

ASSESSING LOCAL PERSPECTIVES IN A FORESTED LANDSCAPE OF CENTRAL CAMEROON

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ABSTRACT

Decision makers require better understanding of local people's needs in tropical forested landscapes to enable more locally relevant and sustainable conservation. The Center for International Forestry Research (CIFOR) developed a series of survey methods that assess the perceptions and priorities of forest dependent people with regard to their environment. These methods were applied in a fragmented forest landscape in Central Cameroon, near a small forest reserve. The results show that despite the importance of agriculture for food and income, people still rely on the forest for most aspects of their livelihoods. However, people's relationships with the forest are changing, potentially leading to increased conflicts and resource degradation. These issues are not easily captured in sociological surveys, but the methods applied generated insights into people's views and preferences regarding the forest and provide grounds for negotiation and compromise between the stakeholders. Future work will link people's preferences to the results of a biodiversity survey.

Key words: humid forest, multidisciplinary landscape assessment, community participation, livelihoods, local values, conservation

INTRODUCTION

Biodiversity conservation and the well being of local people are both major concerns in tropical rainforest regions. Decision makers are required to preserve biodiversity, generate revenues and develop forest regions. Local people, depending on forest goods and services, are often severely affected by restrictions on their use of the forest, commercial harvesting, conversion to other uses and degradation, but this is rarely recognized by developers (and conservationists) who continue to see them mainly as an obstacle (Redford and Stearman 1993, Terborgh 1999, Oates 1999, Schwartzman *et al.* 2000, Brockington and Schmidt-Soltau 2004). In contrast to commercial enterprises and conservationists, the views of local communities often remain unheard by policy and decision makers, so their priorities and needs are easily overlooked (Sharpe 1998, Lawrence *et al.* 2000, Berg and Biesbrouck 2000 and Sheil *et al.* 2002). Yet, relevant and sustainable land use planning that can benefit both people and other outcomes

requires understanding and enunciation of local preferences. Such appreciation will facilitate the recognition of opportunities for collaboration and negotiation, as well as help to avoid predictable conflicts.

The Center for International Forestry Research (CIFOR) developed and tested a series of survey methods to assess local communities' perceptions and priorities with regard to their environment in East Kalimantan, Indonesia. These methods linked 'conventional' forest biodiversity assessments with information on local people's perceptions, needs and preferences (Sheil *et al.* 2002). That study among other results, has helped identify locally important plants and animals that are harmed by reduced impact logging practices (Sheil *et al.* 2006). In order to validate and test them, the methods have been adapted and applied in different countries (see <http://www.cifor.cgiar.org/mla>). In Cameroon, we used this approach in a village on the edge of the Ottotomo forest reserve. Previous CIFOR work had examined the relationship of local communities and the local administration (Jum and Oyono 2005). Our survey was applied with the intention of developing communication and improving the understanding of local perceptions and needs in order to benefit local management.

Study site

The study area is located in the semi-deciduous rainforest zone of Cameroon (Figure 1). The climate is equatorial continental with average temperatures of 23–24°C and a mean annual precipitation of 1450–1750 mm/year. The landscape is moderately hilly with rock outcrops and narrow inundated and often swampy river valleys (mean altitude around 600m). Soils are ferralitic and chemically poor (Ségalen 1967). The vegetation is a mosaic of intact and degraded forests (Santoir 1995). The area was part of the expansion zone of cocoa farming in the 1920's (Santoir 1992) and is considered a hotspot for deforestation (GFW 2000). Large mammals are absent, although the reserve is said to harbour chimpanzees (*Pan troglodytes* Blumenbach). Although the map in Figure 1 shows the forest surrounding the reserve as "dense moist forest", in reality, most of it has been cleared or severely degraded, particularly to the east and southeast of the reserve.

The Ottotomo reserve (2950 ha) was established in 1930 by the French colonial authorities as a timber production forest (ONADEF, 1999) and has been controlled actively by the former National Forestry Development Agency, Office National de Développement des Forêts (ONADEF), since the late nineties. The reserve is surrounded by 14 villages that border the reserve and encroachment is reported to be increasing, leading to conflicts with the authorities. In Cameroon, all land and natural resources belong to the state but local communities have usufruct rights on (limited) timber and non-timber forest products for personal use (MINEF 1994). The management plan of the reserve aims to improve the benefits of forest use for local people. There is also a long-term goal to hand over the management of the reserve to the local community (ONADEF 1999).

