

# ***RURAL DEVELOPMENT FORESTRY NETWORK***

## **NTFPs—THREE VIEWS FROM AFRICA**

**Beekeeping in the Subsistence Economy of the Miombo Savanna  
Woodlands of South-Central Africa**

***Franz Ulrich Fischer***

**The Value of Indigenous Fruit-Bearing Trees in  
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**Harmony and Conflict between NTFP Use and Conservation in  
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# **BEEKEEPING IN THE SUBSISTENCE ECONOMY OF THE MIOMBO SAVANNA WOODLANDS OF SOUTH-CENTRAL AFRICA**

*Franz Ulrich Fischer*

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## **INTRODUCTION**

Honey hunting and traditional beekeeping using bark and log hives have long been part of the subsistence economy of people inhabiting the Miombo woodlands of south-central Africa. Honey-hunting from feral colonies of bees is done by many people on an opportunistic basis. Beekeeping, on the other hand, is often described as a 'specialist enterprise', or a 'way-of-life', originally practised by a minority of people, with the skills passed on from generation to generation within families.

Beekeeping utilizes the woodland ecosystem in two main ways. First, through the partial domestication of wild bees by providing them with suitable places in which to establish their colonies. And second, hives are made out of bark or wood and other equipment (such as harvesting trays and ropes) are also from locally available resources: the bark hive is particularly ideal, since it is light and durable and its construction involves little investment apart from time. Management of the hives and colonies is adapted to the seasonal nature of the woodlands and the semi-migratory habit of the bees.

The traditional beekeeper works within a framework set by the subsistence needs of the household, the chance to earn supplementary income, and the opportunity of supplying important commodities to the community to the enhancement of social relationships. It has high status and a successful beekeeper can accumulate wealth and establish contacts with the outside world through trading and bartering. Beekeeping and the processing and marketing of its products is almost entirely carried out by men. Although, there is evidence to suggest that women are becoming involved in beekeeping in densely populated agricultural land where the colonies become more stable; and, in parts of Zambia at least, women from female-headed households are increasingly taking to honey-hunting in order to supplement their incomes (Clauss, 1991).

This paper, which has been drawn from a larger review of beekeeping in the Miombo zone, begins by looking at the place of beekeeping in the subsistence economy. It then goes on to briefly examine the impact of projects which have attempted to increase the productivity and profitability of traditional beekeeping, and the integration between beekeeping and forest management.

## **BEEKEEPING AS PART OF A MULTIPLE LAND USE STRATEGY**

Beekeeping is both integrated with and, in terms of the time devoted to it, competes with other activities such as crop cultivation and hunting and fishing. Nearly all beekeepers are also farmers, and the time they spend on it is limited principally by other demands during the crop growing and harvesting seasons. This makes it difficult to apply optimal management to the preparation and maintenance of hives and to ensuring that harvesting is done at the right time. Visits to the hives are necessarily infrequent since they are often very widely dispersed. It has been estimated, for instance, that on average only every sixth hive is cropped annually by beekeepers in the North Western Province of Zambia (Clauss, 1991). Two differing approaches to management are

adopted by beekeepers in this area of Zambia:—

- ▶ Beekeepers who have a large number of hives (sometimes in excess of 1000) have the scope to select the most promising hives for harvesting, and to crop outside the season when prices are high. This strategy also allows those hives which have not been cropped for some time to accumulate large stores of honey, in turn stimulating these colonies to produce more swarms which move into empty hives nearby.
- ▶ Beekeepers with a small number of hives will apply more intensive management, harvest more carefully and at the right time, to sustain the colony in the hive.

The attention given to beekeeping also varies according to market factors. Depending on its comparative profitability, beekeeping can be increased or decreased. In the Zambezi district of Zambia, for instance, the profitability of fishing is such that beekeeping has been reduced to a low level, and only enough is now harvested to satisfy the local beer market (Clauss, 1991). The need for cash can increase the intensity of beekeeping, such as more frequent harvesting and preparing value added products according to market standards.

