IMPACT OF BEEKEEPING/HONEY HUNTING ON FOREST SPECIES IN THE GUINEA SAVANNAH OF SOUTH EASTERN NIGERIA

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Abstract

This paper analyses the interactions between traditional beekeeping/honey hunting and the agroforestry/environment in southeastern Nigeria and assess the effects of the former on the later. It attempts, in a rather exploratory manner, to identify the various ways in which inappropriate beekeeping and honey hunting practices result in the loss of important multipurpose agroforestry tree species. Recommendations are proffered towards improving harvesting practices for hive and other non-timber forest products in order to avert the erosion of the natural resource base of fragile farming ecosystems.

1.0 Introduction

Most rural communities in developing countries of Africa, Asia and Latin America depend on a productive natural resource base for a living. But the very exploitation practices of such resources, if overdone, constitute a threat to the natural resource base. Traditional beekeeping (maintaining artificial beehives made notably from earthen pots), and honey hunting (searching the forests and harvesting honey from beehives that are naturally intruded in tree trunks) are two closely related activities which are associated with many other natural resource concerns, with strong implications for community and social welfare as well as environmental conservation.

While beekeeping within the agroforestry system or 'apiforestry' (Pawlick, 1989) complements rather than compete with agriculture, in terms of enhancing crop yields through pollination services, and capital transfers through the sale of hive products, the same cannot be said of honey hunting. Beekeeping and honey hunting are neglected areas of agricultural research in developing countries probably because scholars and policy makers have not been able to adequately demonstrate their importance in the farming systems. Although the links between beekeeping/honey hunting on one hand and arable crop productivity on the other are fairly well known, that between beekeeping/honey hunting and other non-arable agroforestry components have not received adequate exploratory attention, let alone in depth research focus. Many of the trees that serve as honey sources and on which bee nests are found in the tropics are multipurpose species which provide fruits and nuts, timber, shade and amenity; their bark may product tannin and other medicinal products while their flower pods may be excellent animal feeds.

The idea of loging as a potentially destructive, forest depleting harvesting practice is well known (IUCN-UNEP-WWF, 1980). But the negative effects of destructive beekeeping and honey hunting practices are subtle and hardly highlighted in the literature. Yet, in fragile extractive economies where arable farming is rendered too risky and unproductive by poor soils, the high degree of dependence on non-timber forest products (NTFPs) exploitation means that the issue is very important in the livelihood

systems of a significant segment of the rural population particularly in semi-arid regions. This is probably the first work that situates beekeeping and honey hunting practices within the context of agroforestry and the consequences for sustainable livelihood systems and the environment. If it succeeds in stimulating interest and further research in the above relationship, it would have achieved its primary aim.

2.0 Review of Literature

Agroforestry, as a young discipline that is rapidly becoming a science in its own right (Sanchez, 1995) still has a lot of unsettled definitional and conceptual issues. Assessing the definitions of agroforestry in view, particularly of Nair (1993), Cooper and others (in press), Leaky (1996) summarizes the contemporary view of agroforestry as a set of stand-alone systems in which trees are sequentially or simultaneously integrated with crops and/or livestock. Within the 18 different agroforestry practices recognized by Nair (1993), with their infinite number of possible variations, traditional beekeeping/honey hunting has not been specifically assessed as one of the livestock components of the agrosilvopastoral system. As such the unique dynamism fostered through the agency of the honey been between rural communities' social, economic, agronomic and environmental management practices is yet to be adequately accounted for. The current perception of agroforestry as a set of distinct prascriptions usually handed down from experiment sttions for land use (Leaky, 1996) tends to suggest the exclusion of situations in which there is no deliberate planting of trees, but which are nonetheless exploited in a deliberate manner as in much of the rainforest regions of Tropical Africa.

The productivity of agroforestry has been the subject of considerable research. Empirical analysis of agroforestry systems using various techniques have shown very favourable economic returns (Hoekstra and Von Gelder, 1985). But work done so far seems to be limited to considerations of beneficial exchanges between the tree and arable components of the agroforestry system (see, for instance, Young, 1988; Kang and Duguma, 1985; Baiyeri, 1992).

