

# **Non-wood Forest Benefits and Agroforestry Practices in the Fouta Djallon Highlands of Guinea**

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## **ABSTRACT**

An examination is made of the benefits a rural family in the Fouta Djallon Highlands in Guinea gets from forests and trees in their everyday life, how significant those benefits are for their livelihood, and what people think about some agroforestry practices. The data for the study was collected using semi-structured interviews and participant observation. Regardless of the season, trees and forests are an integral part of the everyday life of the inhabitants of the study villages. The benefits offered by forests are both indirect and direct. Wood used for cooking remains the most important livelihood product from forests. Many non-wood forest products, like medicinal and food plants, are important to the villagers. The forest land, and the use of leaves as fertilizers are also essential for agriculture and cattle husbandry. The most explicit value is that from fruits that can be sold for a profit. The *nééré* tree (*Parkia biglobosa* (Jacq.) R. Br. Ex G. Don) is considered the most important wild plant. Other benefits of trees, such as providing shade and windbreaks, are also highly valued. The agroforestry practices studied were not well known in the study villages. Villagers' opinions of living fences and tree plantations on fallow fields varied considerably.

*Keywords: poverty reduction, Parkia biglobosa, living fences, Fouta Djallon*

## **1. INTRODUCTION**

In the *United Nations Millennium Declaration*, the member states defined eight “Millennium Development Goals” for combating the world’s poverty, hunger, and illiteracy, among other things (<http://www.un.org/millennium/declaration/-ares552e.htm>). The role of forests and the forest sector in achieving these goals has become a pressing issue for those involved in the sector. Forests can contribute to reducing poverty, and forestry practitioners agree that policymakers should know about this potential. This contribution of forests to development requires that there be more research information made available on the interdependency between forests and people.

The livelihoods of the poorest people, including women and children, rely greatly on forests. What's more, the way they use forest resources may also have an important impact on other people's lives. According to the United Nations Food and Agricultural Organisation (FAO 2003), the most important environmental services of forests in West Africa are biodiversity protection, watershed protection, desertification control, and climate change mitigation. The

Fouta Djallon Highlands in Guinea (see Appendix 1) are especially important as watersheds. The protection and sustainable management of this area is essential for maintaining the flow of three major rivers—the Niger, the Senegal, and the Gambia—that go through eight countries in the region. Although drought and water scarcity are already major problems in many of these countries and others, careful land use planning and sustainable use of forests could help prevent conflicts over the water resources.

In the remote villages of the Fouta Djallon region, it is common for men of working age to go either permanently or at least for the dry season (i.e. November to April) in search of a better living elsewhere (municipal secretary Bari 1.11.04). They usually go to Senegal or to the larger towns and cities of Guinea. This is not a recent phenomenon, since this same practice was also noted thirty years ago by Derman (1973). He also noted that fields were declining in fertility because of a shortened fallow period. The increasing importance of women's gardens for food production (Derman 1973, Helin 1999) could therefore be due to this same decrease in the fertility and declining availability of fields, as well as to a lack of labour. The nutritive value of garden products is much greater than that for a diet composed only of cereals (Helin 1999).

The focus of this study is on the relationship between people and forests at a local level. The objective was to study the benefits a rural family in Fouta Djallon received from forests and trees during their everyday life and how significant those benefits were to the livelihood of the family, as well as to assess the possibilities of forest-based poverty reduction in the region.

## 2. STUDY AREA AND METHODS

The field work for the study was done in three villages in the prefecture of Mali in the Republic of Guinea. The study area is located in the northern part of the Fouta Djallon Highlands, near the boarder with Senegal. The altitude in the region is about 1500 m. above sea level. Fouta Djallon's average annual precipitation is between 1200-2000 mm. The area of the prefecture of Mali is 8800 km<sup>2</sup> and its population is 204 000 according to the census of 1996. The majority of Fouta Djallon's population is composed of the Fulbe people also known as Fulani and Pulaar. They settled in the region in the 15<sup>th</sup> and 16<sup>th</sup> centuries, and by the 18<sup>th</sup> century had established an Islamic confederation under the Fouta Djallon Empire. The Fulbe elite ruled this empire for 200 years until 1890 it became a colony of France (<http://fi.wikipedia.org/wiki/Guinea>). Guinea gained its independence in 1958 from France.