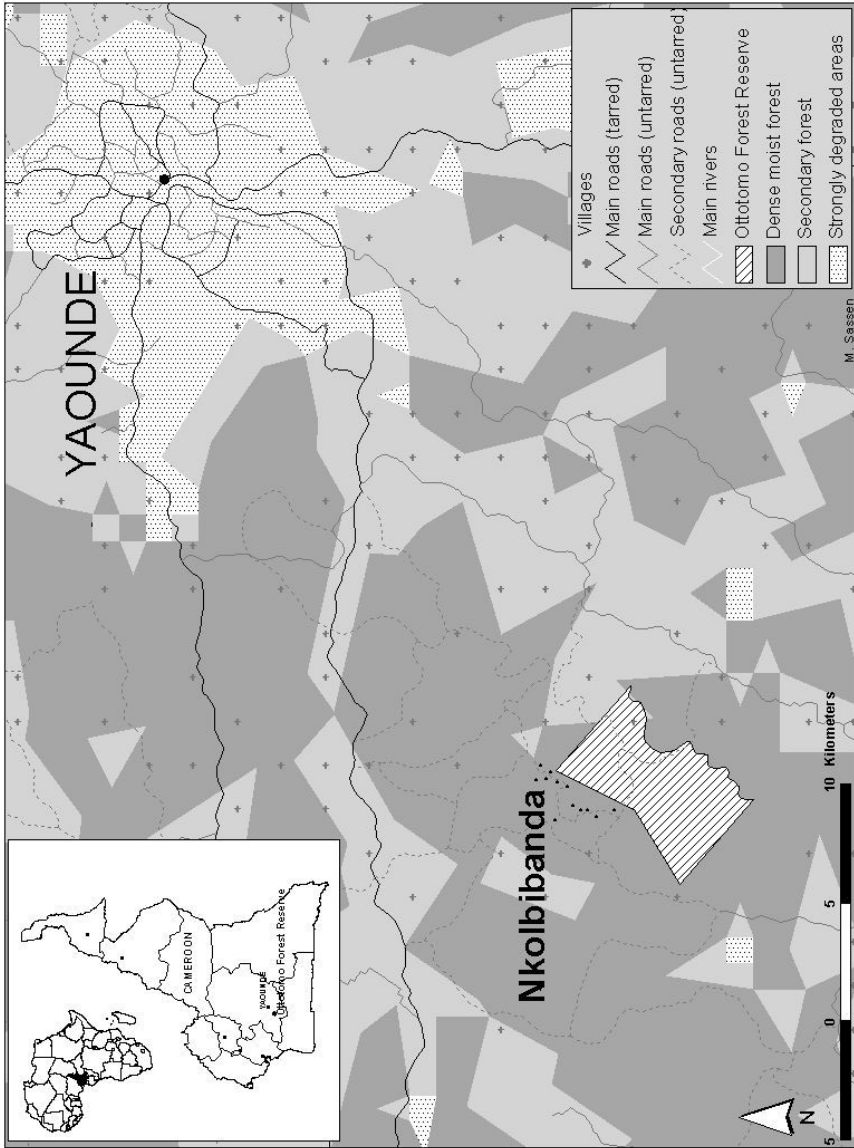


Figure 1. Nkolbibanda and its environment. Information adapted from data in GFW Data Warehouse at <http://www.globallforestwatch.org> (TREES vegetation map of Central Africa (1997), roads and towns (1998)), completed with own data.

METHODS

At the time of the study (2003), Nkolbibanda was a village of about 27 households, all belonging to the Ewondo ethnic group. As in the whole Cameroonian forest zone, swidden agriculture is the basis for subsistence and traditionally a woman's activity. In the past most men had cocoa plantations but many were abandoned when world market prices collapsed in 1988. People also collect a range of forest products – from fruits and nuts to caterpillars and medicinal plants. Small mammals are trapped for consumption or sale. Cash incomes are generated through small scale trade in agricultural and forest products and exchanged for commodities such as alcohol, petroleum, and soap etc. Traditionally women sell most agricultural products and some were organized in groups working on collective fields and marketing most of the produce. Access to health care, schools and markets was difficult as the only access road ended in the village. About a third of the village's household heads had lived and worked in town before coming back to the village to retire, or for economic or family reasons. Almost half of the households received additional income from outside, usually provided by grown-up children or pensions paid to civil servants. Because of the lack of secondary schools nearby, most children are sent to Yaoundé and only come back for holidays (during the study). People hoped that education would help their children have a better future, preferably as “big civil servants”.

The methods used have been described fully by Sheil *et al.* (2002). A 4 week village-based survey collected data on people's perceptions and priorities with regard to their environment. The techniques used included community meetings, mapping, a survey of 25 households (93%), as well as group discussions and scoring exercises.

Although most people spoke and read French, translation by a local NGO collaborator provided clarification and made people more comfortable. The area has seen several environmental and development actors as well as outsiders coming to collect medicinal species and other high value forest products. At first, people were suspicious that we would be making money with their knowledge. Consistency in answering questions, avoiding creating unrealistic expectations and avoiding involvement in internal conflicts proved helpful in reducing this suspicion. Community mapping, discussing village history and traditions related to the use of land and forest also helped to develop a shared framework of understanding and enhanced mutual trust. After the study, we presented some of the main results to the village and people provided feedback and clarification.