The relationship between agroforestry and beekeeping has also been highlighted. According to Crane (1980), farmlands can be important sources of honey, particularly from plants of the Agavaceae, Rubaceae, Proteaceae, Malvaceae, Leguminosae, Rutaceae, Compositae and Myrtaceae families, respectively represented by sisal, coffee, Gravillea, cotton, beans, oranges, sunflowers and eucalyptus plants, plants from which bees store surplus honey (the melliferous plants) in the tropics are well known and have been listed by Crane (1980), of which the Leguminosae, Myrtaceae, Copositae and Labiatae contain the greatest number. Some of the common plants found in abundance in the Nsukka area, and which were listed by Crane include cashew, mango, balsam, thirstles (Cardus sp), Eupatorium sp, Vernonia sp, croton, rubber tree, castor, Ocimum sp, groundnut, Brachystagia sp, Eucalyptus sp, coconut palm, banana and plantain. The importnce of bees as optimizers of envirnmental resource flows is realized when we consider that most of the materials they convert to honey and other products would have gone to waste if bees do not collect them. Bees thus extend and enrich man's use of natural resources (FAO, 1986).

3.0 Methodology

This study was carried out at Ibagwa Aka, one of the autonomous communities and the headquarters of Igbo-Eze South Local Government Area (LGA) of Enugu State in southeastern Nigeria. The vegetation is derived savanna, with scattering of drought-resistant trees and some patches of relief forest which lie mainly on the hill tops and valley sides, showing evidence that the area was once very densely forested. The rainy season (March to November) and the dry season (November to February) are distinct and the temperature range lies between 27 and 28 degrees centigrade. Farming is the major economic activity of the people, although in many areas stony grassland does not permit any meaningful agricultural production. This has meant the diversification of economic activities into

secondary endeavours like beekeeping and trading. The major crops produced in the area are yam, cocoyam, maize, cassava, citrus, avocado, pepper, pigeon pea and various vegetables.

3.1 The sample

The sample for this study was selected through a combination of strategies that recognise the social component of 'apiforestry'. This was carried out in three stages.

All interested persons were invited to a community forum at which a preliminary identification of beekeepers/honey hunters was done. At the community forum, 10 beekeepers/honey hunters were selected purposively to constitute a focus group with whom discussions were held on two occasions. Criteria for the selection were years of experience in beekeeping/honey hunting, active participation in the discussions, among others.

At the community forum also, and with the assistance of community leaders, 3 purposively selected individuals other than those included in the focus group were interviewed as key informants. The criteria for this choice were age (for historical insight on indigenous knowledge), experience, and interest.

During the community forum/focus group discussions (FGD), key informant interviews, and with the help of community leaders, a sampling frame of all beekeepers/honey hunters was built up. From this list, a random sample of 30 beekeepers/honey hunters was selected and interviewed with semi-structured interview schedules.

3.2 Data collection

Data collection for the study was by participatory rural appraisal (PRA) involving transect walks, identification and inspection of bee hives in the field. The Focus Group Discussions/Community Forum were particularly helpful in exploring gender and age specificity of beekeeping and honey hunting activities; eliciting clearer information on the respondents' relationships to the agroforestry resource base. Key Informants enabled us to select apiary (field) sites for in-depth study. The semi-structured, open ended interviews were used to collect quantitative information from randomly selected beekeepers/honey hunters and honey sellers.

The data were analysed by means of descriptive statistics.

4.0 Findings and Discussion

4.1 Socioeconomic attributes of respondents

Socio economic attributes of people are good indicators of their attitudes, sentiments and possible reaction to policy variables.

Most beekeepers/honey hunters are aged between 38 and 57 years with an average of 44 years. The relative youthfulness of the beekeepers and honey hunters means that they are still very active and are likely to perceive themselves as still having a long-term stake in the agroforestry environment of the area.

