

## THE TRIANGLE “FOREST & ENERGY & CREATION OF INCOME”

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**ABSTRACT:** Within the frame of the German Senegalese Programmes PSACD and nowadays PERACOD, a concept was jointly developed with the Senegalese Dep. of Forestry how to improve the general situation in highly degraded forests in the Senegalese groundnut belt. Within the general Senegalese policy of decentralisation some competences were transferred to local decision makers and communes. A 12 step programme that was developed by the FAO was applied in the forest of Dankou with its 16 villages, south Kaffrine in the Dep. of Kaolack. It took about 8 years to develop and realize the communal forestry management programme. The forest regenerated rapidly. Long time not seen medical plants and several species of animals, mainly birds came back from intact Gambian forest to Senegal. Economical activities around forestry products started within GIE (groupement d’intérêt économique). Women profit very much from the revitalisation of forests, because many income generating activities are in line with women tasks. The central question and indicator in this context is, whether villagers are able to fight jointly against bushfire which destroy young trees, beehives, medical plants and fire wood. If so is it a win-win-situation because it proofs democratic understanding and brings economic profit.

**Keywords:** Forest, Energy, Creation of income, Senegal

### 1 THE COUNTRY OF SENEGAL

Officially the Republic of Senegal (fig. 1), is a country south of the Sénégal River in western Africa. Senegal is bounded by the Atlantic Ocean to the west, Mauritania to the north, Mali to the east, and Guinea and Guinea-Bissau to the south. The Gambia lies almost entirely within Senegal, surrounded on the north, east and south; from its western coast, The Gambia's territory follows the Gambia River more than 300 kilometres inland.



**Figure 1:** Map of Senegal

The Cape Verde islands lie some 560 kilometres off the Senegalese coast, but Cap Vert is a peninsula near Senegal's capital Dakar, and the western-most point in Africa. The Senegalese landscape consists mainly of the rolling sandy plains of the western Sahel which rise to foothills in the southeast. Here is also found Senegal's highest point. The northern border is formed by the Senegal River, other rivers include the Gambia and Casamance Rivers. The capital Dakar lies on the Cap-Vert peninsula, the westernmost point of continental Africa [1].

### 2 HISTORY & DEVELOPMENT OF THE GTZ PROGRAMME

In the early 1990 the Senegalese government launched a request to the international donor community to assist Senegal in solving an urgent problem concerning forest and energy. Senegal loses every year about 45.000 ha on forests areas because of new dwellings due to still a high birth rate and for firewood and charcoal production. There are meanwhile only in two provinces, some 700 km far away from the capital Dakar with intact forests. From North to South the deforestation started already long times before the independence of Senegal and has reached meanwhile the south-eastern border with Mali, Guinea Conakry and Guinea Bissau. Considerable extensive reforestation programmes were launched every year with a meagre success however. Reforestation programmes do not need planting trees only, but as well a profound care-programme for some years, respectively.



#### 4.2 Tropical and subtropical dry broadleaf forests

The tropical and subtropical dry broadleaf forest is located at tropical and subtropical latitudes (fig. 3). Though these forests occur in climates that are warm year-round, and may receive several hundred centimeters of rain per year, they deal with long dry seasons which last several months and vary with geographic location. These seasonal droughts have great impact on all living things in the forest. Deciduous trees predominate in most of these forests, and during the drought a leafless period occurs, which varies with species type. Because trees lose moisture through their leaves, the shedding of leaves allows trees such as teak and mountain ebony to conserve water during dry periods. The newly bare trees open up the canopy layer, enabling sunlight to reach ground level and facilitate the growth of thick underbrush. Trees on moister sites and those with access to ground water tend to be evergreen. Infertile sites also tend to support evergreen trees [5].



**Figure 3:** Trinidad and Tobago dry forest showing the dry-season deciduous nature of the vegetation [6].

#### 4.3 Sub-Saharan Africa

Sub-Saharan Africa (fig. 4) is the term used to describe those countries of the African continent that are not considered part of political North Africa. Geographically, the demarcation line is the southern edge of the Sahara Desert. Many countries such as Chad, Mali, Sudan, Niger, and Mauritania thus belong to both regions, and for this reason some object to the term in its entirety [7].



**Figure 4:** A political map showing national divisions in relation to the ecological break [8]

## 5 MEANS OF OPTIMISATION OF FOREST TIMBER & NOT-TIMBER PRODUCTION.

Within the frame of the Senegalese-German Project “PSACD” the Forestry Department of the Ministry of Environment proposed to prove new strategies of communal forestry management and choose the “Foret de Dankou”.

