

# **Approaches for the Improvement of the Economic Sustainability of Natural Forest Management in the Tropics - including REDD+ Mechanism**

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## 7 Case study - Ghana

*Dr. Jobst-Michael Schröder, Institute for World Forestry*

### 7.1 Introduction

African forest resources suffer from continuous degradation caused by over-utilization (e.g. fuel wood collection, hunting, logging) and the frequent occurrence of fires. In an average year, Africa accounts for more than half of the global forest area damaged by wildfires (FAO, 2007). Fire therefore plays an important role in shaping the landscape and the vegetation. The rate of disappearance of tropical forests in Africa is alarmingly high with an annual loss of 3.4 mio ha (0.5 % annual loss of all African forests) for the whole continent (FAO, 2010). Especially West Africa is severely hit by this trend (Schroeder et al., 2010). In the same pace as forests disappear in the region, savannah vegetation spreads which impedes the natural rehabilitation with trees.

Particularly Ghana is hit by a tremendous loss of forests which account for 34 % from 1990 to 2010 (FAO, 2010) and a dramatic increase in savannah area. Since a couple of years local sawmills and other demanders for wood started private afforestation programmes in the savannah region. These forest plantations are constantly threatened by wildfires. It therefore appears to be necessary to develop concepts for the protection and long-term survival of these plantations.

### 7.2 Buffer zones contribute to the survival of tropical forests

During a forest management project in Ghana where frequent wildfires originating from shifting cultivation destroyed valuable forests, local farmers became actively involved in the implementation of strategies to maintain and enhance the woody resources. Traditionally, the rural population in the Ashanti region of Ghana relies on shifting cultivation for the production of the main staple crops maize, yams and peanuts. The living standard is low and people are poor as sources for monetary income are lacking and the rate of illiteracy is high.



When buffer zones were established, tracts of land around the forests were assigned to individual farmers where they were encouraged to plant high-yielding fruit and teak trees together with their traditional staple crops. The farmers stopped the use of fire for land clearing as they did not want to jeopardize the trees on their fields. After 3 years additional household income could be generated from the sale of the high quality fruits. Further income from teak harvest is expected 12 years after planting. Subsequently, increased interest in this type of land use could be initiated. Fire incidents were successfully prevented.

In the case of this project site buffer zones are protective belts of various vegetation types which surround forests or other core areas. Efficient buffer zones ideally provide the same functions as forests do. Thus, the demand of local people for forest commodities and land reserves for agriculture can be satisfied within the buffer zones and the core zones remain unaffected.

### Challenges

The transition zone from tropical moist deciduous forest to moist savannah in the Ashanti Region of Ghana is characterized by tropical moist climate with a mean temperature of 26 °C and a mean annual rainfall of 1250 mm. The bimodal climate profile is characterized by eight humid and four dry months. Severe forest losses appeared during the last decades (Schroeder et al., 2010). The former primary forests with valued timber species like *Entandrophragma utile*, *Khaya ivorensis* and *Triplochiton scleroxylon* have been substantially exploited and are partly covered with secondary forests today. Common secondary tree species are *Bombax buonopozense*, *Ceiba pentandra* and *Spathodea campanulata*. The grass stratum is dominated by *Andropogon gayanus*. The remaining small remnants of natural forests are prone to further degradation through the local population (fire wood collection, charcoal production, local carpentry etc.) and fire encroachment is followed by vigorous grass invasion which impede natural forest regeneration (Abebrese, 2002; Struwe et al., 2006). There is given evidence that the reduction of forests in this transition zone accounts for the decrease of precipitation with further negative impacts to the environment in general and especially to soil site conditions. In the late 1990s, sawmill companies started with



the establishment of teak (*Tectona grandis*) plantations in the region. It was their interest to cover the raw material demand to a higher degree from local resources in the future. Also, these plantations are prone to wild fires.