More than a third of them have not attended school at all while the rest did not go beyond secondary schooling. With an average of 4.4 years of formal schooling, the respondents' level of literacy is rather low when viewed against the 6 years it should take to complete primary schooling in Nigeria. But compared to the level of education among the general farming population in Nigeria, this is relatively high.

The older respondents are involved only in beekeeping while the younger ones are engaged in either beekeeping and honey hunting or both respectively.

Table 1

Occupational Status of Beekeepers/Honey Hunters

Occupation	Frequency (%)	
	Primary Occupation	Secondary Occupation
Beekeeping only	-	50
Honey hunting only	-	20
Beekeeping/honey hunting	-	25
Honey trading	-	-
General trading	20	-
Farming	40	5
Teaching	5	-
Civil Servant	15	-
Artisan	10	-
Services	5	-
Retired	5	-
Total	100	100

Being involved in beekeeping and honey hunting only as a secondary occupation is probably a risk for the environment, since the respondents might feel less committed to protecting it, after all, they could fall back on farming and other occupations when the environment is endangered. They are not aware, however, that the adverse consequences of their vocations may ultimately be impacting negatively on farming as well.

4.2 Bee species, bee forage

The most common species of honeybee found in most parts of West Africa are the Apis mellifera adansonii (Smith, 1960). It was not possible to find and draw on any previous work on bees in the present study area. We therefore identified four types of honey bee found in Ibagwa, based on local knowledge of their behaviours. These are:

4.2.1 Okotobo

The beekeepers are not agreed as to whether this was a species of bee or not, but that its nest is found underground within the hollows left by dead tree roots.

4.2.2 Okpoghoro

4.2.3 Okampu

Very aggressive and attacks on the slightest provocation.

4.2.4 Anu udene

Very mild and restive, not aggressive and can be kept close to homesteads without danger of attacks on people and livestock. We observed a been hive occupied by this species placed as close as 15 metres from the owner's house.

Both okampu and anu udene may occupy the same hive. They are ordinarily physically indistinguishable. These two facts pose a dilemma to those who would like to keep their artificial hives close to the homestead for fear of the okampu.

Beekeepers in Ibagwa have observed that the main sources of nectar for the bees are Eleaes sp., Irvingia sp., Pentaclethra macrophylum, Anacadium occidentale, Mangifera indica. Pterocarpus spp. Treculia africanum and Pterocarpus sp.

5.0 Beekeeping/honey hunting - agroforestry Interactions

Severe competition for the exploitation of honey from hive-bearing trees, particularly in common forest areas, has resulted in environmentally unsustainable practices such as cutting down the trees, chopping tree trunks open, setting the surrounding bush on fire all of which lead to the rapid loss of such hive-bearing multipurpose species, among other adverse environmental consequences. For two major reasons, honey hunters in Ibagwa have not bothered about the possibility of decimating, through unsustainable honey harvesting methods, the species of trees in which wild bee hives are mostly located. One, they feel that the trees are so many that destroying a few in the course of hunting for honey cannot be of serious import. Two, they feel that even if people have to worry about damaging the trees, there is no way anybody is going to obey rules on sustainable harvesting unless they are sure that everybody else does. The later is a classic dilemma in the management of common property resources.

5.1 Wounding of hive-bearing trees and weakening their stems

Honey hunters' attempt to harvest honey by cutting tree trunks have tended to endanger certain preferred multipurpose tree species which are valued for other services in the agroforestry system of Nsukka (CRDC, 1996) thereby rendering them susceptible to lodging by wind storms: Pentaclethra macrophylum is not often cut down completely since they are generally not too tall to climb, although they can be adversely affected by wounds from attempts to hollow the trees to permit scooping of honey comb. Species of trees that are particularly affected are Pentaclethra macrophylum, Irvingia sp, and young chlorophora excelsa. However, all trees that are naturally hollowed are potentially susceptible.