Group scoring exercises and discussions helped the surveyors to understand the relative importance of the different land types making up the people's environment for different livelihood uses and values (Table 1), the importance of the forest currently, and the relative importance of wild versus cultivated sources of plants and animals. Land types and value or use categories were adapted to local circumstances and preferences. Four groups, based on gender and age (younger or older than 35 years) were invited to distribute 100 marbles

TABLE 1

Use and value categories
(adapted with the local community from the methods by Sheil *et al.* (2002))

| Use/value category | Explanation (as agreed with the villagers) |
|----------------------|---|
| Food | All foods and drinks |
| Medicine | Medicinal plants and animals |
| Light construction | Poles and thatching materials for temporary shelters (official ceremonies), materials for furniture making |
| Heavy construction | Poles, cut timber and cordage for house construction |
| Tools | Plants used for tools in agriculture, hunting, fishing, domestic chores, and plants and animals used as poison/ bait for fishing. |
| Firewood | Wood for cooking |
| Basketry/ropes | Ropes (not for house construction), string, weaving materials |
| Ornaments/ceremonies | Ornaments for festivities/ceremonies or items used in rituals. |
| Marketable items | Products that can be sold |
| Hunting place | Area good for hunting, usually indicated by the presence of fruiting species and/or certain animals |
| Recreation | Area or forest products used for entertainment |
| The future | How people see the future in relation to their environment |

on plates with cards representing different use/value categories according to their relative importance – the so-called Pebble Distribution Method (PDM) (Sheil *et al.* 2002). Participation was voluntary and group size varied between 10 and 15 people, representing a reasonable cross-section of the community. Final scores were the result of group discussion and consensus. The concept of importance was not explicitly defined beforehand, as we wanted it to represent local views. Following Sheil *et al.* (2002), the scoring was based on the assumption that importance can be expressed as a holistic rating of overall relative preferences (We avoided using words related to monetary value). (Sheil and Wunder 2002, Sheil *et al.* in press). Each such exercise was followed by a request from the surveyors for clarification of the reasons behind the scores. Explanation of the scores sometimes triggered new discussions and changes in the scoring.

In the analysis, we assumed that the categories of use and the land types are all inclusive and non-overlapping, also that the participants understood the exercises and the scores did not arise by random (Sheil and Liswanti, 2006). (If they should be random, each of the 9 land types would have the same probability (1/9) of being scored highest. {The chance of this happening in each exercise is very small, around 1.5×10^{-4} for the overall group scores or 1.5×10^{-12} for the scores per use category (according to the binomial probability distribution).} Consistency in scoring patterns between groups was assessed by calculating Spearman rank correlations between group scores. Chi² tests on the scores are not appropriate because the counts in the exercises are not independent.

RESULTS

Local perceptions on their environment

During community meetings people said it was becoming more difficult to get new land because of the reserve. However, only 3 out of 25 household survey respondents mentioned land shortage caused by the reserve as a threat to the community. Indeed, the biggest problems they reported were related to health, schooling and isolation.

The household surveys provided us with insights into people's views on the dangers threatening the environment and on the role of forest in ecosystem processes and ecological values.

Table 2 shows the top 5 dangers to the forest given in the interviewed households. Tree felling was seen as the most dangerous because it destroys useful trees and the forest ("trees protect the forest"), for future generations. A few people mentioned that the forest provides pure air. Fire reportedly destroys litter and earthworms that contribute to soil fertility. Interestingly, some cited the spread of chemical fertilizers ("they empty the soil after first use") which they rarely use. A few people mentioned that over-hunting would upset the functioning of the forest.

TABLE 2

Local views of threats to the environment and solutions to degradation

| Questions to the head of household | Response (number of answers among 25 households; more than one response allowed) |
|--|--|
| <i>What is disturbing the maintenance of forest (including the river) functions and uses (top 5 answers)</i> | |
| Tree felling | 24 |
| Fire | 15 |
| Chemical fertilizers (excess) | 4 |
| Poaching (by outsiders) | 2 |
| Excess hunting (themselves) | 2 |
| <i>What will you do if the forest disappears?</i> | |
| Get information on how to use fertilizer/use fertilizer | 13 |
| Die (the wind will take of the roofs and let diseases in) | 9 |
| Give enough time for regeneration after cultivation | 6 |
| Plant (useful) trees | 4 |
| Ask the state for help (i.e. fertilizers) | 4 |
| Ask god for help | 3 |
| Move to find new land | 2 |

People feel they have little choice regarding the threats they cause to the forest, but they blame outsiders for causing more damage than they do. Most found it difficult to imagine that the forest might one day disappear; and many said: “the forest can never finish”. Nevertheless, in case it should happen, soil fertility was the first concern, and most respondents proposed getting fertilizers for their fields (Table 2). Some said they would die because without the forest to protect them the wind would take off the roofs and bring in diseases.

Measures proposed against forest degradation were mostly aimed at insuring forest regeneration after cultivation, such as planting useful trees (Table 2).

During the study, the elders often said that nowadays traditions and taboos concerning the use of the forest are no longer heeded or are changing. Places in the forest protected by tradition are reportedly still important but Christianity and modern life made them “disappear”, meaning that people stopped believing in them. The use of medicinal species was the most frequently and consistently (in each household we interrogated) mentioned traditional practice that still remains.

