THE SOCIOECONOMIC ASPECTS OF NATURAL RESOURCE USE AND MANAGEMENT BY LOCAL COMMUNITIES IN THE SALONGA-LUKENIE-SANKURU LANDSCAPE: GUIDELINES FOR CONSERVATION AND LIVELIHOOD IMPROVEMENT

WWF-Democratic Republic of Congo (DRC)
September 2006

Prepared by: Alejandra Colom[1]

With contributions by:
Billy Kambala Luadia
Isabelle Edumbadumba
Alain Nsuku
Angele Mowa Kapundu
Yolande Muzima
Bruno Ntumba Nzoto
Lisa Steel

[1]Cultural Anthropologist, Consultant to WWF-DRC

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This study represents the efforts of a large team of field researchers and logistical and support staff. The different groups and individuals are as follows:

Field Leaders and Data Entry
1. Billy Kambala Luadia
2. Isabelle Edumbadumba
3. Alain Nsuku
4. Angele Mowa Kapundu
5. Yolande Muzima
6. Bruno Ntumba Nzoto

Local Field Researchers and Logistical Support
1. Baoudouin Kankosa
2. Tinda Hamza Mayazola
3. Judith Mundeka Makila
4. Richard Ngalula
5. Alexandre Onema
6. Jean Felicien Bobo Ibono
7. Michel Imana
8. Emery Elonda Basele
9. Emeli Bokwalolo
10. Bengungu Georgette
11. Baondjo Ikonga
12. Anselme Bendji

Data Entry
1. Martin Bemba
2. Jack Etsa

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Lastly, the teams were greeted with a remarkable amount of hospitality and openness by all participating villages, local authorities, households and other collaborators. These villages and individuals merit our greatest thanks.

