

Kokolopori Socioeconomic Survey: Report of Findings

I. Introduction

Country Background: Political and Economic Context

The Democratic Republic of the Congo (DRC) is in an era of peacemaking and country reconstruction that requires increased financial resources. As a result, the government intends to increase its exports, including timber. This situation increases the stresses on forests, wildlife and the conservationists who have to deal with these politics.

Description of the Landscape

The Kokolopori landscape can be described as a matrix of primary forest with patches of swampy and secondary forests. Three rivers constitute the main corridors: Luo, Lopori and Boongo rivers. The area astride the road is impacted by farming, though not at such level that it becomes a threat to the ecosystems' integrity. Whilst the banks of Luo river and Boongo are covered by pristine forests, those of Lopori river are covered by old secondary growths stemming from the history of former human settlements in years around 1930. This diversity of habitats allows for a high level of biodiversity.

The tropical forest ecosystems around Kokolopori are part of the second largest contiguous rainforest on the planet and are, along with the Amazon rainforest in South America, the "lungs of the earth" because their importance in generating oxygen and storing carbon dioxide. This region of undisturbed rainforests is also an outstanding and valuable area for biodiversity conservation and is home to many rare and endangered species including the bonobo, *Pan paniscus*.

Kokolopori: Demographics of the Community and Area of the Forest Reserve

Kokolopori is a community primarily settled by Mongandu people, with 35 villages divided into four groupements along a 40 mile road. The human population is low (7874 people, see Bonobo Clinic Interim Report, 2007) and population density is about 2 inhabitant/km². The nearest town is Djolu.

The surface area of the Kokolopori Bonobo Reserve is 4,785 km² (1847 square miles).

Educational Opportunities

Kokolopori itself has eight primary schools and two secondary schools. The only school of higher education in the region (a 40,000+ square mile area) is the Djolu Technical College (Institute Supérieur de Développement Rural or ISDR). This college, 50 miles away in the closest town to Kokolopori, is the only opportunity for talented youth in this very impoverished rural province to obtain a college education. Degrees in conservation management, sustainable agriculture and micro-enterprise development equip graduates to build local capacity and introduce low-impact development techniques. At present, however, the college is still lacking computers, an internet connection, electric power, a

library, and even a permanent campus. While the college has successfully been teaching and graduating students for five years now, its students will not be able to compete in today's global economy without these infrastructure improvements.

Goal of the Socioeconomic Survey and Information Exchange

The goal of the study described below was to observe and document Kokolopori residents' social and economic way of living, and to provide readers with socioeconomic data to use as a basis for designing conservation management plans suitable for the area. Data was collected through a sample survey and subsequent focus groups in each of the four groupements of Kokolopori.

II. Methodology

Research Effort and Duration

The socioeconomic surveys were conducted by a two person team over two months (March-May 2007.)

Sampling Method

We used village transect sampling, a method the team leader had previously learned in survey training at the Epulu Okapi Reserve in eastern DRC. Households were systematically sampled via a walk through the villages lying along the Kokolopori road, and selecting every fifth household. Houses away from the road generally belonged with one of the households next to the road.

We sampled 40 out of 845 households in Kokolopori, with a total of 138 respondents. All 138 respondents were male, both for the questionnaire and the subsequent interviews in the focus groups. The number of respondents from each groupement was roughly proportional to the population of that groupement (varying between 1.5 – 3% of the groupement population.) Women did not answer the questionnaire. In all households, wives told the team to speak with their husbands, both for responses to the questionnaire and subsequent interviews. The omission of women is thus a source of bias in the survey results.

We used a standardized questionnaire with questions relating to identification of the respondents and their households (location, gender, size and age composition of household, origin of household members, length of time in household of immigrants); and activities and affiliations of respondents, including affiliations in task groups or other social or economic groups such as church groups, farm associations, village committees, etc.; sources of monetary income; and types of hunting, fishing and agricultural activities.

Answers to questionnaires were used to calculate statistics (quantitative data) and focus group interviews provided complementary information (qualitative data) that increased the understanding gained from the questionnaire. The number of individuals in a focus group was not fixed. The focus groups were open and flexible to complete respondents' information in each village and involved other people in addition to the questionnaire respondents. Thus for example, ten questionnaires were passed to ten households in a village, then focus groups were interviewed in the common house in an informal discussion

targeting what was not clear from the answers of the respondents. In each groupement, we gathered at least one focus group made up of aged persons and youths for interviews.

The focus groups allowed more informal discussions, especially with hunters, fishermen, micro-entrepreneurs and farmers, which allowed us to understand more details of people's way of life and complex social group interactions. Women were not included in these discussions.