We asked people which animals and plants protect the forest and its use to them. The most important single species that was listed was Bubinga (*Guibourtia tessmannii*, (Harms) J. Leonard), a powerful medicinal and culturally important medicinal tree. There are strong restrictions on its use (see Mallart-Guimera 1969, cited in FAO 1990). Although it clearly still remains very important, it is also a very valuable timber species and individuals will sell it to outsiders when they need cash. Animals protecting the forest include Gorillas (*Gorilla gorilla*, Savage and Wyman) and Chimpanzees (*Pan troglodytes*, Blumenbach), although the first are not found in the area anymore. Totem and bad omen animals, such as the tree hyrax (*Dendrohyrax dorsalis*, Fraser), scare people away, though it has important medicinal properties and value.

Fruiting forest species and seed dispersers are considered important for maintaining forest values. People know about the dispersal strategies of many (fruit) tree species and several animals are known to: “help plant trees”. People could often specify which animal disperses the seeds of which tree (e.g. bats disperse *Ricinodendron heudelotii* (Baill.) Pierre ex Heckel, an important local condiment).

SCORING THE IMPORTANCE OF LAND AND FOREST FOR PEOPLE'S LIVELIHOODS

Land types

According to the villagers more than half their territory was covered with forest (including *Raphia* swamps), the rest was agriculture (fields and fallows) and habitation. The land types identified with the community included

- the village,
- abandoned houses,
- food producing fields,
- young fallows (<10 years),
- old fallows (>10 years),
- cocoa plantations,
- streams,
- swamps and
- forest.

The village included the homesteads and their immediate surroundings, comprising the yards and gardens with some food crops, fruit trees and medicinal plants. Abandoned homesteads were found both outside the habitation area ('village') and inside. Fallows provide various products, from harvestable cassava roots to fruit trees. Cocoa plantations, often contain planted or remnant fruit trees. Swamps are dominated by the multi-use raphia palm (*Raphia regalis* Becc., for construction, furniture, fruits, larvae, palm wine etc.). They also contain important rattan and game (rodents). The villagers used the term 'forest' for any significantly wooded area in their territory, but distinguished four main forest types:

- Old growth forest, called 'dense forest' (or 'primary forest'), that had not been cleared for agriculture in living memory; "not since our grand parents". It was usually situated further from the houses than secondary forest,
- Secondary forest, re-growth older than 25 years but not yet qualifying as 'dense forest',
- Small pockets of tall remnant trees close to the houses, called nearby forest,
- Seasonally inundated forest found in lower lying areas, generally along streams.

Forest types were less distinct from each other than the other land types (e.g. nearby forest is in fact secondary vegetation) creating a risk of overlap. Nevertheless, as they were cited, we wanted to know whether they had specific importance.

Overall importance

Different groups in a community have different priorities and preferences regarding their environment. To explore this, we asked people to score the different land and forest types according to their overall importance for their livelihoods (Table 3). We then tested the correlation between the scores of the four gender and age groups (Table 4) as described in the methods. The scoring patterns of older women and men were highly consistent ($R_s=0.889$, $p<0.001$). They considered the village, forest and fields to be the most important land types overall. Correlation between the scores of young women and older women

TABLE 3

Scores for the overall importance of different land and forest types per group

| | Men | Women | Men | Women | Average | | | | |
|--------------------|-----------|-----------|-----------|-----------|-------------|-------------|-------------|-------------|-------------|
| | >35yrs | >35yrs | <35yrs | <35yrs | >35yrs | <35yrs | Men | Women | All |
| Village | 16 | 20 | 13 | 18 | 18.0 | 15.5 | 14.5 | 19.0 | 16.8 |
| Abandoned houses | 6 | 5 | 6 | 5 | 5.5 | 5.5 | 6.0 | 5.0 | 5.5 |
| Plantation (cocoa) | 8 | 9 | 12 | 13 | 8.5 | 12.5 | 10.0 | 11.0 | 10.5 |
| River | 16 | 10 | 12 | 11 | 13.0 | 11.5 | 14.0 | 10.5 | 12.3 |
| Swamp | 8 | 10 | 10 | 8 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 |
| Fields | 16 | 18 | 9 | 12 | 17.0 | 10.5 | 12.5 | 15.0 | 13.8 |
| Young fallow | 8 | 5 | 12 | 9 | 6.5 | 10.5 | 10.0 | 7.0 | 8.5 |
| Old fallow | 6 | 4 | 15 | 11 | 5.0 | 13.0 | 10.5 | 7.5 | 9.0 |
| Forest | 16 | 19 | 11 | 13 | 17.5 | 12.0 | 13.5 | 16.0 | 14.8 |
| Total | 100 | 100 | 100 | 100 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Dense forest | 35 | 28 | 50 | 21 | 31.5 | 35.5 | 42.5 | 24.5 | 33.5 |
| Secondary forest | 25 | 40 | 19 | 28 | 32.5 | 23.5 | 22.0 | 34.0 | 28.8 |
| Nearby forest | 20 | 32 | 31 | 32 | 26.0 | 31.5 | 25.5 | 32.0 | 28.0 |
| Inundated forest | 20 | 0 | 0 | 19 | 10.0 | 9.5 | 10.0 | 9.5 | 9.8 |
| Total | 100 | 100 | 100 | 100 | 100 | 100.00 | 100.00 | 100.00 | 100.00 |