5.2 Outright felling of some trees in order to permit the extraction of honey

5.3 Bush fires

The beekeepers and honey hunters reported that in the process of raiding bee colonies, some bush fires have started in the past. Such bush fires are specifically caused by

i. deliberate lighting of forests by honey hunters with the objective of scaring resting bee colonies and hence identifying nests to be harvested later;

ii. embers falling to the forest floor and starting a fire during harvesting operations. Besides. young seedlings of the hive-bearing trees are often be destroyed in the process. Also bush fires have led to the migration of bees away from the inclement environment created during honey harvesting activities.

5.4 Killing of bees during harvesting operations

This happens in two ways. First, fire is used to kill off stuborn bees. Second. residual brood combs are destroyed as all contents of the hive are scopped off during harvesting. leaving none to quickly regenerate the colony. Apart from using smoke produced by burning some dry grass to calm the bees in order to keep them from stinging, the villagers do apply fire with the sole purpose of killing off stubborn ones that are not easily calmed by smoke. The harvester regularly brushes fire from burning grass or straw over bees clustering around the pot whether on the tree or on the ground. Consensus among the beekeepers during the focus group discussion supports the estimate that 40% of the bees in any hive are killed during each harvesting operation from clay pots. The beekeepers and honey hunters are unaware of the possible consequences of this outcome. namely, the reduction in the population of bees, bee activity, honey and crop yield.

The responses of the 30 beekeepers and honey hunters to questions regarding the frequency of occurrence of these incidents in the 1996 season are given in Table 2.

Table 2

Indicators of Adverse Impact of Beekeeping/Honey Hunting on the Agroforestry of Ibagwa

No. of Incidents	No. of Honey Hunters Witnessing		
Observed in 1996	Tree cut down	Tree Trunk cut open*	Bush Fire Started
1	3	5	3
2	1	3	-
3	-	1	1
4	-	1	1
5	-	-	-

*To such an extent that, in the beekeepers' opinion. the tree could easily be felled by a storm.

Calculating from Table 3, we obtain the following figures:

Number of treess cut down = (3 x 1) + (1 x 2) = 5

Number of tree trunks cut open = (5 x 1) + (3 x 2) + (1 x 3) + (1 x 4) = 18

Number of bush fires started = (3 x 1) + (1 x 3) + (1 x 4) = 10

Table 2 indicates, for instance, that of the 10 honey hunters interviewed. 3 witnessed the cutting down of a tree while another one witnessed the cutting down of two trees during the course of the 1996 honey hunting season. The most rampant occurrence is the cutting open of tree trunks which often leads to such other effects on the trees as invasion by disease, slow regress and felling at later dates.

when it would be difficult to attribute that directly to honey hunting. Of the 10 bush fires reported. 2 were said to have been serious in the sense that they went out of control of the honey hunters and engulfed large areas.

Precautions during harvesting include clearing the surrounding brushes not necessarily to protect the vegetation, but in order to lessen the danger of fires to the harvesters themselves. Members of the team on the ground also continuously check to extinguish potentially dangerous embers that fall to the forest floor. Some big bush fires that have got out of control in the Nsukka area during the dry season are known to have resulted from accidental fires that started during honey hunters' nocturnal harvesting activities. However, honey harvesting is not done during the harmattan season which corresponds to the driest months of the year.

6.0 Further Implications

Our study area is representative of a very large ecological space spanning many. but particularly Enugu, Kogi, Benue, Ebonyi and Anambra states of Nigeria. The results of this study, therefore, hold strong promise of reliable extrapolation to inform policies that might slow down multipurpose tree depletion across these states.

One of the important issues raised by our findings is the question of ecological sustainability of non-timber forest products harvesting practices. One reason why the figures we calculated are important is that such trees as Pentaclethra macrophylum are not being replanted, and continued removal through honey hunting activities increases the possibility of their going extinct. And beekeepers in relatively highly populated areas complain about not having adequate numbers of suitable trees on which to place hives. This scarcity of trees within the areas immediately beyond the near compound farms probably has to do with destruction of such trees in earlier years of honey hunting activities when such areas composed the distant fields and forests. Also, these trees on which hives are located happen to be notable sources of bee forage.