#### 5.1 The “Foret de Dankou”

The “Foret de Dankou” (fig. 5) is a forest of about 3500 ha, it is situated within the Department of Kaffrine, a town of some 100.000 inhabitants, about 260 km south-east of Dakar. There are 16 villages with about 20.000 inhabitants, which share the management of this forest. There is one official forester responsible for whole the district.

The general idea was to evaluate the forestry potential of Senegalese forests and to find new methods of optimising its production, mainly for firewood, but as well for other timber and not timber products.



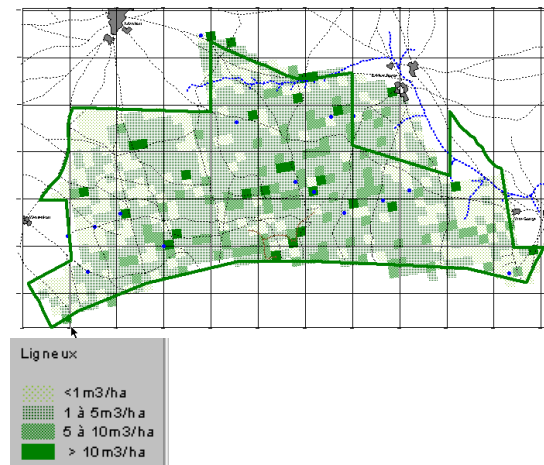
**Figure 5:** Forest of a Baobab-trees Forest of Dankou [9]

#### 5.2 Analysing the forest of Dankou

The forest of Dankou was extremely degraded (fig. 6). However it was still there, while several other forests in the same region had disappeared completely. Only the native name of certain places reminds on former large forests. There was, for the first step, to evaluate the actual situation. The evaluation was done by the CSE (Centre suivi écologique, Dakar, Senegal) utilising a GPS-GIS-method for detecting the actual boundaries of the forest and the density of the forest [9]. Many parameters were plotted and served as base-line for further investigations.

It was found, that about 1/5 of the forest area was already converted to arable farm Land and that the forest had only very few small still intact areas. The complete

distraction of the forest was therefore just a question of time.



**Figure 6:** The density of forest plotted in different density.

### 5.3 Communal forestry management.

Within the frame of stately decentralization strategies it was foreseen, that well trained and organized village-committees could manage their own forests, assisted by an official forester. The in total a 12 step FAO (Food and Agriculture Organisation) process lasted 8 years, till the community felt ready to foster that task.

### 5.4 Village committees as basic democratic entities.

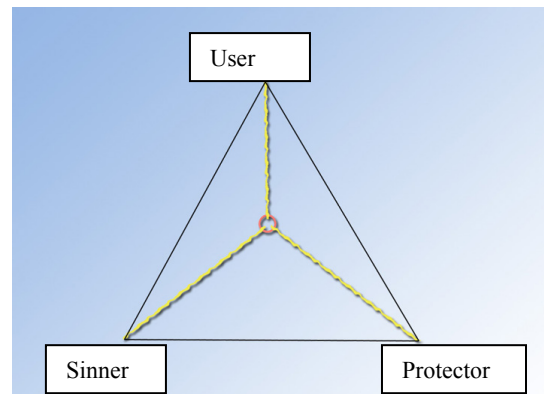
In Village committees (fig. 7), like elsewhere in the world, fight different fractions within the society for different aims and options. It was found out, that the external influence from the PSACD-Programme strengthened already existing but weak groups, which were the majority by numbers but without power. Furthermore it was found, that about 1.5 € or US\$2 per year and person of external subsidy was enough to start self-supported actions. The money was handled by GIEs (groupement d'intérêt économique) [10]. Most of the money was used to pay collectors of buy, a local fruit from baobab-trees. The buy was kept in the villages till market prices rose and was sold then for double the price after some 3-4 month. The transfer of this type of action to a local bank failed. It is therefore not very likely that this operation will work still in future. The support of local banks is vital for economic activities in rural areas [11].



**Figure 7:** Signature of the « Protocol of agreement» of concerned parties for communal forestry management [12].

## 6 PARTIES SHARING THE FOREST

There are three mayor parties who share the forest (fig. 8). Each of them is again subdivided in smaller fractions with different strategies and attitudes.