Note: highest scores are in bold

TABLE 4

Correlations between the groups' scores for the overall importance of different land types (Spearman rank correlation coefficient and p value)

| | Men>35yrs | Women>35yrs | Men<35yrs | Women<35yrs |
|-------------|----------------------|---------------------|--------------------|-------------|
| Women>35yrs | 0.889** (p=0.001) | 1.000 | | |
| Men<35yrs | 0.000 (p=1.000) | -0.120 (p=0.759) | 1.000 | |
| Women<35yrs | 0.642* (p=0.062) | 0.648* (p=0.059) | 0.453 (p=0.221) | 1.000 |

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.1 level (2-tailed)

and men was modest ($R_s=0.648$ and 0.642 respectively) and only just significant ($p<0.1$). The scoring pattern of younger men was not significantly correlated to the other groups. This is largely due to their high score for old fallows. According to them these provide essential soil fertility, crop remains and seedlings.

Average scores over groups suggest a higher relative rating of forest by older (17.5) compared to younger (12) people and by women (16) compared

to men (13.5), although statistical certainty would require repeating the process with more groups. Men rated dense forest higher than women who preferred secondary and nearby forest. Women often stressed the importance of forest as a source of agricultural land.

Importance for different uses

After the assessment of overall importance, we asked the groups to repeat the exercise but for separate use and value categories. Table 5 summarizes the results. Forest is overall seen as the most important land type for all uses except marketable products and recreation. The scores of the forest and the village for the future are very close. The most important marketable products are agricultural products. In this village forest products are an important source of subsistence (food), but only a source of occasional income.

The village as the basis for people's lives (houses, family) and the forest as the basis for their livelihoods scored highest for the future.

Among the forest types, dense forest was preferred for most uses (Table 5). Secondary forests were considered very important for food because they contain useful trees planted in land that previously had been fields; these were nearer and easier to clear for fields than dense forest. Dense forest contains favoured fruits, vegetables and game (such as blue duiker (*Cephalophus monticola*, Thunberg)). Dense forest is also considered to be the 'source' for all other land types that are useful to people.

People give more precise answers to narrowly defined questions than when asked for holistic judgements. When assessing the overall importance of land and forest types, the many factors people need to include in their assessment seem to invite a cautious response. Looking at different aspects of their livelihoods (food, medicine etc.) separately should make it easier for people to focus, with less fear of undervaluing any aspect. To test this, we counted the number of zeros given in each use and land category (Table 6). We would expect to see less zeros in narrowly defined categories, that include very specific products or locations, than in broad and fuzzy ones. As Table 6 shows, there were no zero scores for "overall" importance. A very narrow use was that of basketry and ropes (20 zeros), which requires specific species found in limited areas. Medicines, marketable items and hunting places represent broad categories in that they are found in most land types: people said that they plant, keep or find medicinal plants near their houses and all over the village's area, many things that are used by people are also sold, and traps are set-up anywhere between the houses' gardens and the forest. Table 6 also illustrates that the forest has some importance for all categories for each group.

Correlations between scoring patterns for each specific use or value varied a lot, and no clear pattern emerged. The variation can however be explained by the different roles, activities and knowledge of each group leading to a multitude of perceptions for each category. The details will not be presented here as they are beyond the scope of this paper.

TABLE 5

Summary of the importance of land types for different uses. The figures represent the mean of four groups (men/women, young/old)

| | Food | Medicine | Light Construction | Permanent Construction | Tools | Firewood | Basketry/corbage | Ornaments/ceremonies | Marketable items | Hunting place | Recreation | The future |
|--------------------|--------------|--------------|--------------------|------------------------|--------------|--------------|------------------|----------------------|------------------|---------------|--------------|--------------|
| Village | 7.25 | 12.50 | 6.75 | 11.25 | 8.25 | 3.75 | 0.00 | 14.50 | 11.00 | 6.25 | 18.75 | 17.75 |
| Abandoned houses | 3.50 | 9.50 | 3.00 | 2.00 | 2.50 | 7.00 | 0.00 | 4.50 | 6.25 | 7.00 | 6.25 | 7.25 |
| Plantation (cocoa) | 7.25 | 13.75 | 8.25 | 6.00 | 11.50 | 16.25 | 4.00 | 10.75 | 13.25 | 12.25 | 15.75 | 11.50 |
| River | 12.75 | 5.50 | 4.50 | 12.75 | 8.75 | 0.50 | 0.00 | 2.50 | 7.50 | 9.50 | 19.50 | 11.00 |
| Swamp | 11.25 | 8.50 | 27.00 | 16.75 | 13.00 | 0.75 | 15.50 | 15.00 | 12.00 | 12.75 | 9.50 | 10.25 |
| Fields | 16.75 | 8.75 | 3.50 | 4.25 | 7.00 | 11.00 | 0.00 | 1.75 | 22.75 | 12.00 | 13.25 | 11.50 |
| Young fallows | 9.25 | 5.75 | 5.00 | 4.50 | 4.00 | 14.25 | 12.25 | 8.75 | 8.00 | 8.25 | 0.00 | 6.00 |
| Old fallows | 11.25 | 8.50 | 12.25 | 9.00 | 10.75 | 13.25 | 18.00 | 11.75 | 6.25 | 10.00 | 1.50 | 6.50 |
| Forest | 20.75 | 27.25 | 29.75 | 33.50 | 34.25 | 33.25 | 50.25 | 30.50 | 13.00 | 22.00 | 15.50 | 18.25 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| Dense forest | 34.00 | 43.25 | 32.00 | 43.00 | 49.50 | 28.75 | 50.75 | 25.00 | 40.50 | 42.50 | 28.00 | 37.25 |
| Secondary forest | 35.50 | 28.00 | 24.25 | 26.25 | 24.75 | 28.00 | 19.75 | 24.00 | 24.25 | 24.25 | 24.50 | 19.50 |
| Nearby forest | 22.75 | 22.75 | 28.25 | 18.25 | 14.00 | 40.75 | 19.25 | 31.50 | 21.25 | 22.00 | 37.00 | 24.50 |
| Inundated forest | 7.75 | 6.00 | 15.50 | 12.50 | 11.75 | 2.50 | 10.25 | 19.50 | 14.00 | 11.25 | 10.50 | 18.75 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100 |

