sell is increased
- Environmental situation improved
- Nutritional situation of some families improved
- Promising R & D results obtained.
- Capacities of selected communities and government staff built regarding fruit production, value adding, processing and marketing.
- Food security and health situations improved
- Market situations of fruits improved

## **6. STRATEGY**

Natural growing conditions in Bonga are excellent for diverse fruits. But both research and technical services for fruit trees and the general horticultural area is lacking. Equally missing a strong support services including germplasm and supply of high quality seedlings and planting material. Currently, the supply for certified planting material such as apples is both weak and expensive. Farmers around Chencha area sell apple seedlings from 25 to 35 birr per seedling, which is not always, available one has to drive to Chencha, South Omo to buy. This illustrated that the government and the private sector are not involved in fruit growing, processing and trade. The Kenyan experience of avocado and passion fruit production and business is pertinent to consider. Avocado growing is just an idea as diversification program from too much dependence on few export crops (coffee, tea, pyrethrum) some 25 years ago. But now avocado is both industrial crop as well as food in homes and hotels. The same can be said for Passion fruit growing in Kenya. Both of these fruit crops are grown by smallholder farmers, and rarely under commercial plantation. This same route can be taken for Bonga fruit production and trade, including value adding. Institutional arrangements and development of support services to this important sub-sector is vital.

The main strategy is to start from a market feasibility study of each fruit tree species making the market as an entry point to any fruit tree development work:

- Focus on household level fruit production mainly at the homestead planting site
- Focus on marketable fruits and farmers' preferences
- Build the capacity of individual farmer
- Introduce high yielding fruit varieties
- Assist in developing marketing cooperatives and private sector partner

## **7. PROJECT SITE**

Community members and villagers in Bonga area who are interested to participate in the fruit tree growing program. All PFM Coops Members in their respective homesteads. School compounds in Kaffa zone.

## **8. BENEFICIARIES**

- PFM groups (sale of products, food security through enhanced income)
- Local communities
- Women and youth groups
- Private sectors (investment opportunities)
- Local government (enhanced revenues)

## **9. IMPLEMENTING PARTNERS**

- FARM Africa
- SuPAK
- EARO
- Jimma Agricultural Research Center
- MoA
- Agriculture & Natural Resources offices, Education offices (Region, Zone, Woreda)
- Jimma University
- PFM Coops.
- Private sectors

- ICRAF
- Relevant NGOs and GOs

## 10. DURATION

5-7 years

## 11. INDICATIVE BUDGET

(1, 000, 000 ETB)

Activities	Amount	Remarks	
	Unit	Cash	*Source of funding (EU, SuPAK (Netherlands Govt.) World Bank, UNDP and other Donors
1. Seed/Germplasm and nursery Development		250, 000	
2. Training of farmers and experts in fruit production and management		250, 000	
3. Fruit handling and storage techniques		200, 000	
4. Market research and development		100, 000	
5. Research and Development		200, 000	
<b>Total</b>		<b>1, 000, 000</b>	