## **BEEKEEPING PRODUCTS IN THE SUBSISTENCE ECONOMY**

Both honey and brood are important sources of food. For instance, a mixture of honey and sorghum (*Sorghum* spp) is an emergency food in parts of southern Tanzania because it can be stored for a long time (Ntenga and Mugongo, 1991). In several old publications it was recorded that amongst the Masai honey was the main food of the warriors when they were on hunting excursions, honey would normally be eaten only by young children, whilst old men would eat the brood (Merker, 1910; Weiss, 1910). The Wanika people, living between Lake Tanganyika and Lake Malawi, were reported as appreciating the young brood more than honey (Thompson, 1881; Fuelleborn, 1906).

Honey is of particular importance as an ingredient for honey beer. In this form it can even be regarded as a local currency amongst smallholder farmers in the North Western Zambia where it is used for the payment of services like field cultivation (Clauss, 1991). Ntenga and Mugongo (1991) mention the importance of honey beer for the Barbaig in Tanzania in paying for services and in traditional ceremonies. Whilst the social importance of honey beer is recognized in the anthropological literature, it has often been given a negative image in reports about beekeeping (Smith, 1958; Fraser, 1963; Papadopoulo, 1969; Silberrad, 1976). Mixed and unclean honey from bark hives is regarded as a wasteful product, but for brewing beer brood and pollen combs are essential to provide the protein for the yeast to develop which transforms the sugar.

In many places honey is still used in the exchange economy, and is of sufficient value to be traded for cattle in Zambezi District of Zambia (Clauss, 1991) and in Babati District in Tanzania (Ntenga and Mugongo, 1991). However, market statistics generally only include bee-products traded through official market organisations and leave out the bulk of honey consumed and traded or bartered locally. Most statistics are biased towards the production for external markets, like beeswax and clear table honey, which is sold to the richer urban communities and is exported (Smith, 1951b; Silberrad, 1976; Gnaegi, 1988). In this way the major products derived from

traditional beekeeping are effectively given a zero value.

## **KNOWLEDGE OF THE TRADITIONAL BEEKEEPER**

It is often written that traditional beekeepers have very little knowledge of the biology of bees. Although the Chagga in Tanzania replicate colonies by searching for the queen and putting her into a hive with a few workers (Gutmann, 1922), this type of knowledge is rare. As Clauss (1991) writes with regard to North Western Zambia: 'Even old and experienced beekeepers never saw a queen bee in their life.' Their capacity to directly control what happens inside the hive is therefore limited.

What the experienced beekeeper does have is profound knowledge of the environment and its impact on the bees including, especially, an understanding of the seasonal cycles of the colonies and factors influencing swarming and productivity (Nightingale, 1983; Clauss, 1991). Beekeeping is a skill taught by fathers to their sons and Brokensha *et al* (1972) refer to beekeepers as a special clan or cast. Nightingale (1983) also notes that beekeepers are often traditional healers as well because of their accumulated knowledge of plants and their properties.

Beekeepers have extensive knowledge of the trees which have suitable bark for hives, ropes and other utensils, and other important things that enable them to survive long harvesting excursions in the forest (Clauss, 1991). During these trips, which may entail covering more than 100 kilometres on foot and lasting over a week, it is necessary for them to make many of the accessories needed to harvest the hives in situ.

A traditional beekeeper knows the bee plants and can judge from the flowering how much honey to expect. In Zambia there are two cropping seasons (Holmes and Zulu, 1970; Silberrad, 1976): the first around October-November at the start of the rains when *Brachystegia spiciformis* and a few other woody plants are the important nectar sources; the second, when nectar comes mainly from *Julbernardia paniculata*, occurs at the end of the rainy season. However these cropping seasons are dependent on many variable environmental factors, and observant beekeepers are able to shift harvesting the hives to the most appropriate time.

Another aspect is that traditional beekeepers can give information concerning the bee characteristics of a plant according to their experiences in a specific environment. A tree can be highly appreciated as a source of nectar and pollen in one area, but condemned in another. This is the case, for instance, with the tree *Isobertinia angolensis*. In parts of Zambia this species flowers alongside other nectar sources, but because it yields much pollen (which in turn induces the colony to increase its brood) nectar taken to the hives is transferred to reproduction depleting honey stores before harvesting takes place. In other areas the tree is favourably assessed by beekeepers where its flowering precedes trees yielding abundant nectar; in this case the colonies build up before the main harvesting season (Clauss, 1991).