Adaka's (1996) study of agroforestry practices among 100 households in nsukka in Nigeria found that most species, particularly in the distant fields, are not deliberately planted or propagated. From the study, a look at the species composition of the agroforestry system indicated very low density of the important 'apiculture' (bee forage) species, which happen to be of most commercial importance. in those distant fields (where honey hunting normally takes place).

Table 3

Density of Agroforestry Species in Distant Fields in Nsukka

Tree Species	Average Number of Species Per Household
Irvingia sp.	2.5
Parkia higlobosa	0.4
Pterocarpus sp.	0.7
Treculia africanum	1.7
Mangifera indica	0.3
Pentaclethra macrophylum	1.1
Anacadium occidentals	3.3
	10.0

Source: Adapted from Adaka, M. N. (1996) 'Role of Agroforestry in the Economy of Nsukka'. Unpublished B. Agriculture Thesis, Department of Agricultural Economics, University of Nigeria, Nsukka, Nigeria

Examining Table 3 in conjunction with the calculations from Table 2, and working out, for each species, the proportion (average number of trees lost per year/total average density per household, i.e. 5/50) what emerges, with the reasonable assumption that only the 7 species in Table 3 are impacted by destructive honey hunting practices, means that currently, each household in the study area loses an average of 50% of their stock of these trees directly to destructive honey hunting practices every year. Indirect losses would also occur due to wounded trees being felled by storms or invaded by disease. Nigeria is said to be losing about 0.7% of its forests per annum (World Resources Institute, 1994). The type of subtle forest losses that accompany such 'insignificant' activities as beekeeping and honey hunting relative to those attributable to the search for timber and fire wood occur in the fringes of honestead (and secondary forest) areas and not usually a part of the 0.7% loss mentioned above. Beekeeping and honey hunting-related tree depletion is nevertheless very important for many reasons including the following:

a. it has direct effects on the poor;

b. it affects the immediate means of livelihood of rural people;

c. it encourages farmers' incursion into more primary forest areas;

d. it is particularly pernicious because it occurs imperceptibly;

e. it increases in direct correlation with agricultural intensification particularly in areas with poor soils;

f. it is all the more pervading because there are no institutionalised regulations to control it.

7.0 Recommendations and Conclusion

Based on the discussions so far, we can make the following recommendations:

7.1 Enlightenment campaigns

Local authorities should embark on a major enlightenment campaign to create awareness about the environmental side of beekeeping and honey hunting. Beekeepers and farmers should be made to understand the link between the abundance of flowering plant species in their farms and the amount of honey they can harvest. They ought to become aware of the losses attendant to unsustainable harvesting practices such as cutting of trees and burning of bushes. Farmers need this kind of consciousness which will hopefully help preserve trees within the farming system. The necessary public enlightenment effort is unlikely to come from local authorities without outside support.

In addition, agricultural development projects or other government agencies should lead (in conjunction with researchers and institutions) efforts to propagate multipurpose tree species on farmers' fields.

7.2 Artificial beehives

Policy must be directed towards teaching beekeeping and honey hunting skills needed to use artificial beehives in order to reduce dependence on naturally intruded honey combs. Even if this is achieved, the question of availability of adequate sources of bee forage keeps the issue of plant species depletion through unsustainable extraction practices on the agenda.

7.3 Enforcement of relevant laws

Often, in developing countries, environmental problems persist not only due to a dearth of relevant legislation but also as a result of lack of resources and/or political will needed to implement existing laws. In Enugu State of Nigeria, for example, an existing edict on bush burning has never been enforced probably. There is need for a review of the implementational procedures of central, state and local environmental laws in order to ensure that concrete steps are taken to translate precepts and statements of intension to action at local levels.

7.4 Institutional organization

It is expected that beekeepers'/honey hunters' cooperatives, apart from increasing the people's access to loans, training and other assistance will constitute the nucleus of much needed local institution building in non-timber forest resource management. Cooperatives formed by stakeholders could also carry out monitoring and policing duties in concert with local authorities, reporting violators of rules governing extraction, especially in common property areas.

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