The self-accelerating process of resource degradation represents a major risk for the future development of the Ashanti Region since the majority of the rural population is economically dependent on traditional forms of agriculture. An eventual surplus of harvest is sold on local markets to generate cash income. Other sources of income are widely missing. The agricultural crops, natural and planted forests are constantly threatened by fires. Therefore a strategy was developed which includes the improvement of people's livelihood and simultaneously the enhancement of the environment. The traditional unsustainable farming system should be improved by the introduction of new elements and techniques which are oriented towards a permanent agricultural system with agroforestry elements. This will diversify the production, reduces risks and offers chances for better market access. Furthermore, a permanent land use system which integrates trees contributes to the enrichment and stabilization of the ecosystem which might be a prospective for the development of the environment in the Ashanti region.

### **Concept**

It was intended to create acceptance among the population towards timber growing and at the same time secure the teak plantations. The creation of farmers' interest in a more diversified farming system including a tree component was an important prerequisite. The idea was to introduce a taungya-like agroforestry system which aims at permanent cultivation and income generating measures.

This system was designed as an "outgrower" system encouraging farmers to grow and tend timber trees for a local saw mill together with crops in their fields. In general, forest outgrower systems are a type of partnership between people who grow trees and timber buyers or processing companies. The main driver of this system is usually a company with inadequate forest holdings, insufficient access to public forests, or unmet demand for raw material. The enterprise seeks to secure additional supply to meet the increasing demand for wood products by signing partnerships between



farmers to allocate land and other resources to the production and management of trees (sometimes other forest products) and the company, which provides a guaranteed market. The varying responsibilities of each partner are defined by contracts (Desmond and Race, 2003).

The incentive for the farmers is the potential income from selling timber with a target diameter for a fixed minimum price. Thus, it is anticipated that farmers become sensitized to tree growing, avoid and protect their fields and trees from fire as future source of income. Income from tree harvest is expected after 12 to 15 years. To bridge this time span, it appeared necessary to include activities with short-term returns. Interviews with farmer groups revealed their interest in the cultivation of genetically improved fruit trees (orange, mango, oil palm, cashew). Further accompanying measures were the improvement of infrastructure such as road maintenance, digging of village dwells and construction of school/training buildings which were carried out by the sawmill company.

## Results

Technically, the Teak Outgrower Programme in Ghana represents an adapted version of the classical Taungya system (Lamprecht, 1989). Seedlings of teak and the nitrogen-fixing tree species *Albizia lebbek* were sold to farmers having their crop fields in the buffer zone around the teak plantations. The fruit trees were mainly grown along the boundaries of the agroforestry plots. These plots are intended to act as a "green fire belt" since their shade suppresses weed growth, which otherwise would serve as fire accelerant. All perennials are furthermore intercropped with annual food crops as long as light conditions allow cultivation. The initial skills for the simultaneous cultivation of different crops were taught in professional workshops; while extension service and further supervision was provided by both local sawmill representatives as well as village committees. To assure good compliance with the regulations, all duties and responsibilities were spelled out in agreements signed by every stakeholder. Farmers are granted full possession of all yields, i.e. crops, fruits and timber for their labor input. On a contract basis, a buy-off of the timber was guaranteed by the sawmill (Poppenborg et al., 2012).



This component became very popular in the project area. An increasing number of farmers joined the activity, organized village nurseries for seedling production and created a basic financial system.



Figure 7-1 Plantation at the beginning and 7 years later, photos: Jobst-Michael Schröder

Since 2005 an area of more than 200 ha has been afforested under the out-grower programme in the surroundings of three villages. Due to the well accepted buffer zone management fire incidents could be avoided since the establishment of the green belt.

### Perspectives

Generally, the response of the local population towards the introduced programme is positive. The project results show that forest protection initiatives can be successful if the local population is actively involved and

supported. The buffer zone approach can be transferred to other tropical regions with similar problems. Thus, it offers a great potential to contribute to the protection of tropical forest resources.