These examples show clearly the specific nature of many experiences and observations made by local beekeepers. Today, however, as beekeeping increasingly becomes an opportunity to earn additional income, many more, less experienced beekeepers have joined the 'cast' and this could have a negative impact or will shift beekeeping towards a new approach.

## **INTERVENTIONS IN TRADITIONAL BEEKEEPING**

The high potential for beekeeping in the Miombo woodlands has given rise to various initiatives aimed at improving the efficiency and productivity of traditional methods. The first attempts focused on aspects of partial harvesting, such as leaving the brood-combs and taking only the honey-combs, analogous to the use of the queen-excluder in modern hives (Harris, 1932, Chorley, 1936; Trapnell and Clothier, 1957), but with limited success (Smith, 1958; Ntenga, 1979).

From the 1950s attention shifted to increasing honey and in particular beeswax production through the introduction of manufactured equipment like the frame hive and later the transitional hive (Gnaegi, 1988). Emphasis was put on training and education since traditional methods - particularly the use of local materials like bark or tree trunks for hive construction, were regarded as inefficient (Smith, 1958; Silberrad, 1976; Ntenga, 1979; Ntenga and Mugongo 1991). In certain situations these projects have been successful. In Kenya, Mwangi (1985) reports the successful introduction of the Kenya Top Bar Hive into many parts of the country, especially in more densely populated areas where agriculture is the main economic activity. Due to the lack of available nesting sites in agricultural land, and a rich melliferous flora throughout the year, the colonies are more stable. It is estimated that in Kenya over 100,000 top bar hives are now in use (Mwangi, 1985).

In the North Western Province of Zambia, although beekeepers have not accepted frame hives, it was observed that people starting beekeeping can be introduced to new technologies like transitional hives and village beekeeping, especially in areas of mixed habitats, cultivated and woodland patches (Clauss, 1991). The placing of the hives in the vicinity of the village also allows women to participate in beekeeping.

In other places, however, insufficient attention has been given to the constraints a traditional beekeeper faces, and why these may prevent up-take of new methods and equipment. There are two types of constraints:—

- ◆ Natural constraints: the adaptive semi-migratory characteristics of the colonies in response to the seasonality of the Miombo woodlands make it very difficult to have an apiary concentrated at a certain point for better management and handling.
- ◆ Socio-economic constraints: the other problem is that the risks involved in investing in new technology are too high for many subsistence farmers and beekeepers. As already indicated, beekeeping is part of a multiple land use strategy aimed at food security and minimizing the risk of depending on one activity too heavily.

Beekeepers are willing to adopt new materials and methods as long as they are appropriate. Wire for suspending or wedging hives will be used, if it is cheap enough, because it is durable (Nightingale, 1983; Clauss, 1991). Also plastic buckets are increasingly used by beekeepers because they are light and easy to carry and they have a multiple use. But all these technologies depend on the price, and if it is too high the people do not adopt them. Other improvements include making as many hives as possible from one tree, to use grass doors instead of bark doors.

The other major impact of projects has been in marketing systems. The Tabora Beekeepers

Cooperative Society (Tanzania) and the North Western Bee Products Company (Zambia) are two examples among others, which ensure a regular and efficient service of purchasing the harvest from the beekeepers. These organisations are seeking to supply national and/or international markets. The national market is normally in the urban areas, where the preferences are still for clear table honey. Past difficulties in supplying these markets are evident in the fact that from 1965 to 1974 Zambia imported on average 29 tons of honey per year (Silberrad, 1976).

If traditional beekeepers are to accept quality standards demanded by external markets, then the marketing system has to pay higher competitive prices for the products. Beekeepers will certainly realise the advantage of following a certain procedure for preparing high grade honey and beeswax which will realise higher prices. However the marketing organisation should not try to destroy the local market by paying prices with which the traditional outlet cannot compete. The buffer and regulatory function of the local markets can be very important when outside markets become too competitive, oversupplied or the consumer taste changes. The worst prospect is that project interventions which emphasize the sale of produce to an external market can starve a local market of the required honey and so disturb the subsistence and local markets in many respects.