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Monkoto Territory

Dekese Territory

Baseline Socio-economic Study
Salonga-Lukenie-Sankuru Landscape
September 2006

Summary

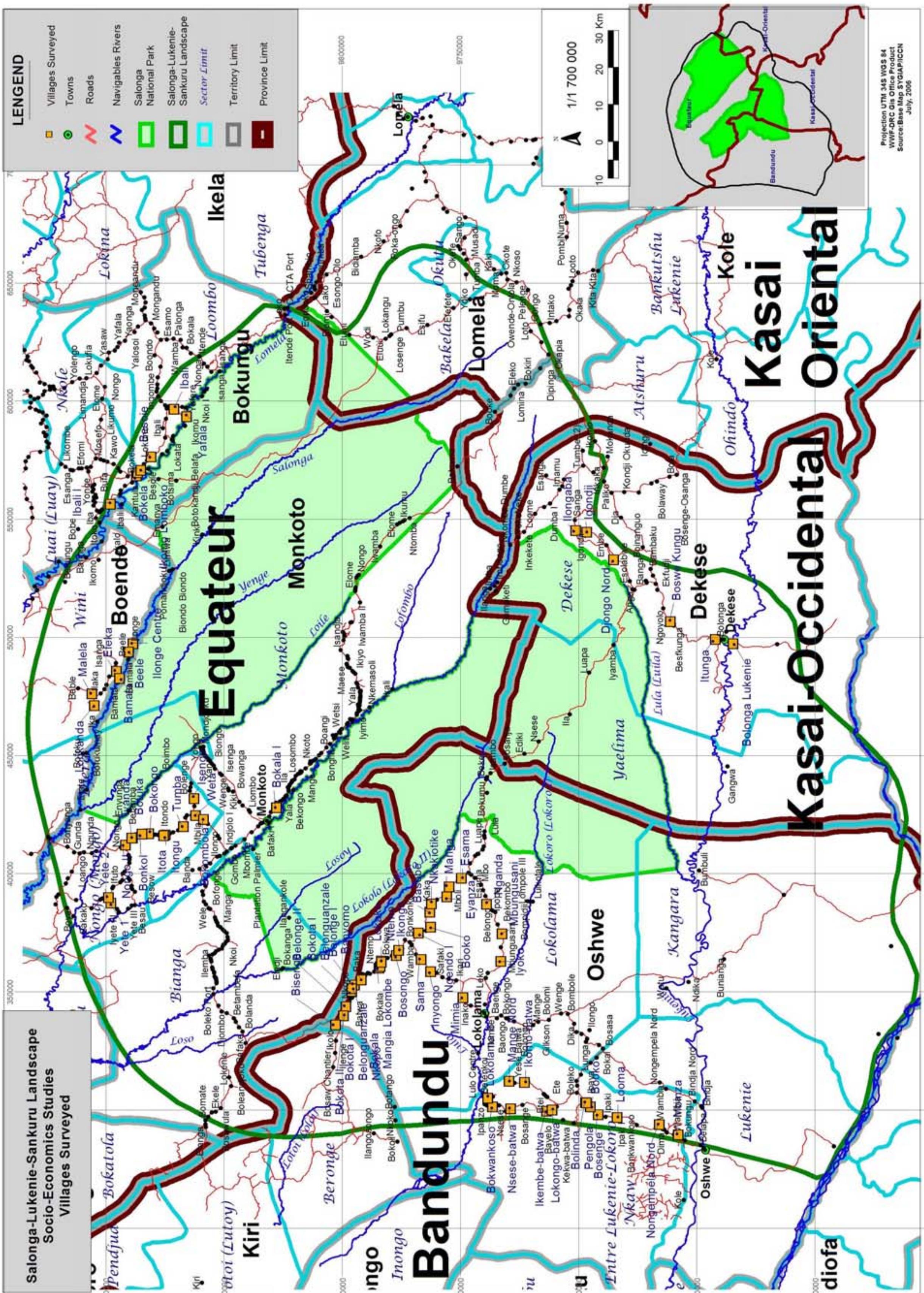
Field work for the baseline socio-economic study was conducted between May 2005 and February 2006 and included the following activities:

- 6 fieldtrips to 73[2] randomly selected villages corresponding to 18% of villages in the landscape[3] during which two research teams
    - Organized focus groups with men and women
    - Conducted household level surveys
    - Interviewed merchants
    - Met with local authorities
    - Identified community based organizations (CBOs) and non-governmental organizations (NGOs)
    - Collected geographic information on villages including access routes (river and road)
- Organization, codification, entry, and analysis of qualitative and quantitative data
- Preparation of final report
- Participating villages are located across four provinces, four districts, four territories, seven sectors, and nineteen groupements (table 1). Map 1 includes the axes and villages visited during fieldwork activities.
- Selection of households: in order to maximize coverage of households, team members divided the villages in sections where each member interviewed households in intervals based on the size of the village[4]. Time limitations permitted interviewing between 25% and 27% of households in each village.

[2] Merchant interviews, meetings with local authorities and CBOs were also conducted in the towns of Dekese and Lokolama.
[3] The majority of villages in the corridor between the two blocks of Salonga National Park (SNP) were included in socio-economic studies conducted by WCS (2004 and 2005), and thus excluded from this study.
[4] Every other, every two, or every three households.