**Figure 8:** Triangle of concerned parties

### 6.1 The Users

There are many users of a forest and there are many users in a forest. Users often have a tendency to tend towards sinners. An overexploitation is always in reach. Other users may have a high interest to protect the forest however, because they depend on forests products. Beekeepers belong to this group (fig. 10) & (fig. 11). Beekeepers depend on an intact forest. They belong clearly to the group of protectors. It is known, that a forest with sufficient bees have a 1/3 higher production than forest without bees.



**Figure 10:** Beehive, System Vauthier, Forest of Dankou, [13].

An appropriate distinction might be to divide users in:

- Non formal users and
- Formal users.

Non formal users would be defined as users which use the forest and its product for not commercial reason, e.g. a person who picks some medicine plants to cure himself or members of his family a.s.o.

A formal user would collect the same medicine plants, probably in a higher quantity, to sell them on the local market or to dealers.

Another distinction would be, whether a group or a single person, would use the forest and its products as member of a village or group of villages, or whether that person or group of persons comes from abroad.

- Shepherds and cattle breeder.

In fact are there three mayor groups:

- Local cattle-breeder: They belong directly to the corresponding community which manages the forest.

- Regional cattle-breeders: These shepherds are from the local region. They go with their herds from forest to forest.

- Nomads: Nomads travel with their herds' considerable distances. In Senegal the nomads come from the Ferlo in the north of Senegal and may go till The Gambia or even deeper south.

Each group has distinct interests. The local cattle-breeders have a certain tendency towards the Protector-position. The regional cattle-breeders have a certain tendency towards the Sinner position. The Nomads have a clear tendency towards the Sinner-Position. They insist on traditional laws and hardly take care for protective communal actions. This harsh position brings nomads more and more in conflict with other parts of the society. Generally the shepherds do not own their herds which explain certain carelessness in respect of the protection of the forest.

## 6.2 The Women

For women the forest is an important resource. They gather wood, because fire-wood collection is a task of women. That might be dangerous, because women are occasionally violated, one reason for AIDS dissemination in the country-side. Women therefore go in groups into forests.

Women have knowledge about medical plants. They collect them for their own purposes or for their families. They sell as well medical plants on local markets or to dealers, who sell these plants generally in Dakar. Women are never sinners, but have often a tendency towards protectors.

## 6.3 The Loggers

In sound communities loggers are very much on the line between users and protectors, with a certain tendency for sinners. Since new laws within the frame of general decentralising processes, certain competences are transferred to regional or even local level. The management of forests is one of the transferred competences. Hence decisions about local forests can be taken by local authorities, assisted by official forestry servants.

## 6.4 Char burner

Char burner have a strong tendency towards sinners, generally spoken. Generally they belong to a specific ethnic group which lives on charcoal production. They virtually could transform whole forests into charcoal. Often they migrate from forest to forest with only thin linkages to the local environment. Often they have other nationalities than the Senegalese.

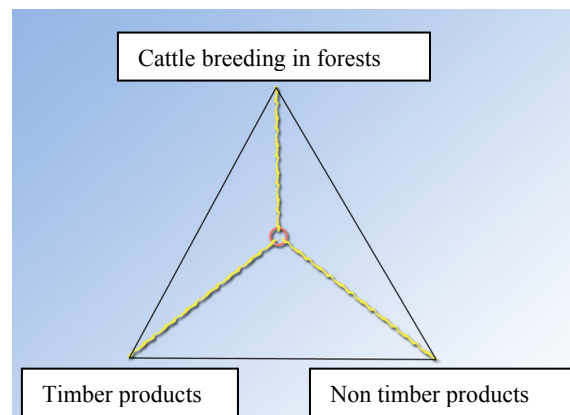


Figure 11: Triangle of Forest products.

## 6.5 Fruits from Trees and bushes as Non Timber-products

The consumption of fruits gathered in the forests play a mayor role the alimentation of local peoples. This fact is often neglected, mainly for the importance of a sound nourishment of young children. Only a fraction of fruits appear on the market and enters in the commercial circuit. The figure 12 explains the utilisation of certain fruits in % in selected households [14].

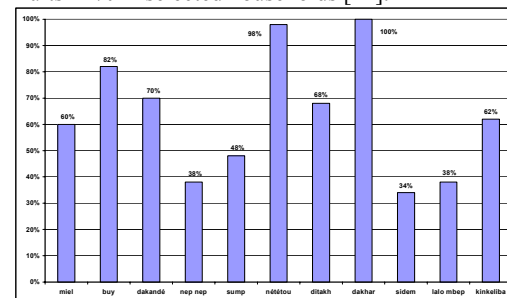


Figure 12: Consumption of fruits selected in the forest in representative households [15].