## **BEEKEEPING AND FORESTRY**

Beekeeping was for a long time considered detrimental to forestry in Miombo, particularly because of the large number of trees used in hive construction, and the indiscriminate burning that was sometimes caused by honey-hunters. This attitude changed, however, when it became apparent that these woodlands do not contain large quantities of valuable timber, and that beekeeping is often a more profitable enterprise (Tesda, 1968). Beekeeping has the great advantage that it can be carried out in Miombo woodlands without conflict with any other form of land use therein (Boaler, 1965). Beekeepers and foresters also have a common interest in forest conservation. Smith (1962) and Clauss (1991) have said that beekeepers complain about late fires destroying the flowers and reducing the nectar flow and they suggest the beekeepers should be included in a strategy for fire protection and the preservation of the Miombo woodlands.

For the North Western Province of Zambia a recent beekeeping survey gave some figures and assumptions concerning deforestation by beekeeping (Clauss, 1991). It was estimated that 272,900 trees are debarked every year, to make on average 1.7 bark hives from each, to provide the 15,000 beekeepers owning on average 73 hives, with 29 replacement hives each year. Assuming that about 70% of the North Western Province of Zambia is forest (88,000 km<sup>2</sup>) then 3.1 trees are debarked every year per square kilometre. The available resource was estimated to be 224 useable trees per square kilometre, allowing that each has 73,500 trees of which 11,000 trees (15%) are in the required size class and about 660 are of the preferred tree species of which about a third have the cross-grained bark structure, this would permit a regeneration cycle of about 72 years.

However there are other uses of trees by the traditional beekeepers. About 600,000 hive doors annually are made of bark, but these do not always kill the trees. Harvesting trays for cropping and carrying are estimated to be 150,000 per year and about 270,000 smaller trees are destroyed for cordage made from bark fibre. The trees damaged by hacking steps for suspending and easier access to the hives was not estimable for the North Western Province of Zambia, but it should not exceed the total number of new hives made per year.

These figures appear high, but in the context of utilisation of available resources, which can be assumed to be 6,526.8 million trees of which about 1,434.8 million (22%) are of the suitable size classes, a use of about 1.16 million trees of the larger size classes needed (more than 61 cm girth at breast height) and about 0.27 million of the small size class (less than 30 cm girth at breast height) can be considered as a reasonable utilisation of the available resource.

The selective tree utilisation creates small gaps in the tree canopy, not a large cleared area. Many of the trees are only damaged causing a reduction in the growth rate and a higher susceptibility to pest and diseases. They are however still available for other uses and continue their function within the woodland system. The damage of trees by cutting steps or removing pieces of bark could have an important ecological function by enabling organisms to enter the wood and create cavities, used by many animals and insects (feral bees) as a nesting site. The selective use of old straight grown *Julbernardia* spp and *Brachystegia* spp would give room for younger trees and regrowth, which could improve the honey yield, a theory not yet proved for the main Miombo woodland species (Smith, 1962). The smaller gaps could be valuable since the regeneration of valuable timber species, like *Pterocarpus angolensis* could be enhanced.

The use of smoke and the accidental spread of fire during cropping is however very damaging for the regeneration of the woodlands, especially during the end of the dry season in October and November, the harvesting time of the first honey crop. Although beekeepers are aware of the danger (Clauss, 1991) and they usually take care to avoid fires, it has been claimed that beekeepers are causing too many fires (Smith, 1962; Clauss, 1991). However since fire is used in the subsistence economy for many other purposes, it is impossible to assess the fire damage caused by beekeeping alone.

These arguments relating to the impact of traditional beekeeping on the savanna woodlands underline the fact that beekeeping is not an isolated activity within the subsistence economy. It is fully part of the strategy adopted by rural people to obtain the highest possible food security. In places where extensive woodland cover still exists, there is no reason to radically change traditional methods of beekeeping since they have proved to be resilient to many different internal and external forces and to be sustainable. In other places, however, this dynamic system faces many challenges relating to larger populations and increasing pressure on the woodland resource. The transformation of woodland into agricultural land offers new opportunities for beekeeping.

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