Note: highest scores are in bold

TABLE 6
Number of “zero” responses among all 4 respondent groups

| Use/value category | Village | Abandoned houses | Plantation (cocoa) | River | Swamp | Fields | Young fallow | Old fallow | Forest | Total |
|----------------------|---------|------------------|--------------------|-------|-------|--------|--------------|------------|--------|-------|
| Overall | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Food | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Medicinal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Light construction | 1 | 2 | 1 | 2 | 0 | 2 | 1 | 1 | 0 | 10 |
| House construction | 0 | 2 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 6 |
| Tools | 0 | 1 | 1 | 1 | 0 | 1 | 2 | 1 | 0 | 7 |
| Firewood | 1 | 1 | 0 | 3 | 3 | 1 | 0 | 0 | 0 | 9 |
| Basketry/cordage | 4 | 4 | 3 | 4 | 1 | 4 | 0 | 0 | 0 | 20 |
| Ornaments/ceremonies | 0 | 2 | 0 | 3 | 1 | 3 | 1 | 1 | 0 | 11 |
| Marketable items | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Hunting place | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Recreation | 0 | 1 | 0 | 0 | 1 | 1 | 4 | 3 | 0 | 10 |
| Future | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 3 |
| Total | 8 | 15 | 7 | 14 | 6 | 14 | 10 | 7 | 0 | 0 |

Some results were unexpected and appeared illogical. For example, young men gave fields the highest score as a source of firewood. When asked however, they explained that a recently opened field provides a lot of cut wood. Women gave the same reason for ranking dense forest highest amongst the forest types: old forest that is cleared for agriculture provides good firewood, but according to the men, dense forest was too far away to collect firewood.

Evolution of the importance of forest in time

According to women and youths the forest would become less important in time (Table 7) because as people get paid jobs they depend less and less on the forest. Women also said “Before, the forest was richer because people did not exploit it the way they do now”. Many perceive a decline in soil fertility and wildlife. Older men, on the contrary, thought that these declines will make the forest increasingly important in time. They told us that researchers and development workers had made them realize the importance of the forest: “Our ancestors did not know the importance of the forest outside [subsistence] hunting, gathering and construction, but now, with increased knowledge, the perceived value of the forest will increase”.

Figure 2 shows the change in relative importance of different forests uses and values in time. The scores have been translated into ranks for simplicity. Uses for which materials are increasingly being replaced by modern implements become less important in time, light construction and basketry and ropes: there was only one old man left who made baskets. The forest is seen to remain fairly important for basic needs like food, firewood, medicinal uses and tools. According to the villagers, game for hunting was probably going to decline and thus become less important. Even though the value of forest for marketable products is much higher now than in the past, the perceived decline in resources explains the lower score in the future. Despite widespread short time horizons, the importance of the forest was seen to increase in the future.

TABLE 7

Scores for the importance of forest over time for each group

| Group | 30 years ago | Present | 20 years from now | Total |
|--------------|--------------|---------|----------------------|-------|
| Men >35yrs | 20 | 30 | 50 | 100 |
| Women >35yrs | 40 | 35 | 25 | 100 |
| Men <35yrs | 50 | 29 | 21 | 100 |
| Women <35yrs | 50 | 30 | 20 | 100 |