Table 1 Fieldwork activities carried out between May 2005 to February 2006

Axe	Location	Dates	Villages	Households	Focus groups
Nganda-Mimia-Sama	Province: Bandundu District: Mai Ndombe Territory: Oshwe Sector: Lokolama Groupements: Bolendo and Bolongo	May-June 2005	6	66	12
Manga-Bisenge	Province: Bandundu District: Mai Ndombe Territory: Oshwe Sector: Lokolama Groupements Bolendo and Bolongo	July-August 2005	21	250	42
Dekese area	Province: Kasai Occidental District: Kasai Territory: Dekese Sector: Ndengese-Ikolombe-Isolu Groupements: Ngelendjale, Vekfu, Itende	September-October 2005	6	106	14
Salonga and Lomela rivers	Province: Equateur District: Tshuapa Territory: Boende Sectors: Wini, Luayi, Loombo Groupements: Nongokwa, Nongongomo, Mom'elinga, Lotoko Ikongo, Makanda	September – November 2005	14	177	26
Oshwe 1	Province: Bandundu District: Mai Ndombe Territory: Oshwe Sector: Nkaw Groupement: Bokongo, Imoma	November –December 2005	8	127	15
Oshwe 2	Province: Bandundu District: Mai Ndombe Territory: Oshwe Sector: Nkaw Groupement: Bokongo, Imoma	February 2006	6	78	12
Monkoto	Province: Equateur District: Tshuapa Territory: Monkoto Sector: Nongo Groupements: Mpenge, Iyonganongo, Etete I, Iyongo	February 2006	12	147	24
Total			73	951	145

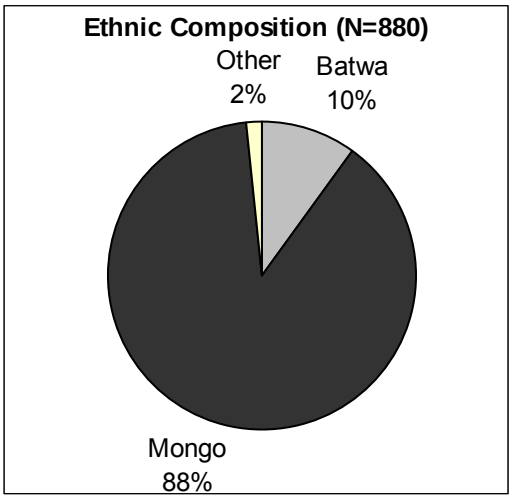

Salonga-Lukenie-Sankuru Landscape
Socio-Economics Studies
Villages Surveyed
LENGEND
Villages Surveyed
Towns
Roads
Navigables Rivers
Salonga National Park
Salonga-Lukenie-Sankuru Landscape
Sector Limit
Territory Limit
Province Limit
1/1 700 000
10 0 10 20 30 Km
Projection UTM 34S WGS 84
WWF-DRC Gis Office Product
Source:Base Map SYGIAP/ICCN
July, 2006
Equateur
Bandundu
Kasai-Occidental
Kasai Oriental
Boende
Monkoto
Bokungu
Ikela
Lomela
Dekese
Oshwe
Kole
Kiri

Major findings

General Demographics and Social Organization

1. **Demographic:** Ethnically, the majority of the landscape population is of Mongo origin (88.4%). The principal Mongo sub-groups recorded were Nkundu (45.5%), predominant in the southwest portion of the landscape, Ndengese (13.5%), living in the Territory of Dekese; and Mbole (13.8%), recorded in the Territories of Monkoto, Boende, and Bokungu. Batwa groups represent 9.9% of the landscape population. Batwa villages are located, for the most part, in the Territory of Oshwe, in the southwest portion of the landscape. The remaining 1.7% of the population corresponds to migrant families of Luba, Sakata, Tetela, and Yasa origin (figure 1).

   Figure 1



   The Territory of Dekese was the most ethnically uniform, with 99.1% of households identifying themselves as Ndengese.