## 6.6 Example of buy

Buy is a soft drink (fig. 13). It is full of vitamins and has a slight acid taste. Buy gets a very high price in Dakar. Because the process from harvesting the fruits until its final stage is a long and difficult one only very few communities manage whole the process. Generally losses of 50% of the potential revenue are frequent. Senegal as nation loses as well, because again 50% of the fruits are spoiled between collecting and final consumption. This makes that the product is expensive. There are, as well, not enough quantities on the market for proper exportation strategies.



Figure 13: Buy From the fruits of the Baobab – tree [16].

## 7 ENERGY

Generally rural poor spend a small amount for energy of any kind. That is exactly the reason why villages are generally not connected to the national grid or are served by stand alone systems. Their consumption is just to low. It makes for the utilities no sense to branch consumers who spend 5-6 € per month to the national grid. This energy, be it electrical or thermal, is generally used in private consumption.

The situation is then slightly different, when water pumping is involved. Internationally water-pumping is considered as a productive use of energy. Within processing of timber and Non timber products, thermal and electric energy are used. Milling of any kind is generally done by electricity or by diesel-motors. The processing of baobab fruits needs as well thermal and mechanic energy. Honey processing on the other hand could easily be done without mechanic energy input.

The UNDP (United Nation Development Programme) has encouraged inventors to develop a “Multiplattforme” (fig. 14). Bigger dissemination-programmes have started in Mali and Senegal. They provide villages with mechanical and electrical energy to process agricultural and forestry products.

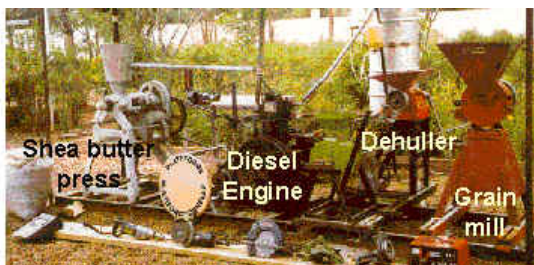


Figure 14: UNDP-Multifunctional platform

The multifunctional platform is built around a simple diesel engine, than can power various tools, such as a cereal mill, husker, alternator, battery charger, pump, welding and carpentry equipment, welding, etc. It can also generate electricity and be used to lift and distribute water.

Another important sector is cooling, either for medicaments, but as well for fruits and meet, including fish and crabs in case village are close to rivers or the sea. In general could it be stated, that processing and cooling of any kind of Non Timber-products increases the value of a product by about 50%. The use of energy of any kind is often a prerequisite for further processing. If there is no energy available, certain processes can not be executed and the product has to be sold to deals for a very low price.

Telecommunication: Telecommunication is very, very important, but one can't use it without electricity. There is a big market for solar battery-chargers. The Mobile Phone is much more than a status symbol. It is an absolute need in the country side. It links the village to the 21 century. There are many villages with a high rate of immigrants who transfer money and other goods to the country side. It is estimated that about 10% of the national Senegalese budget comes from transfer money from abroad. Meanwhile the first Telecommunication-centres were opened in some villages. The offer Fax, Photocopy, Scanner PC, printers and Internet.



Figure 15: Improvement the energy situation in rural areas by Photovoltaic [17].

## 8 PREREQUISITES FOR A SUCCESSFUL COMMUNAL FORESTRY MANAGEMENT

Finally it has to be acknowledged that the Triangle “FOREST & ENERGY & CREATION OF INCOME” is incorporate in a general democratic movement and a general personal engagement of the villagers. This can be explained by the creation of firebreaks and their permanent maintenance [18]. The creation and maintenance of fire-breaks is a common task of all the villages however, who profit all from the forest. If villagers manage to organise themselves to create new and maintain old firebreaks, it can be assumed that they will manage their problems and tasks without external help. Then advisors change position and get friends.

It was proved by PSACD and PERACOD that the same surface of a forest has in total a higher productivity, than agricultural land only. Finally a forest has a three-dimensional space which enables a multitude approach. A precondition is however, that the community creates firebreaks and maintains them permanently. A normal bush-fire can not destroy big trees, but it kills all young trees, medical plants, kills bees, and burns fodder for the wild animals and herds. Finally the fire kills the profit of the villagers.

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