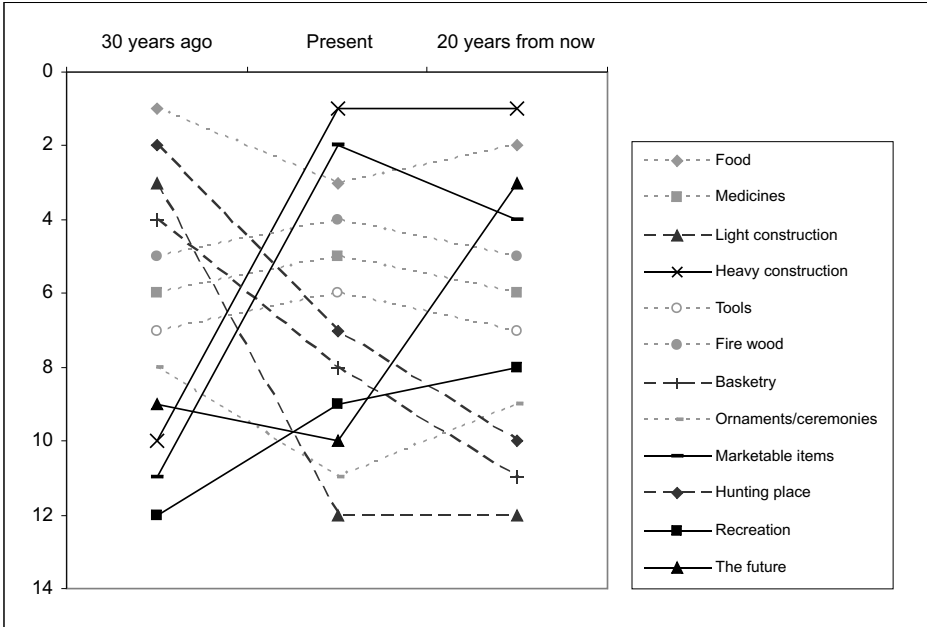


Figure 2. Change in the relative importance of forest over time per use category (averaged ranks over groups)

Importance of different sources of plant and animal products

Animal and plant sources of products are almost equally important, although older people seem to value plants more (“they have more uses”) (Table 8). Women’s high scores for cultivated plants reflect their role in agriculture. On average, wild products scored higher (53) than cultivated/farmed (27) or purchased products (20). Wild animals are an important source of protein and cash for the community. According to the older men, who all hunt using traps, most forest animals are caught in (nearby) plantations, swamps and fields. (Can you explained why wild products were rated of the highest importance?)

Some younger men had recently started agricultural groups for market production of cassava; this change from traditional patterns was reflected in their score for purchased plants (seedlings in their case). Young women preferred domesticated animals to wild ones. According to the older people this reflected a serious lack of knowledge on the part of the younger generation. Nevertheless, these results reflect a change in attitudes towards perhaps a less traditional and more commercially oriented outlook on land and forest use.

TABLE 8

Scores for the importance of different sources of products

| Product and source | Women <35yrs | Women >35yrs | Men <35yrs | Men >35yrs |
|------------------------------|--------------|--------------|------------|------------|
| Wild plant from forest | 15 | 5 | 17 | 15 |
| Wild plant, not from forest | 10 | 11 | 17 | 6 |
| Cultivated plant | 25 | 18 | 13 | 11 |
| Purchased plant | 10 | 9 | 9 | 15 |
| Wild animal from forest | 20 | 13 | 13 | 15 |
| Wild animal, not from forest | 5 | 14 | 20 | 17 |
| Domestic animal | 5 | 20 | 5 | 11 |
| Purchased animal | 10 | 10 | 6 | 10 |
| Total | 100 | 100 | 100 | 100 |

Note: highest scores are in bold

DISCUSSION

Using scoring exercises to assess people's perceptions

Reaching a common understanding of terms and concepts is perhaps the biggest challenge in studies of people's perceptions. For example, in another study of forest values in Western Cameroon, researchers first thought that forest was not particularly important to local people until they found out that 'forest' was only used for an undisturbed and infrequently used area (Brocklesby and Ambrose-Oji 1997). Prevailing prejudice, such as that of forest dependent people being ignorant or backward, can also influence people's answers (Sharpe *et al.* 1998 and Jeanrenaud 1991).

Generating numbers through scoring exercises can suggest a precision that is not a reflection of reality. The numbers obtained from scoring exercises should be considered as relative ratings and extremes provide more information than two very close scores (5 and 40 is a large difference in preference while 17 and 18 is not). The value of this type of exercises lies as much, if not more, in the explanations sought for and given after each scoring round as in the scores themselves. Discussion clarified apparent inconsistencies and provided additional insights in the way people perceive their environment. Scores were both a reflection of preference, based on usefulness, effectiveness, taste, monetary values etc., as well as of actual use, for various reasons of accessibility and convenience. These criteria varied according to gender and age, reflecting traditional roles of men and women but also possible changes in attitude by younger generations.

Asking general questions affects the accuracy of people's responses, their reflection of reality and misses important information (see also Sheil and Liswanti 2006). Limiting questions to specific aspects of people's lives, such as food or medicine or house construction, and defining these as narrowly as possible, creates an opportunity for more focused reflection and discussion.

Perceptions, attitudes and change

The forest is the basis for Bantu people's identity, culture and social system (i.e. Guyer 1984; Diaw and Oyono 1998, Sharpe 1998; Oyono 2002). Yet, Brocklesby and Ambrose-Oji (1997), state that "it is not the forest, but the land that it occupies which is valued – both in terms of ownership and, more importantly, in terms of its use value to local actors". Indeed, people in our study, especially women, repeatedly said that the importance of forest included its importance as a source of land for agriculture. Yet, the survey also revealed that forest itself has important values for people, as a source of many products, as habitat for game and even as protection against diseases.