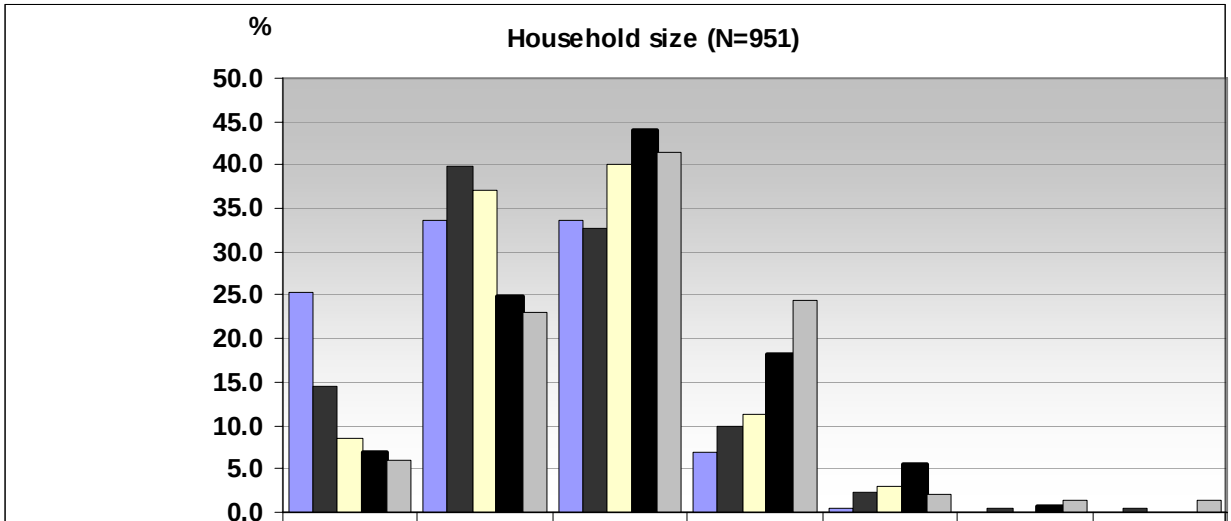
2. **Household characteristics:** Heads of household are for the most part male, with an average age of 46.0 years. The highest percentage of female heads of household was found in the areas of the Salonga and Lomela Rivers (9%). The average age of female heads of household varied from area to area, ranging between 37.8 and 51 years. Table 2 summarizes the general characteristics of landscape households.

Table 2 General characteristics of households

	Lokolama Sector	Nkaw Sector	Salonga and Lomela Rivers	Monkoto Territory	Dekese Territory
Average age of head of household	45.9 (men), 40.1 (women)	46.7 (men), 45.1 (women)	45.7 (men), 37.8 (women)	45.8 (men), 51.0 (women)	46.0 (men), 38.3 (women)
Female heads of household	6%	4%	9%	6%	4%
Average household size	7 (SD=3.91)	6 (SD=1.79)	8 (SD=3.88)	9 (SD=4.49)	7 (SD=3.27)
Nuclear families	62%	65%	59%	44%	61%
Polygamist families	7%	9%	14%	12%	19%

The average size of households, as well as their composition, varied greatly, with factors such as nuclear versus non-nuclear households and the practice of polygamy[5] influencing household size. The number of members per household varied between 1 and 33, with Nkaw reporting the smallest average household size (6.0) and Monkoto the largest (9.1) (figure 2). Non-nuclear households included elderly parents, younger siblings of the head of household or his/her spouse, married children with their families, grandchildren, nephews, nieces, cousins, and/or distant relatives under the head of household's charge.

Figure 2



	1 – 3	4 – 6	7 – 10	11 – 15	16 – 20	21 – 25	> 25
Nkaw	25.4	33.7	33.7	6.8	0.5	0.0	0.0
Lokolama	14.6	39.8	32.7	9.8	2.4	0.4	0.4
Dekese	8.6	37.1	40.0	11.4	2.9	0.0	0.0
Salonga and Lomela	6.8	24.9	44.1	18.1	5.6	0.6	0.0
Monkoto	6.1	23.1	41.5	24.5	2.0	1.4	1.4

3. **Migration trends:** Households in the southwest of the landscape (Oshwe Territory) reported a greater desire to migrate out of their villages (21% of households in Lokolama and 25% in Nkaw, versus 9.6% in the Salonga/Lomela River areas, 10.1% in Monkoto, and 10.4% in Dekese). Participants who expressed no plans to leave their villages said, in the majority of cases, that they wanted to stay because it was their village of origin, their family was there, or because they had responsibilities in the village.