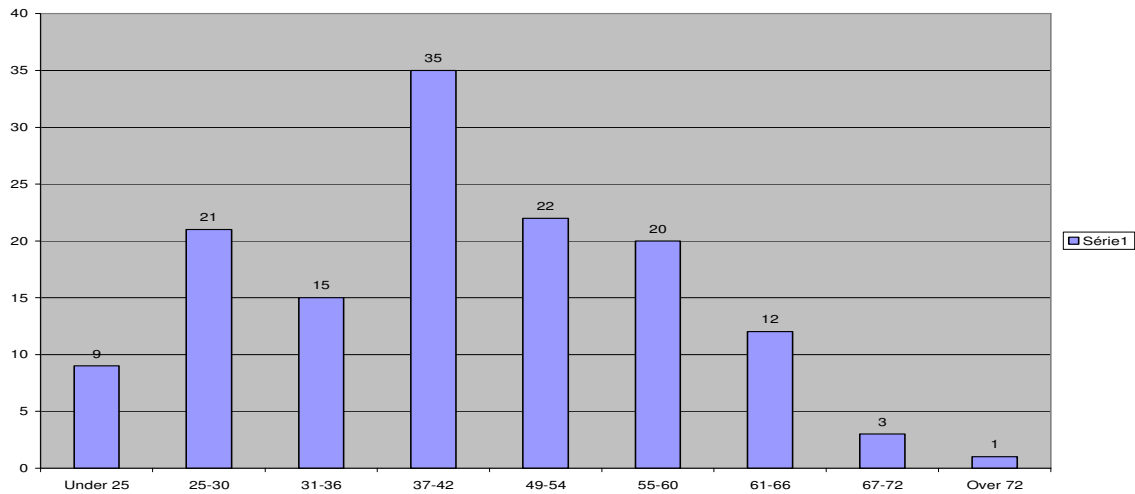
Sample area

Kokolopori estate was our sample area. We took advantage of SPIAF aerial photography maps of the district (1974) at 1/2000000 scale to get the details of the location, especially the position of watercourses relative to villages, roads and forests. The maps, though old, were critically important in the second phase of data collection, i.e., the focus group discussions. This technique was a substitute for participatory mapping and turned out to be very concise and efficient. The 1974 maps were not used for sampling design.

Data collection

Questionnaires were answered by 138 persons whose age structure is given below in figure 1. Note that all the respondents were adult males and the age structure is considerably older than that of the total population of Kokolopori (see next section.)

Figure 1 : Age classes of total persons that participated in the survey (n=138)



III. Results

Population Census

In the summer of 2007, the nurses from the Kokolopori health clinic (the "Bonobo Clinic") undertook a census of Kokolopori's inhabitants that provided data on Kokolopori's population (see Bonobo Clinic Interim Report, 2007.)

According to this 2007 census, Kokolopori is inhabited by 7,874 persons as shown in table 1 below. The population density is 2 inhabitants per km².

Table 1: Census results at Kokolopori

Groupements	# of villages	Total population	# of men	# of women	children
Lindja 1	8	1843	355	443	1045
Lindja 2	4	569	127	144	298
Pombi	13	3668	699	835	2134
Iyondje	10	1794	329	411	1054
Total	35	7874	1510	1833	4531
%		100	19	23	58

At the time of the survey,

- The total number of women was: 1833
- Number of pregnant women: 372
- Non pregnant women: 1461
- % pregnancies: 20%

- Total number of children (<12 years old): 4531
- Under-five children: 2003
- 5-12 years of age: 2528
- % under-fives: 43 %

According to Table 1, the population of Kokolopori is approximately 19% men, 23% women and 58% children under the age of 12. Thus the population age structure of Kokolopori is very young, and is somewhat skewed toward women over men. The fact that only 19% of the population (adult males) actually took part in the socioeconomic survey is a source of bias insofar, for example, as women engaged in micro-enterprises are not represented in the survey.

Size of households

A household is a group of persons under the authority of one chief of the family, including the father, the mother, their sons and daughters and also their visitors. They live in a house or two, with one house being the main house and the other the dependent house.

A 2004 CARE International survey of households gave an average household size of 9 – 10 persons in the Maringa-Lopori-Wamba landscape, which constitutes a big portion of the Province Equateur.

Household sizes in Kokolopori were variable. **Iyondje** was the groupement with the largest size of households. In fact, 53% of the households in Iyondje had 6-10 individuals. 39% of the households had 0-5 individuals. Households with 11 or more individuals were scarce (8%).

Kokolopori groupements other than Iyondje had a modal distribution of 0-5 individuals per household, defined as the most frequently occurring data element, which is among the

lowest household size in the entire Equateur Province. Possible reasons include fewer immigrants, higher dispersal of people for hunting or harvesting, possibly higher mortality than average.

Pombi groupement had 60% of households with 0-5 individuals, 28% with 6-10 individuals and 12% with more than 11 individuals. No household had more than 20 persons.

Lindja 1 groupement had 53% of households with 0-5 individuals, 34% with 6-10 individuals and 13% with 11-15 individuals.

Lindja 2 has 62% of households with less than 5 individuals per household, 38% with 6 to 10 individuals and none with more than 10 individuals. This is consistent with the fact that hunters and gatherers generally live in smaller groups than farmers. Lindja 2 men rarely inhabit the village alongside the main road. They spend most of their time hunting deeply in the forest and inhabit hunting camps and fishing camps longer than any other people of Kokolopori.

Associative affiliations (Leadership)

There are four main types of leadership in Kokolopori: church leaders, lineage chiefs, leaders of village committees and farm association leaders. These are defined below:

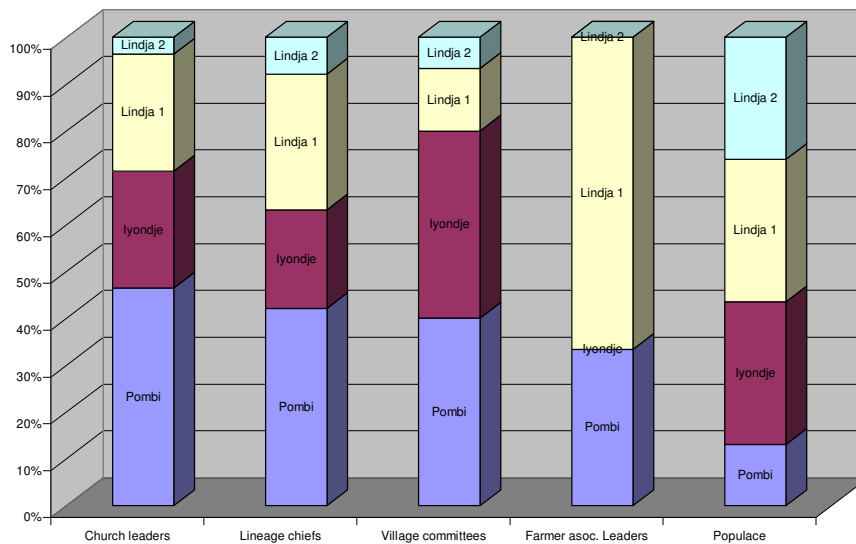
Church leaders: Each village has at least one church. Catholic churches are most common but other types that may be present are Protestant (Communauté des disciples du Christ (CDCC and CADELU)) and Kimbanguist (which reveres a Congolese prophet named Simon Kimbangu). Types of leaders in the church are the pastor, the gospel group leader, the youth leader, and the women's group leader (the latter would not necessarily be a woman). Church leaders are among the most influential leaders in a village, and may also lead farming associations, village committees or "groupe de jeunes" (non-church related youth groups). Church leaders generally would not be political party leaders.

Lineage chiefs: Lineage chiefs are usually old men who are descended from a chief of a clan. A lineage chief also is head of a household. Each village would have one or more lineage chiefs. There could be more than one lineage chief in a village, if for example the village is made of two or more clans that have contracted marriage with each other. Lineage chiefs preserve custom and tradition. (Note that a lineage chief is not an individual landowner. Land is owned communally by an entire clan, not by an individual, though each family or clan has a portion for its use.)

Village committee leaders: Village committees can relate to: political parties; Lilwa cultural dancing; youth groups for soccer games; collective development activities, e.g., temporary associations to remake roads or bridges; or "ristourne" , i.e., arrangements for common labor or distribution of benefits. "Ristourne" works as follows: One day all the benefits or production or income of the group may be given to one member of the group. The next day the chain continues in favour of the second member and so on, until everybody is served. Village committees address specific concerns and last the time required to address these concerns. Church leaders may also be village committee leaders.

Farming association leaders: Farming associations include organizations to share labor for clearing forest for agricultural fields, or for planting or harvesting. With Vie Sauvage, farm associations may also be for marketing agricultural products. Church leaders are often also farm association leaders.

Graph 2: Associative Affiliations in Kokolopori: Leadership



For each type of leadership, Graph 2 shows the percent of total leaders that were from each groupement.

Thus, Pombi has the largest percentage of church leaders (43%), while Iyondje and Lindja 1 are similar (26 and 24%), and Lindja 2 has very few church leaders at all (4%). Pombi is the largest groupement with the most villages and is also the location of the Yalisere mission. Given their smaller size (half that of Pombi), Iyondje and Lindja 1 had comparable numbers of church leaders though.

Lindja 2's relative lack of church leaders is consistent with its standing as the smallest and most traditional groupement. Compared to other groupements in Kokolopori, Lindja 2 is also famous as the one where animism and witchcraft are the strongest of the entire Kokolopori community. Neighboring groupements think that this stems from their proximity with Lalia, in Ikela. Lalia is considered to be very advanced in witchcraft.

Pombi also has more lineage chiefs than all the other groupements (40%), because it is larger and has more clans than the other groupements. Due to its number of traditional chiefs, Pombi is well represented on the Kokolopori Bonobo Reserve Association Board. Lindja 1, Iyondje and Lindja 2 have 30, 21 and 10% respectively of lineage chiefs, mainly because their populations are smaller than Pombi.

Iyondje and Pombi have about the same percentage of village committee leaders (40 and 37 % respectively), and Lindja 1 and 2 have only 13 and 10% respectively, of all the village

committee leaders. However, relative to their smaller populations, Iyondje and Lindja 2 have more village committee leaders than either Pombi or Lindja 1, given that Pombi has twice the population of Iyondje and 6.5 times the population of Lindja 2.

For farm association leaders, Lindja 1 has by far the most (70% of all farm association leaders), which is consistent with the fact that Lindja 1 has the most mosaic disease-resistant cassava cooperatives. Thirty percent of farm association leaders are from Pombi (which has twice the population of Lindja 1), but Lindja 2 and Iyondje have no farm association leaders at all, according to our survey.

This makes sense for Lindja 2, in that people in this groupement are most focused on hunting which reduces the need for farm associations. Iyondje is a riverside community relying in fishing as main source of income and food. Although we provided disease-resistant cassava cuttings and recommended to the people to create farming associations, cassava fields in Iyondje are individual businesses. The sandy soils of Iyondje are poor in nutrients, and it may be that Iyondje residents don't have sufficiently high yields of cassava to consider it worthwhile to establish cooperatives.

The "populace" category includes those respondents who are not leaders and are often illiterate. Iyondje, Lindja 1 and Lindja 2 groupements each had about 30% of respondents from the populace, while in Pombi, only 10% of the respondents were not leaders of anything. These findings suggest that in the first three groupements, leadership is either more centralized or that they are less organized than Pombi (or both). The fact that 30% of all respondents who were part of the populace came from Lindja 2 is particularly striking, given this groupement's small size.

The leadership profiles of the different groupements differed in other interesting ways. Pombi had leaders in every category and very few members of the populace among respondents. Pombi is the largest groupement and is seen as the most competitive and active of the four groupements and men from Pombi compete for lead roles in village lineages, church committees, village committees and farming associations. In contrast to Lindja 1, however, where people are best organized in farming activities, people of Pombi, according to focus group discussions, are individualists and the promotion of community fields is somewhat difficult there, though they did create some cassava cooperatives.