In previous centuries, the Fulbe of Fouta Djallon led a nomadic existence and worked as cattle farmers, but by the end of 19<sup>th</sup> century almost all Fulbe had settled permanently and the cattle were kept mainly for social reasons (Derman 1973). Today, the Fulbe of the study area were observed to be subsistence

farmers who have some livestock. The villages studied were mostly self-sufficient in food production. When needed, it was possible to buy the products not grown in a household's garden or field, at the market or from a neighbour. This self-sufficiency, however, appeared to be always dependent on the harvest.

The data for the study was collected by semi-structured interviews and participant observation when the researcher joined villagers with their daily activities during a three-month stay in the area in 2004. Altogether 21 villagers were interviewed, 12 women and 9 men. Most of the interviewees were from 20 to 60 years old, but also some high school students and older people were interviewed; the youngest person was 17 years old the oldest was 82. The development association Indigo provided support for the field work through its connections with the inhabitants of the region. The Indigo Association is a Guinean-Finnish non-governmental organisation (NGO) that works in partner villages for the development of the prefecture of Mali.

### 3. RESULTS

#### 3.1 FRUIT TREES IN HOME GARDENS AND WOODLAND

Three interviewees related that their lives were harder than their parents' lives because the agricultural yields had decreased. They said that their parents got better harvests of maize (*Zea mays* L.) and the millet crop known as, *fonio* (*Digitaria exilis* (Kippist) Stapf), and their parents had cultivated smaller fields and used more modest inputs. Although leaves collected from the forests were being used as an important fertiliser, this did not stop the soil in the fields from degrading. Due to the decreased agricultural harvests the importance of women's home gardens increased. Orange (*Citrus sinensis* (L.) Osbeck), mango (*Mangifera indica* L.), and avocado (*Persea americana*) were described as being the most common and most appreciated cultivated fruit trees. Other common cultivated tree, tree-like, and shrub plants described included papaya (*Carica papaya* L.) and coffee (*Coffea robusta* Linden, *Coffea arabica* L.). The small-scale exporting of fruits, especially oranges and mangoes, to Senegal provided an income for some people. Unfortunately, this business was restricted by the lack of vehicles, as well as the bad roads from the villages to Senegal. About third of men interviewed did not highly value the money that women earned from selling fruits. However, for nine of the twelve women this was the only money they could earn with which to purchase many important needs, like children's shoes and clothes.

During the interviews, a total of 48 wild fruit tree species were mentioned as growing outside home gardens. The most valued species described were the *nééré* (*Parkia biglobosa* (Jacq.) R. Br. Ex G. Don, the shea butter tree (*Vitellaria paradoxa* Gaertn. f.), the baobab (*Adansonia digitata* L.), the lemon (*Citrus limon* L), the *bumme* (*Vitex doniana* Sweet), and the *sungala* (*Harungana*

*madagascariensis* Lam. Ex Poir.). All of these species were described as providing not only fruit, but also traditional medicines. Leaves from the baobab and shea butter trees were being used when cooking. The fruits of the multi-beneficial *nééré* can be eaten or be processed to juice, the leaves were being used both in cooking and as a fertilizer, the flowers were used in wild honey production, and different parts of the tree were commonly used as traditional medicines. The most valued product was, however, a spice called *sumbala* or *sumbara* made from the stones of the *nééré* fruit. *Sumbara* was described to be a significant part of the Fulbes' food culture and was used in practically all sauces; many women were still using only it, despite the presence of popular commercial spices like "Maggi" or "Jumbo." It was also described that in April or May, when *nééré* fruits ripen, women go to collect fruits as many as three times per day; children would usually help their mothers with this task. The production of *sumbara* was described to be a long process, which takes at least 5 days, but can even take 10 days.