4. **Group membership (e.g. CBOs and NGOs):** Group membership is low. The Salonga and Lomela River areas reported the lowest participation in groups, with only 15.3% of households reporting membership in more than one group. The Territory of Monkoto reported the highest participation in the landscape, averaging 2.27 groups per household.

   Across the landscape, most membership corresponds to religious groups (68% of households in Lokolama, 94% in Nkaw, 74% in Salonga and Lomela, 86% in Monkoto, and 88% in Dekese). Participation in other groups, such as farmer associations, cooperatives, and self-help groups did not exceed 10% except in the Territories of Dekese and Monkoto. In Dekese, 18% of households reported membership in farmer associations, while 48% of households in Monkoto reported the same. Monkoto

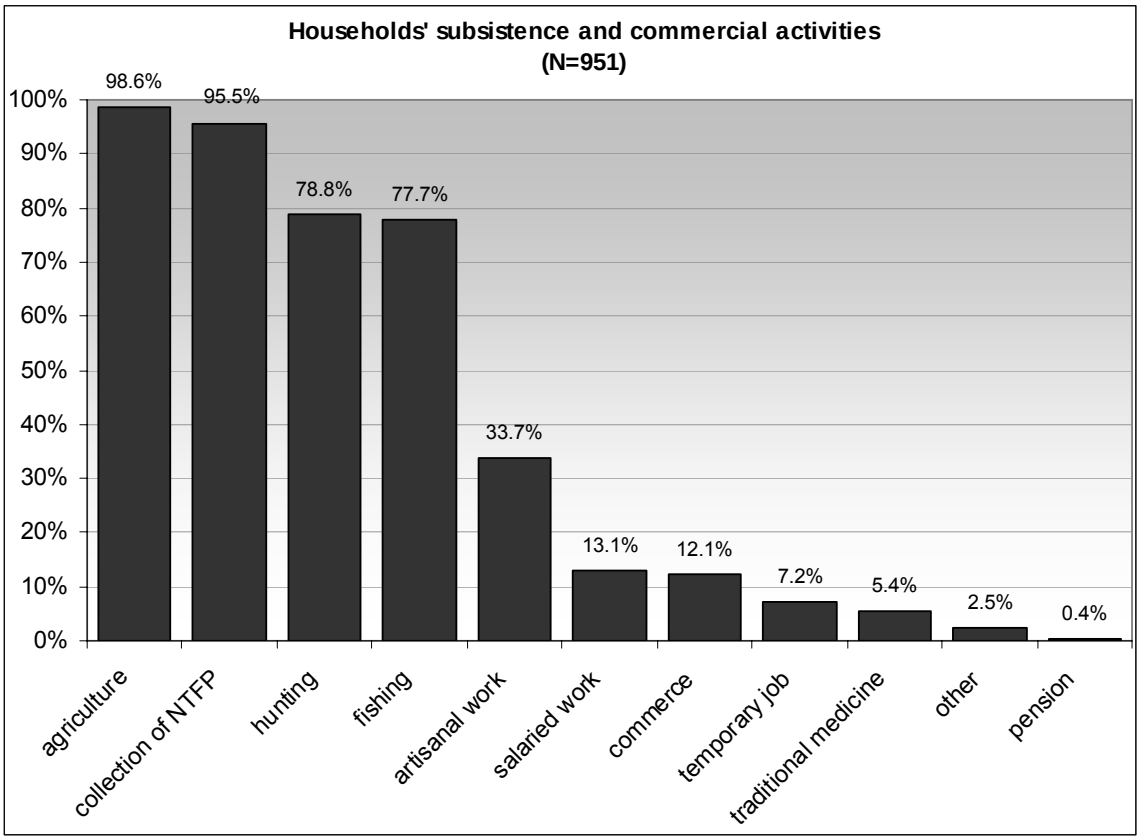
[5] 100% of cases were of polyginy (one husband and various wives).

households also reported participating in self-help groups (43%), political parties (18%), and sports associations (16%).