Iyondje appeared to have the most village committee leaders relative to its population, but no farming association leaders. As mentioned above, this groupement is located by the river and fishing is a more important economic activity than farming.

Lindja 1 had by far the most farm association leaders, which is consistent with the number of its cassava cooperatives, but relatively few village committees. Perhaps when a groupement is already highly organized in farming associations, village committees are not as essential for group decisionmaking.

Lindja 2, the smallest and most traditional groupement, had fewer church leaders, consistent with its animist tradition, and no farm association leaders, which is consistent with this

groupement's focus on hunting. It did however have a considerable number of lineage chiefs and village committees for its small size.

Associative affiliations (Membership in organizations)

Organizations of which the survey respondents were members included:

Churches (as described in the leadership discussion above)

Farm associations, i.e., common labor arrangements for farming (for clearing forest, planting, harvesting and/or marketing agricultural goods)

Cultural clubs, including Lilwa cultural dancing for men, Iyokobenda dancing for girls, Lokenya dancing for their mothers; odéo dancing for both girls and mothers; rarely bisiya dancing for men and women. (Note: Lilwa is 'une école de mystères ésotérique' (school of esoteric mysteries.) The content of the 'initiation' is only revealed to the initiates. Rituals are magic-religious and the dance is the 'ésotérique' side. Only men can dance Lilwa, not women.)

Political parties, including the PPRD of President Joseph Kabila, the MLC of Jean-Pierre Bemba, and the 'Parti Démocrate et Social Chrétien'.

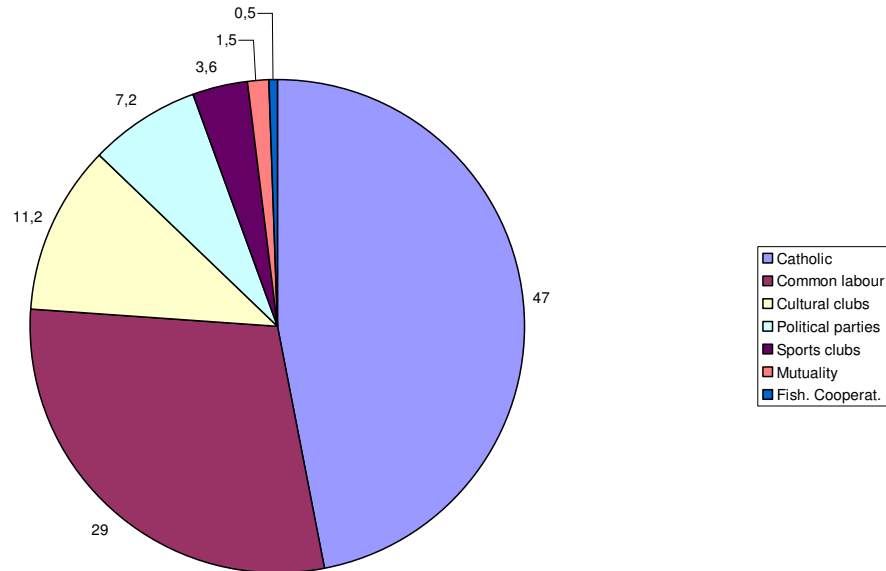
Soccer clubs would also include youths who were not part of the survey or focus groups.

Mutuality groups, i.e., groups of persons that put their financial resources together and share them to provide a kind of insurance to members by sharing common resources, so that if one family falls on hard times, the others will help them.

Fishing cooperatives are established for fishing together (but rarely for marketing fish together.)

Note that any of these groups could also include women, except the lineage chiefs and Lilwa cultural associations, where women are excluded.

Figure 3. Associative affiliations: Membership in community organizations (memberships in each type of organization/all responses)



In Kokolopori, community associations feature as follows and are shown in Figure 3:

1. Church associations are the most common mode of people gathering. 47% of respondents are members of church associations. There are Catholic churches, Protestant churches, and Kimbanguist church of the national prophet Simon Kimbangu. Catholics hold the majority. The reason is that the Catholics arrived first in the region around 1930. Protestant churches arrived much later.
2. Next, come common labour arrangements for farming (29%).
3. Third, cultural clubs (11, 2%).
4. Fourth, are the political parties (7, 2%)
5. Fifth, are soccer clubs (3, 6%)
6. Then mutuality associations (1, 5%)
7. Finally the fishing cooperatives (0, 5%).

Respondents could be members of multiple associations. The importance of different associations differs among groupements.

Iyondje, which is by the Luo River, has all the fishing cooperatives. Lindja 1 and Pombi have the largest number of political party members, soccer clubs and mutuality members, partly due to their population size, particularly for Pombi, the largest groupement. Farming associations are most important in Lindja 1 and to a lesser degree in Pombi, but not at all in Iyondje or Lindja 2, because the last two groupements focus more on fishing and hunting respectively. Churches are also less

important in Lindja 2, since it has the most traditional culture with the highest level of belief in animism and magic.