### 3.2 SEVERAL NON-WOOD FOREST BENEFITS AND SERVICES

The knowledge and use of traditional medicines was common in the study villages. All interviewees knew how to use medicinal plants and only one said that he hadn't ever used them. Only in emergency cases (e.g. malaria, parasites, or infections) did people use the services of the region's medical clinic and pharmacy. These facilities are situated in a town relatively far from the villages and their services were often considered too expensive. Interviewees named 33 common plants that could be used as traditional medicines. Most of these plants grow wild, but they were also cultivated in home gardens. People extracted medicines from the leaves of orange, mango, and avocado; as well as from the roots of papaya and mango. The traditional beliefs that people can become ill due to magic or bad spirits were still present in the villages, but perhaps were not as strong as they were in the past (Derman 1973). Some plants had ceremonial uses, for example kola nuts (*Cola nitida* (Vent.) Schott & Endl.) were an important part of their traditional rites.

Other important non-wood products from the forests, of a material nature included: rubber, wild honey, and oil for soap. The oil was collected from seeds of trees and shrubs like *Carapa procera* DC. and *Jatropha curcas* L. The homemade soap was said to provide good health effects and was sold in the local markets. The rubber was also collected from forest trees (e.g. *Saba senegalensis*) and sold. All of the respondents' households collected thatching grass and bamboo for their own needs from the woodlands. However, bigger trees for building purposes must be bought from outside the area because they are not available in the local forests.

Non-material benefits of forests and trees that villagers set the most important values on were shade, windbreaks, bringing rains, and watershed

protection. Mango was considered one of the best shade trees; the meeting places in the villages were often in the shade of a big mango or orange tree. Two young women said they would like to plant trees even if they did not get any benefits other than shade and visually aesthetic.

*"The shade is a remarkable benefit because every time we have a meeting we gather together under a shade tree." (Male, 18, student)*

*"Indeed, the shade of trees is important because sometimes if you must go for a long walk in the brush, you get hot and then you may want to have a rest in a shade of a tree." (Male, 54, farmer)*

Each year during the dry season the strong dusty Harmattan wind coming north-east from the Sahara blows through the hills of the prefecture of Mali, trees can protect a village from this wind:

*"Trees protect us from strong winds. Big trees growing on the eastern side of the village form a windbreak that prevent corn and other cultivated plants falling and breaking" (Female, 34, married)*

Many plants contain colorants that were used by the interviewees. By drying the leaves of *Tamarindus indica* L. the women made a red colorant with which they decorated their fingers, toes, and nails. In the prefecture of Mali, people still knew how to make indigo blue with natural dye. A variety of plants provide the indigo dye, and some of them grow in the area. Dyeing cotton clothes indigo was popular in the region, and for many women it was an important source of income. Indigo clothes were also exported abroad.

The occurrence of rains was seen as one of the main benefits of trees. Half of the interviewees were sure that trees could attract rains. They said that it would rain only rarely in deforested areas. They had also recognised that rivers and brooks would lose water faster if there were no plants growing on the banks.

When asked what would happen if some kind of disaster, like a long drought period, would kill all plants, including trees. Trees were so important that for some of the interviewees even imaging this situation was difficult. Most of the interviewees thought that under such harsh conditions moving to another area would be necessary:

*"In that situation we would suffer. We couldn't have shade from the sun, we couldn't use litter as fertilisers on the fields and so very soon we would suffer from hunger." (Male, 77, retired)*

*"Hunger would make us to move to other area where living conditions are better. In that kind of disaster we just couldn't adapt to live here any more." (Male, 70, farmer)*

Only two persons said that it would be possible to adapt to such a situation, for example by planting tree seedlings. Half of the interviewees thought that such a disaster was very possible. Four persons said that it could happen because of

shifting cultivation, excessive tree cuttings, or forest fires. Five persons argued that the disaster would happen if God made it happen. They said that people cannot decide what will happen in the future because everything happens as God wills it.

### 3.3 ATTITUDES TOWARDS AGROFORESTRY PRACTICES AND TREE PLANTATIONS

Fruit trees were usually cultivated in home gardens; other agroforestry practices were not commonly known in the study area. The respondents were asked about local people's opinions of two agroforestry practices: living fences and tree plantations on fallow fields. There were several different negative and positive views of these practices (Table 1). Sixteen of the twenty-one interviewees thought that new methods could not be added to current cultivation methods while one quarter had more open minds for new ideas. Though there was a lot of scepticism concerning the importance of planting trees, a good example of the common attitudes is represented by the statement from one man: "Every plant has its meaning."