Despite the strong dependence on agriculture for food and income, forest was considered the most important land type for most uses. Dense forest was generally the most highly valued forest type. It contains more species for many uses (Sassen, unpublished data) but also, according to Diaw (1997), the access for forest product gathering in this forest type is generally open. There is no (or no more) lineage claim on it (Diaw 1997). Our perceptions of traditional patterns that link "forest" in Bantu societies to notions of manhood (Guyer, 1984, Berg and Biesbrouck 2000), led us to expect higher relative scores for forest by men than by women, but this was not always the case. Still, individual results of the scoring exercises were often explained by traditional responsibilities of the gender (and age) groups.

People have conflicting attitudes to and interests in the forest. They acknowledge the threats, but the forest and its resources are the only means available to maintain or improve their livelihoods. Besides, even if they report diminishing resources, most people tended to see the forest as infinite (see also Lewis 2002). Thus, some people started pineapple or oil palm plantations and sold valuable timber, fruit or medicinal trees to outsiders (causing jealousy and conflict in the village). Prevailing uncertainty about the future also causes people to have short time horizons and adapt as situations arise. When asked about his feelings on the disappearance of the greatly appreciated wild pig about 30 years ago, a village elder's answer was: "Ah that is just the way we are, we eat it until it is finished and then we just find something else!" People could either feel powerless in the face of change, or, more simply, the available alternatives (duikers, large rodents) are satisfying enough for them not to worry about the disappearance of one particular species. Alternatives will probably run out one day and people will either eat less animal protein than they already do or have to turn to domestic meat, if they can afford it.

People's answers are affected by external influences or may be biased in the hope of accruing some benefit – e.g. by proposing useful tree planting to protect the forest (agroforestry was promoted in the area) or by claiming a shortage of land due to the reserve. Growing access to information, schooling and health care influence people's aspirations and perceptions with regard to forests. In Cameroon, more than 20% of rural children over ten go to school in town, and most will only return to their village when forced by unemployment

or family circumstances (Kemadjou and Sunderlin, 1999; Boudigou *et al.*, 2000). According to Berg and Biesbrouck (2000) external influences encourage people to see the forest and forest resources more as commodities. This study provided some indications of change, through the different scoring patterns of older and younger groups and the perceived evolution of the importance of forest in time. These are important issues, and our methods permit a broader assessment and crosscheck of people's perceptions and attitudes than more conventional consultations with local communities, but the implications remain unclear. More research is needed on how traditional knowledge, cultural identity and perceptions of the forest environment are changing, and the implications for forest resource use.

The Ottotomo Forest Reserve is relatively small and surrounded by village territories and more or less degraded forests, requiring management that integrates local values. People's acknowledgement of the threats that their activities pose on the forest should be used as a basis in negotiations on local regulations, and provide opportunities for conservation projects that would benefit local livelihoods. Useful trees for people are also important sources of food for preferred wildlife species and, as many perceive a decline in game species, protection of wildlife habitat may be practicable. People's views of the importance of the forest in and for the future are arguments for conservation, but a conservation that includes local values.

A study by Ambrose-Oji and others (Ambrose-Oji *et al.* 2002) assessed the values of forest biodiversity to local communities on Mount Cameroon (North-western province) with the same goal of improving local people's voice in negotiations of management and conservation plans. Their approach was different in that they sought to assess how local communities defined biodiversity. The resulting criteria were then used to assess the biodiversity value of land types and species from a local perspective (Ambrose-Oji *et al.* 2002). We assessed land types primarily on their livelihood value, not their biodiversity value, from a local point of view. However, a plant biodiversity and an ethno botanical survey of the different land types was conducted as part of the study and further analysis will investigate the links between people's preferences and biodiversity. The study on Mount Cameroon also addressed aesthetic, moral and ethical, symbolic and humanistic values, but as Ambrose-Oji *et al.* (2002) acknowledge, these are difficult to quantify. They were not included in our study, which focussed mainly on utilitarian values.

CONCLUSIONS

Few studies have tried to quantify local communities' perceptions of the importance or value of resources beyond monetary values (i.e. Campbell *et al.* 1997, Sheil and Wunder 2002, Lynam *et al.* 2003, Lawrence *et al.* 2000, Ambrose-Oji *et al.* 2002). Local people's relationships with their environment are complex and dynamic. Age, gender, religion, market economy, research,

development aid, education and many other factors all influence the way people perceive their environment. Changes in people's attitudes to the forest can lead to conflicts and resource degradation. However, until they are totally alienated from the forest by these forces or until the forest has disappeared; local communities represent important potential allies to conservation.

Although this type of study does not guarantee solutions to the problems in Ottotomo, the process of fact finding and the results should improve understanding of local perceptions and needs by the reserve management and other local government authorities and help to avoid future conflicts. Issues such as tenure insecurity and related short time horizons need to be addressed if people are to be involved in constructive and democratic negotiation and management processes.

It takes time to establish trust and a common framework of understanding with people, a process that is essential if studies like this are to have value. Bad reputations and unfulfilled promises can cost researchers a great deal in both time and erroneous information.

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