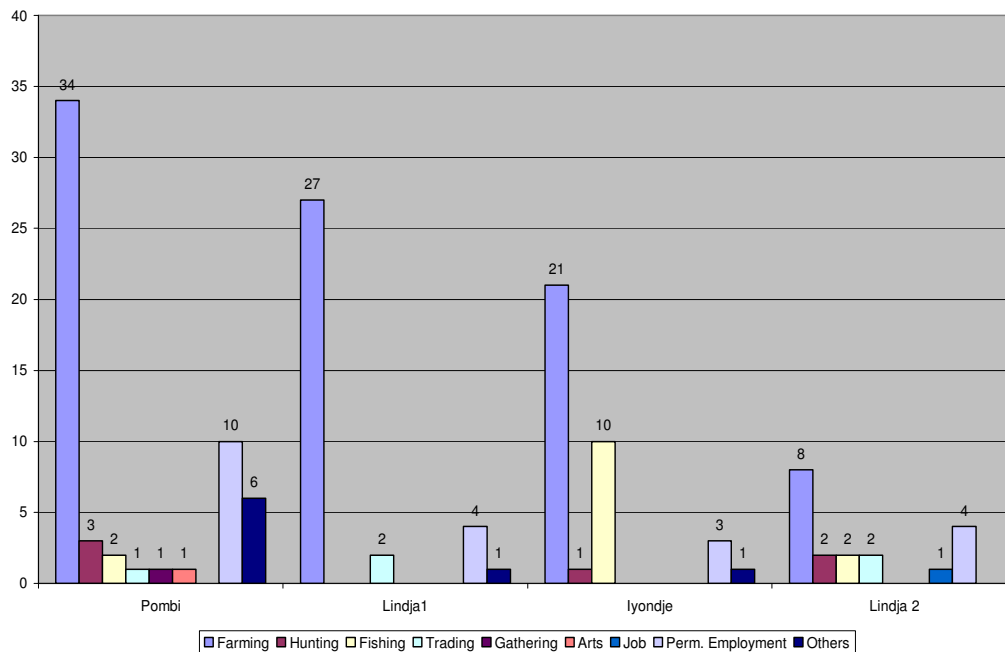
The association leadership and membership findings raise the question of what kind of community development models are most effective in Kokolopori as a whole: greater individualism as in Pombi or more collective action as in Lindja 1?

Pombi has a greater variety of leaders than other groupements and the fewest members of the populace among respondents, which suggests that it has many associations whose leadership is spread out among the population.

Our experience indicates that collective action as applied since the beginning of the project has shown its limits. That model encourages parasitism and overdependence on assistance because the laziness of some group members is hidden. Perhaps, BCI should help Vie Sauvage create market and trade opportunities and let play the creativity of each member of the community to let him or her benefit from the reserve from personal efforts.

Some critical needs for business development in Kokolopori include regular riverboat access to get products to market, trucks to transport products to the river port, and agricultural machinery to add value, reduce transportation costs and increase profitability of local products.

Main sources of money/cash income in Kokolopori



Graph 4: Sources of cash income per groupement

Graph 4 shows, for each groupement, the relative ranks of (male) respondents' sources of cash income. Note that because women did not participate in the survey or focus groups, women's businesses are excluded here.

Agricultural products that brought in cash income included cassava, rice, maize, coffee and palm nuts or oil.

Hunting is described in more detail in a later section.

Trading includes sale of manufactured goods coming from Kisangani, the closest city, which is a two week walk or about 300 miles away.

Gathering includes larvae, caterpillars and other non-timber forest products sold in Kisangani.

Arts includes handicrafts, e.g., pottery, utensils and other commodities produced mainly by women and therefore not observed in this study, except for one male respondent in Pombi.

Jobs were some form of temporary employment.

Permanent employment means steady jobs such as trackers, teachers or nurses who receive monthly salaries. Eight schools in Kokolopori employ about 54 teachers, Vie Sauvage employs 71 people, the health clinic and dispensaries employ 6 medical personnel, plus 4 chefs de groupement, which means that out of 3343 adults, 135 are employed, for an employment rate of 4%.

The Kokolopori economy is mainly a barter economy, and for those few occupations where it is possible to earn some cash income, earnings are between \$5 and \$25 per month.

From Graph 4, it can be concluded that:

-In all groupements, agriculture was the largest source of cash income, followed by permanent employment in all groupements except Iyondje. For example, in Pombi, 34 respondents sold agricultural products in markets in other communities, to which they had carried products on their backs.

-In Iyondje, respondents obtained more income from fishing than from permanent employment.

-Hunting, fishing and trading were each somewhat important in Lindja 2 as a source of income but not quite as much as permanent employment.

-In Lindja 1, agriculture was by far the greatest source of income, which is consistent with the number of farming associations.

-In Pombi, while agriculture was still the largest source of income, other sources of income included blacksmithing, which is best developed in Pombi groupement. Masonry, carpentry, traditional healing are also not negligible in Kokolopori and are concentrated particularly in Pombi.