The scepticism to the use of living fences was probably due to a lack of knowledge of the technology; most of the people had never seen efficient living fences. In two villages there were wire-netting fences that had been built with funds from the NGO Indigo, without this kind of external funding these fences would have been too expensive for the villagers. The traditional fences of brushwood around gardens and fields were rebuilt once a year, requiring a lot of wood and time. One average fence demands about 15 days of work for maintenance and reconstruction during a year. Living fences were proposed to solve the problem of animals entering and destroying cultivated areas.

When describing living fences some trees that were traditionally used as fences were mentioned including *Jatropha curcas* L. and *Spondias monbin* L. In these cases the trees were not planted or managed in a way that they were effective as living fences. In some places there were fences made from living sisal (*Agave sisalana* (Perrine ex Engelm.)). One interviewee was unsatisfied with his sisal fence, since as the plants got older there were more holes in the fence.

**Table 1.** Local people’s positive (+) and negative (-) opinions about living fences and tree plantations on fallow fields in Fouta Djallon, Guinea.

	+	-
<b>Living fences</b>	<ul style="list-style-type: none"> <li>- Monetary investments not needed</li> <li>- They are alive</li> <li>- They can provide other products also like fruits and soap-making materials</li> <li>- Poles would not be needed</li> <li>- Shade</li> </ul>	<ul style="list-style-type: none"> <li>- Effects can not be seen immediately</li> <li>- Replacing a broken tree takes time</li> <li>- They can not prevent animals from passing to a home garden</li> <li>- Tree that is too tall may be blown down by a storm wind</li> <li>- Termites would quickly destroy the fence</li> <li>- “Our ancestors didn’t use them either.”</li> </ul>
<b>Tree plantations</b>	<ul style="list-style-type: none"> <li>- Prevent drought and attract rains</li> <li>- Provide building materials</li> <li>- Shade</li> <li>- Visual aesthetic values</li> <li>- “Trees do not have bad effects.”</li> </ul>	<ul style="list-style-type: none"> <li>- Impossible to plant in fallow fields</li> <li>- They can be successful only on good soils</li> <li>- Animals would destroy the seedlings</li> <li>- Planting and other management practices take time from the works</li> </ul>

In recent years NGOs working in the region have started to contribute to the establishment of tree plantations. In one village, people had planted acacias (*Acacia mangium*), but none of the villages visited had tree plantations on fallow fields. The knowledge of different tree species and their site and nutrient demands seemed to be weak among interviewees. Five men argued that it would be impossible to plant trees on the fields because of shifting cultivation practices. They said that burning the trees and soil is indispensable to successful agriculture, but that would destroy the planted trees. The interviewees did not express the possibility that trees could be exploited before the next burning, which was the practice for the plantations that were established in other villages. Barren soil was also considered an obstacle since some of the interviewees thought that trees could be planted only on clay.

Despite the expressed doubts, plantations still interested interviewees and they listed several benefits that they believed tree plantations could offer, such as providing building materials. The interviewed villagers were willing to try tree growing if they could find time for it part from other work and if seeds and advice were provided. The acquisition of seeds would soon be easier when seeds could be collected from the local plantations near the villages. All women emphasised that gardens and crop fields had priority over all activities.

#### 4. DISCUSSION AND CONCLUSION

Trees and forests are an integral part of the everyday life of the inhabitants of the study villages, throughout the year. The benefits offered by forests are both indirect and direct. Wood used for cooking remains the most important product from the forests. Forests are also essential to livestock production since cattle are grazed in the forest. Leaf litter is also transported to home gardens and used as fertiliser. The most explicit value is that for the fruits that could be sold for a profit. A large part of the income of a rural family comes from the sale of agricultural products, which can be considered as indirect products of forests since they are produced in swidden fields or gardens where leaf litter and other forest residue are used as fertilizer. Other benefits of trees, such as for shade and as windbreaks, are also highly valued.