Subsistence and Economic Activities

Natural resources represent the foundation of local populations' subsistence and economic activities (figure 3). Agriculture and the collection of non-timber forest products (NTFPs) represent the most widely practiced activities, each engaging over 95% of landscape households. Hunting and fishing are the third and fourth most widely practiced activities, reported by more than three-quarters of the population. Household involvement in other activities such as artisanal work, commerce, traditional medicine, and some temporary jobs, further highlights the dependence of local populations on natural resources. Furthermore, all households containing a member with full-time paid employment also reported participation in other natural resource-related subsistence and income-generating activities. In summary, 100% of the landscape's village-based population is dependent on the exploitation of local natural resources.

Figure 3



The Territory of Monkoto reported more subsistence and economic activities per household than the rest of the landscape, with a higher percentage of households engaged in artisanal work than fishing, and more households practicing commerce (36.7% versus 5.3% in Lomela, 0% in Salonga, 5.7% in Dekese, 12.6% Lokolama, and 2.9% Nkaw).

Income-Generation

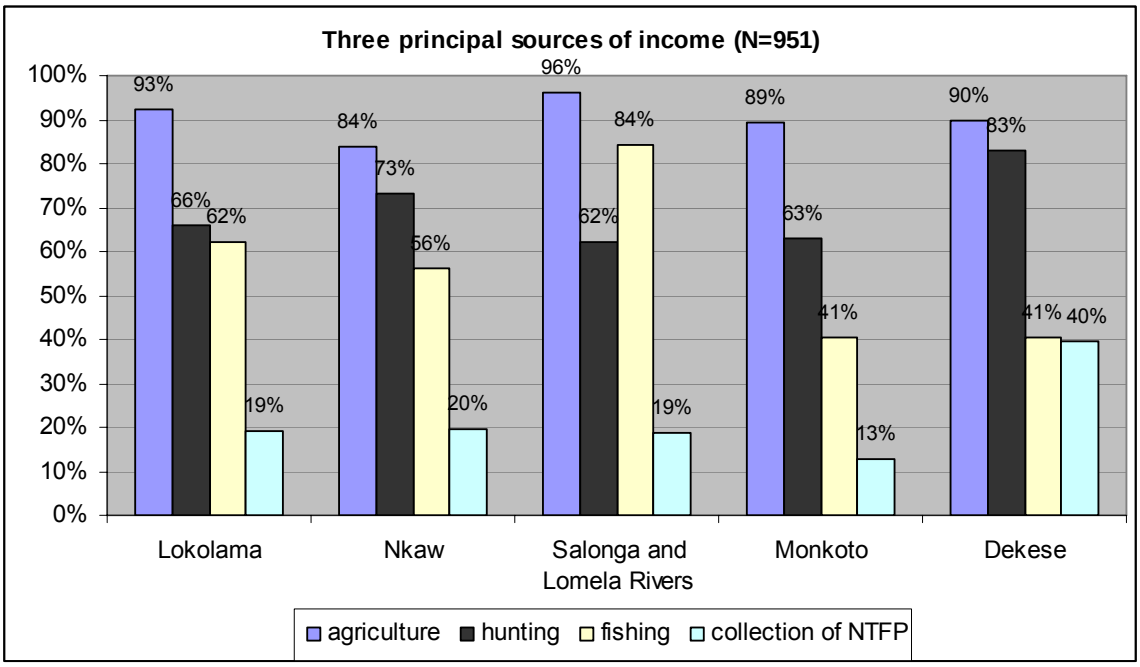
In terms of income generation, the population's dependence on natural resources is evident throughout the landscape with 90% of households identifying agriculture among their three principal sources of earnings.