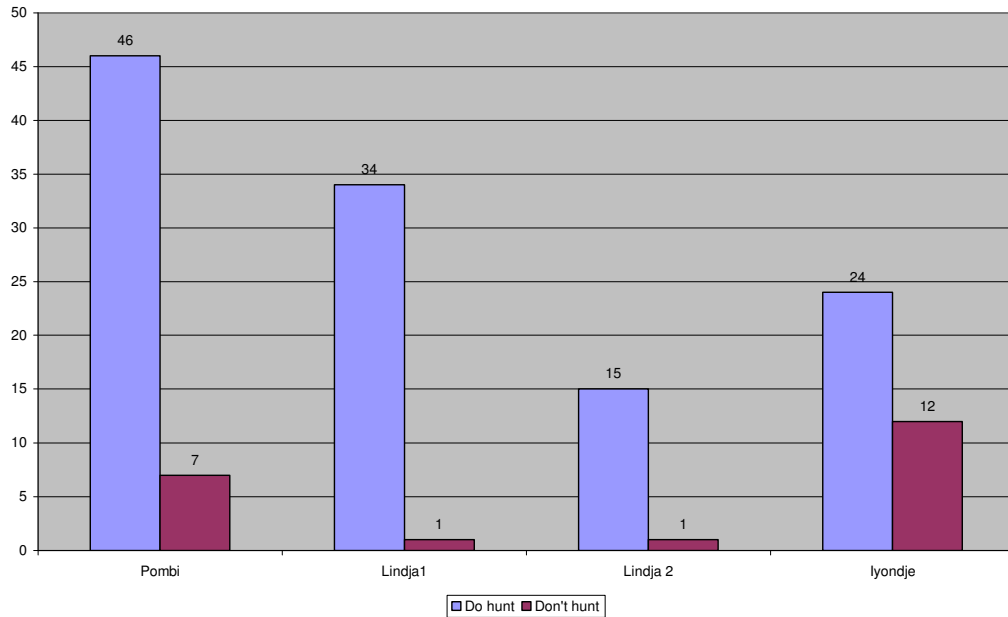
Pombi and Lindja 2 have the largest spectrum of opportunities in term of sources of income, and Lindja 1 and Iyondje have the least different types of income sources.

These findings offer some possibilities for women's microenterprise projects in the groupements. Oil processing and soap-making might be readily developed in Lindja 1 where

farming cooperatives are already well organized. Because fishing is already a big industry in Iyondje, making and selling salted fish could be a good microenterprise there.

Percentage of hunters per groupement

Graph 5: Number of hunters per groupement

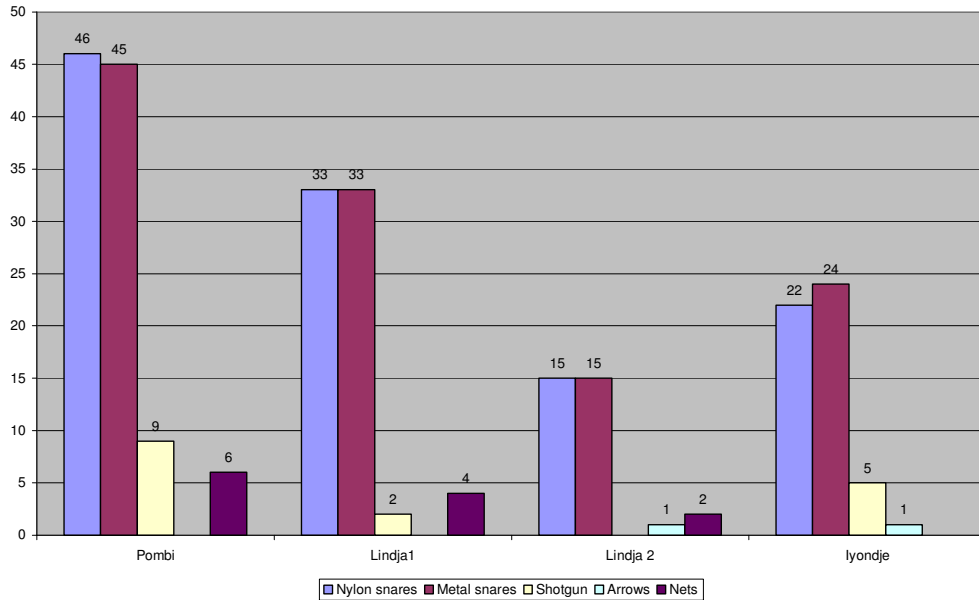


The percentage of hunters among the respondents includes:
Pombi: 87%, Lindja 1: 97%, Lindja 2: 93%, and Iyondje : 67%.

Iyondje has the lowest percentage of hunters because it has good fishing, followed by Pombi groupement, possibly because there is a larger spectrum of possible occupations in Pombi. Lindja 1 has the highest proportion of hunters, somewhat higher even than Lindja 2, but the difference between 93 and 97% may not be significant.

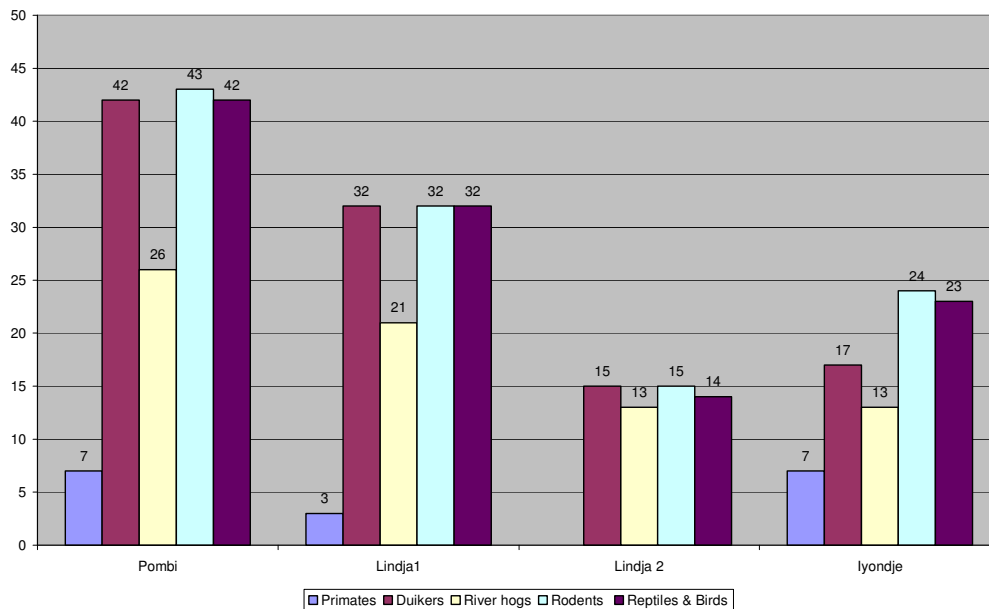
Ranks of each hunting technique

Graph 6: Rank of hunting techniques



Hunting techniques include snares (nylon and metal), shotguns, arrows and nets. Note that hunters may use more than one kind of hunting technique. For all groupements, the most common means by far of hunting game is with snares, as shown in graph 6. Use of shotguns is low, especially in Lindja 2, where it seems nonexistent. Lindja 2 hunters used to hunt with arrows until the introduction of our reserve programs.