The *nééré* tree (*Parkia biglobosa*) was considered the most important and beneficial tree species in the local forests. It is also commonly used in many ways in other countries (Arbonnier, 2002). For example in the rural villages of Guinea Bissau the smoke from burning the seed capsules of *nééré* is used to reduce the numbers of mosquitoes indoors at night (Pålsson and Jaenson, 1999). The use of extracts from *nééré* is also commonly and effectively used to treat snakebite victims in rural areas of Nigeria (Asuzu and Harvey, 2003). Agunu et al. (2005) have investigated that the aqueous methanol extracts from the *nééré* have pharmacological properties to aid against diarrhoea, which support its use in traditional medicine for the treatment of diarrhoea. Bayala et al. (2005) have reported that the leaves of *nééré* had a higher nutrient content and contained more ash and lignin than the leaves of the shea butter tree. Leaf litter of *nééré* also decomposed more rapidly (Bayala et al., 2005). In the study area spice, *sumbara* was the most important product from the *nééré*.

As also indicated by Campbell et al. (1989), rural people understand the issues and problems, are anxious to see improvements in their conditions, and are prepared for radical transformation – but only if they are equal participants in the process. Unfortunately international development planners and consultants often emphasize technical and descriptive data and overlook important historical changes in the social and economic conditions that affect natural resource management strategies. A comparison of four planning documents prepared in Guinea during 1987-93 with historically examples from field research demonstrates how the documents overlooked important factors necessary to understand the local techniques for soil management and from women's organisational experiences (Astone 1998). Therefore local beliefs and the level of knowledge should seriously be taken into account while promoting tree plantations, living fences and other agroforestry practices in Fouta Djallon.

In addition to the protection of fields from the damage caused by animals, living fences could provide other benefits such as leaf litter for composting, fuel wood, fodder, and fruits. These fences near homes could actually provide many of the same general benefits as forests. For example Madany (1991) has reported



an encouraging experience when using living fences to improve the livelihoods of Somali farmers. In Fouta Djallon living fences could contribute to combating poverty. They require maintenance, but compared to the traditional fencing the workload would probably diminish according to the NGO workers in the area. Replacing traditional fences with fences like living fences that do not need to be rebuilt each year would decrease the pressure on the forests to supply fencing materials; this benefit could, however, also be attained by using wire-netting fences. In the neighbouring country of Mali, many positive effects have been obtained with fences composed of *Jatropha curcas* L. (Henning 1996). There are several potential species for living fencing; appropriate selection requires preliminary studies of the species suitability to the environment in question.

Forests are considered indispensable to life in general and all their benefits – implicit or explicit - are highly valued. Hence, forests and trees could have a considerably greater role in ensuring and increasing the well-being of the inhabitants of the region. Yet, an increase in forest resources or in their exploitation does not guarantee a decrease in poverty as such, and may even increase it. Likewise, a decrease in forests resources may also have both positive and negative effects on livelihoods. To secure a balanced and harmonious development, any strengthening of the forest sector should be planned in way that the goal of poverty reduction can really be reached. It is questionable if forestry alone can end poverty. As Palo and Lehto (2005) have stated it is likely that poverty reduction on a large scale by the tropical forests will remain rhetoric as long as no integrated theory exists to indicate the operational steps to be followed.

Fouta Djallon is a typical region that has a high degree of male migration; the heads-of-household are therefore often women. Because of the importance women now have in this rural economy it is necessary that any policies and programmes advocated take into account this role of woman. In Guinea, the national household survey data reveals that women are not more likely than men to be consumption poor or to suffer greater consumption poverty (Shaffer 1998). However, Shaffer (1998) found that women are “worse off” than men when deprivation includes, *inter alia*, excessive work load and reduced decision-making authority.

Multidisciplinary and diverse research activities could yield useful information for the inhabitants of the study area that could be used when they try to find new possibilities for ensuring their livelihoods and well-being. The needs for further study in the region include building and maintaining living fences, regenerating indigenous tree species, the interrelationship between the quantity and use of forest resources, and the composition of the livelihoods and incomes of the families.

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## APPENDIX 1

**Map 1.** Fouta Djallon Highlands in Guinea.