Hunting (including trapping) represents the second most important income source. On average, 69.5% of households cited it among their three principal sources of earnings. The highest number of households reporting hunting as a revenue source was in the Territory of Dekese (83%). In other parts of the landscape, between 62-73% of households cited hunting among their three principal sources of income.

The third most frequently mentioned activity was fishing. The importance of fishing, however, varied across the study area. While only 41% households in Monkoto and Dekese reported fishing among their three principal income sources, 84% of households in the Salonga and Lomela Rivers areas described it as their second most important activity after agriculture. On average, 56.7% of households reported it as being among their three principal revenue sources.

Non-timber forest products (NTFPs) constitute a supplementary source of income for households. Their significance was particularly evident in the area of Dekese, where 40% of households reported harvesting of NTFPs among their three principal income sources - almost equal to fishing (41%).

Figure 4



1. Agriculture:

a. *Principal crops*: Cassava, corn, rice, squash, plantains, groundnuts, sweet potato, sugar cane, and peppers.

b. Locally perceived changes: The disappearance of markets for local crops, as well as transport limitations, has resulted in decreased production. The relative remoteness of the area, accentuated by years of war, continues to negatively impacted the commerce of agricultural products. Production is further hindered by a lack of access to appropriate tools as well as the technical capacity necessary to increase yields, combat plant diseases, and control destruction of crops by wildlife.

c. *Opportunities for partnership*: The population's interest in improving and expanding agriculture as an income source is prevalent through the landscape. Agriculture is viewed as a more desirable activity in terms of revenue generation than hunting and fishing.

d. *Constraints and Conditionalities*: Improving transport networks for agricultural commerce will also facilitate access to natural resources by commercial poachers and fishers from outside the landscape. Agricultural development will need to be

paired with community engagement in sustainable natural resource management and the strengthening of rules and regulations governing access in order to effectively reduce pressure on wildlife and local fisheries.

2. Collection of Non-Timber Forest Products:

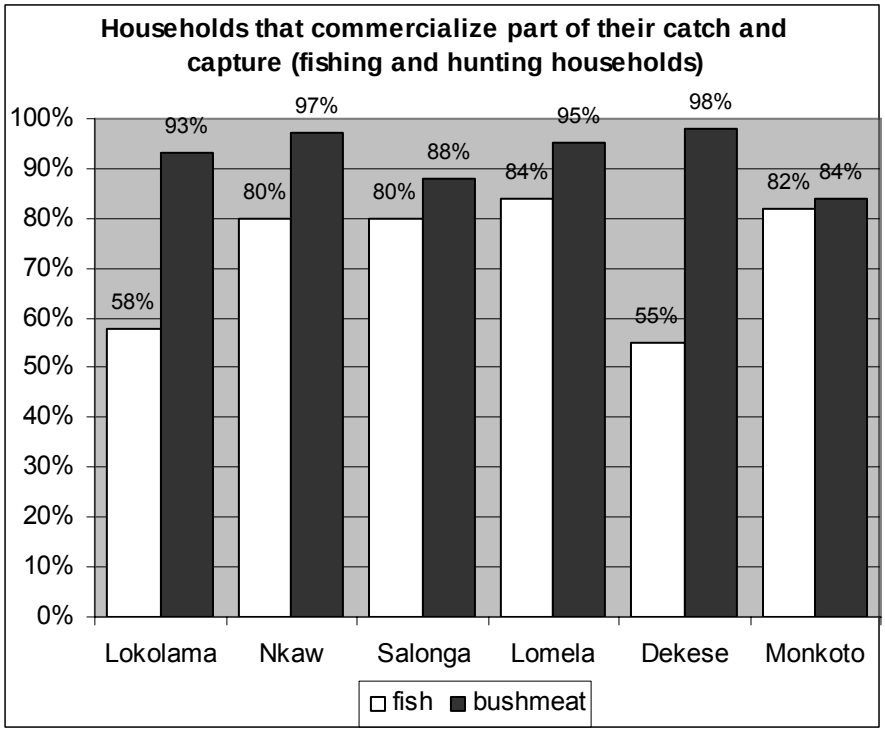
a. *Principal products*: Caterpillars, mushrooms, cola nuts and fruits such as *Gambeya lacourtiana, Treculia Africana, Landolphia spp, Anacardium occidentale,* and *Dacryodes edulis.*
b. *Locally perceived changes*: Among subsistence and economic activities, the fewest changes were reported for NTFPs. The principal change, decreasing availability of NTFPs, is linked primarily to the transformation of forest to agricultural land. The supernatural and traditional beliefs were also offered as causes for the negative trend.
c. *Opportunities for partnership*: The reported market demand for caterpillars, mushrooms and other products like cola nuts, represents an opportunity for communities to both increase and systemized harvesting. However, communities should be supported to ensure that harvesting is sustainable and economically viable.
d. *Constraints and Conditionalities*: Community restrictions on the exploitation of NTFPs are minimal. Perceptions of an endless supply coupled with their limited commercial relevance are probably the reasons that access is relatively open to outsiders. The few exceptions reported related to exploitation for commercial purposes with control under the authority of traditional leaders.