Commonly hunted game



Graph 7: Commonly hunted game by groupement

This graph shows the ranks of different kinds of game hunted in each of the groupements: primates, duikers, river hogs, rodents and reptiles/birds.

Lindja 2 was the only groupement where primates did not appear to be hunted at all. Given that the population of Pombi is the largest of the groupements (about twice the size of Iyondje and Lindja 1, and six times the size of Lindja 2); there is also relatively little hunting of primates in Pombi relative to its population. Iyondje had somewhat more hunting of primates than Pombi or Lindja 1.

Types of monkeys hunted, when they were, included: *Cercopithecus wolfii*, *Allenopithecus nigroviridis*, *Cercopithecus ascanius*, *Lophocebus atterrimus*, and *Colobus angolensis*. The most commonly captured animals were duikers and turtles.

While hunting of primates is not very common, population sensibilisation to prevent hunting of primates, especially bonobos, should permanent and budgeted for.

Hunting localities and distances from human villages

Hunting frequency is higher within 0-10 km from human settlements in all groupements. That means that people hunt within the agreed Reserve boundaries. They put snares in locations where trackers don't go. This means that our monitoring systems should change to cover more area instead of just tracking bonobos. This also reveals that the local community has a hard time to depart from their habit of hunting and eating bushmeat. Sensibilisation is not enough. It is better to improve monitoring and enforcement as well.

The Kokolopori reserve core area boundaries are as follows: The western limit is the Lufo River, Bakaoloko, mouth of the Lonua River to Lana River, Samba and Lilenda forest, Kohola River. The eastern limit is the Loongo and Loila Rivers. The southern limit is the Maringa River, and the northern limit is 27 minutes latitude, a parallel to the Equator that passes through Yoko y'Ekuka, the mouth of the Bongundju River and crosses the Lofia River.

Iyondje is the groupement where hunting is most concentrated near villages. This may explain why two villages gave away their forest's left bank of the Luo River to the Centre de Recherche en Ecologie et Foresterie (CREF) and the Japanese researchers in Wamba.

Lindja 2 uses all forest strata to hunt. They hunt in all parts of the forest to the same degree. One Lindja 2 resident, Mr Likenge of Yanyangombula village, answered that he usually hunts in the Hali hali forest (the forest with the best habituated bonobos). This is indicative of the fact that Lindja 2 people in general and Yanyangombula village in particular, consider Hali hali forest as their hunting territory and may feel constrained by our work there. Information exchange alone would probably not solve this. Once again, monitoring and enforcement are critical and they should be improved.

Improvement of monitoring and enforcement will require an increase in the number of patrols and rangers, improvement in their equipment and the involvement of local officials to enforce the law.

Lindja 1 residents also concentrate their hunting near human settlements. It may be possible to successfully extend the Reserve boundaries in this groupement.

Pombi is the groupement that uses much the third forest stratum, 21km-30km from villages. This groupement is the one that owns the Nkokoluwo forest. Because they use Nkokoluwo much as their hunting locality, it may be difficult to get this portion as a core area for the Reserve immediately. Nkokoluwo could be a management zone where selective hunting is allowed.

Other Findings

Seasonal activity calendar

From June to October, most of the community (entire families) camps in the forest for hunting and harvesting larva (caterpillars) and other nontimber forest products (NTFP). From November to January they cut back the forest to reestablish their fields and burn them in February. They also make roads in January and February, the heart of the dry season. Then they plant in April and May. Rice and maize are harvested in September, and then there is another period of cultivation in early September. The biggest feast is on December 31st and January 1st.

Agricultural methods and crops

Coffee, palm oil and rubber are cash crops, whereas cassava, maize, rice, pineapple and banana plantain are subsistence crops. The modal size of an individual cash crops' plantation is one hectare. That of a subsistence crops' field is half a hectare.

Farmers use slash-and-burn clearing techniques without rotating the types of crops cultivated in particular fields. The system is itinerant, wandering from fallows to fallows each two or three years. People do not practice agroforestry.

Wild plant resource use

Plants are used in community forestry to produce fire wood, planks, and medicines.

Hunting camps

Hunting camps are not established inside the reserve core area boundaries and tend to be remote from human settlements. The average size of a camp is 4-5 huts. The most common way of hunting is by use of snares.

Fishing methods

Fishing is mainly concentrated near human settlements and particularly in the Luo River. In Iyondje groupement, fishing is the most developed within the Kokolopori estate and is conducted all the year long by men, using hamecons, nets and nasses/traps.

Fishing is most common in the big dry season from January to March. Women also fish by going to swamps and dry water beds where ponds are left behind and trap fish using small nets and nasses. In the past, people also poisoned small watercourses for fishing. This practice no longer takes place because of resource monitoring and education campaigns.

Trade

In decreasing order, goods that are traded are: bush meat, agricultural products, fish, manufactured goods from Kinshasa or Kisangani, and handicrafts, i.e., locally made goods.

Knowledge and enforcement of the hunting law

Eighty four percent of the survey respondents knew which species are endangered and recognizes that the government prohibits their hunting since the colonial period. The most ignorant group about this law is the youth under 25 years of age. About 78% of young men consider that the killing of the Giant pangolin (*Smutsia gigantea*) is not illegal and 63% think that the killing of a leopard is an object of pride, no matter what the government says.

Knowledge of the new Forestry Code

Although a limited education campaign has been undertaken in Kokolopori, the majority of interviewed people do not know their rights to the land as stated in the new Forestry Code. They consider themselves owners of the land, even if they do not hold a legal document.

Poaching in the Reserve

Hunting is a way of living, a custom, a tradition or culture in Kokolopori. The Mongandu are a tribe of hunters and gatherers. We have a hard time to ban hunting in Kokolopori in the short term. Our strategy is to divert this hunting to chosen territories in Kokolopori forest, through the process of participatory zoning.

Poaching in Kokolopori is stimulated by the increase in human population and the breakdown of authority at the provincial level. Poaching happens in remote spots far from villages. A squad of poachers from Basankusu entered Kokolopori forest. It comprised five men, two women and two sons. We made two trips and sensitized the community to avoid any cooperation with them. The poachers departed.

Delineation and gazettelement

Through participatory mapping undertaken during the reserve zoning process, we have all the names of natural boundaries of both the entire Kokolopori forest and individual groupements.

IV. Conclusions and Recommendations

This report summarizes the first ever socioeconomic survey undertaken in Kokolopori. Using village transect sampling and a questionnaire passed in the 35 villages of Kokolopori together with follow-up focus groups, we have documented residents' social and economic way of life and provided a basis for designing conservation management plans suitable for the area.

1. Principal findings

Social statistics:

- Based on 2007 data, males comprise 19% of the overall population of Kokolopori, women 23%, and children under the age of 12 comprise 58% of the population. This means that there is considerable momentum inherent in Kokolopori's population growth rate. Survey participants were all male.

The economy:

- Kokolopori's economy is mainly a barter economy. Only about 4% of the population is permanently employed.
- People derive cash income mainly from farming (i.e., selling agricultural products), with permanent employment (trackers, teachers, clinic staff) the next most important source of cash income.

Social organization of groupements:

- Pombi, the largest groupement, appears to have somewhat decentralized leadership and a relatively large spectrum of possible occupations, including blacksmithing, masonry, carpentry and traditional healing, as well as agriculture.
- Churches are the most common mode of people gathering in Kokolopori, but animist traditions are strongest in Lindja 2.
- Lindja 2 is the smallest, most traditional groupement with the largest proportion of illiterates, but the best habituated bonobos in their forest.
- Lindja 1 has the majority, by far, of farm associations, presumably due to the importance in this groupement of cassava cooperatives, and relatively few village committees, suggesting that perhaps farm associations are used for other types of group decisionmaking as well.
- Iyondje has all the fishing cooperatives and relatively more village committee leaders for its size.

Hunting:

- In three of the groupements, 87-97% of respondents hunt, with the exception of Iyondje, where fishing takes the place of some hunting (67% hunt).
- Overall, the most commonly hunted game included duikers, rodents and reptiles and birds. All the groupements hunted some primates (monkeys) except Lindja 2.
- Snares were the most common type of hunting technique, and hunting frequency was higher, but not exclusively, within 0-10 km of villages, so people do hunt within agreed Reserve boundaries.

Knowledge of laws:

- Land is owned communally and people consider themselves landowners despite not having legal documents. Most respondents did not know their land rights under the new Forestry Code. The demographic group that was most ignorant about hunting laws was individuals under 25 years of age.

Agriculture:

- Farming methods involve slash and burn clearing, and moving between fallow fields every two or three years. However, the successful introduction of mosaic disease-resistant cassava has considerably reduced the need to clear additional forest. Crop rotation and agroforestry are not practiced at this time.

2. Recommendations

Our socioeconomic study revealed various problems that affect the population of Kokolopori in their struggle for life and welfare. Some of these issues may pose problems for the effectiveness of our conservation work. Recommendations for improving the effectiveness of Vie Sauvage and BCI's conservation efforts include:

1. On its current trajectory, population growth rates in Kokolopori are and will continue to be high, which will continue to increase the pressure on forest resources and wildlife. Educational opportunities for women and improved access to family planning and health care are urgently needed.
2. A followup survey should be pursued to interview women, as this may reveal a number of direct and indirect ways in which women can contribute to conservation in Kokolopori.
3. Kokolopori residents are in desperate need of greater economic opportunities, which would be facilitated first of all by the introduction of a) trucks to transport agricultural goods to Befori, the closest riverport, b) agricultural machinery to increase the profitability of local products, and c) regular riverboat access to get products to market, and d) improved communications with markets.
4. Education in sustainable agriculture is also essential, which could be provided by graduates of Djolu Technical College if these graduates can find paid employment in Kokolopori.
5. Increased education about land and hunting laws is needed, as is improved monitoring and enforcement against poaching and hunting within Reserve boundaries. Increased monitoring and enforcement implies employing additional Vie Sauvage personnel as rangers and equipping them with adequate tools and supplies.
6. Prohibiting hunting in a growing human population will put more people over the edge of malnutrition, which suggests a need for greater access to alternate protein sources, e.g., domesticated animals.
7. In general, a combination of local sensitization and education, regional and international recognition, and adequate outside funding is needed to facilitate conservation of Kokolopori's globally important forests, bonobos and other rare and endangered wildlife.