3. Fishing:

a. *Principal species:* Mungusu (*Channa obscurus)*, nina *(Malapterururs electricus),* ngolo *(Clarias spp),* mwenge *(Hepsetus odoe),* and mfumbe or mbedji *(Gnathonemus spp).* Mungusu and nina were among the four principal commercial and subsistence species in all areas of the landscape. Other species varied in importance according to site.
b. *Fishing as an income source:* Over two thirds (73%) of households engaged in fishing reported commercializing part of their catch (figure 5). However, revenue from fishing is low, with the majority of households reporting profits of under $15 per season.
c. Locally perceived changes: The transformation of fishing from a subsistence to a commercial activity coincided with the decline of commercial agriculture. Decreasing fish stocks, the principal change reported by local populations, was observed by households across the landscape. This change is associated with demographic pressure, and the introduction and proliferation of new fishing techniques. Species reported as decreasing were often those most often commercialized.
d. Opportunities for partnership: Awareness and concern over decreasing fish stocks coupled with the continued existence of traditional controls governing access to freshwater resources offer an opportunity to collaborate with local communities. Traditional regulations and knowledge constitute an important starting point for the development of sustainable community-based natural resource management (CBNRM) initiatives. An emphasis should also be placed on improving local livelihoods by adding value through processing techniques and working to direct proceeds from commerce to the local versus external actors.
e. Constraints and Conditionalities: Traditional systems of governance of fishing grounds are limited to rules of access applied to neighbors and foreigners. There are no internal restrictions or prohibitions on different techniques or the number of instruments employed by local fishers. While communities are aware that certain practices are unsustainable, they have little or no knowledge of more sustainable management systems or alternatives to destructive practices.

Increasing demand from outside the landscape also poses a challenge to principles of sustainable fishing and local governance. Even though fishing by outsiders is less problematic than for hunting and trapping, the more accessible areas of the landscape are under increasing pressure from groups coming from the Congo River (in the cases of Monkoto and Salonga and Lomela Rivers), and parts of Bandundu and Kasai (in the case of Nkaw Sector).

Figure 5



4. Hunting

a. *Principal species*: River red hog *(Potamocherus porcus)*, duiker *(Cephalophus spp)*, brush-tailed porcupine *(Atherurus Africanus),* Giant pouched rat *(Cricertomys gambianus).*

b. *Hunting as an income source*: Ninety-two percent (92%) of hunting households commercialize a portion of their capture. This percentage is higher than that reported by households that commercialize a portion of their fish catch (figure 5), highlighting the importance of bushmeat commerce to household economies. Revenue from hunting is low, with the majority of households reporting earnings of under $15 per season.

c. *Locally perceived changes*: Decreasing wildlife numbers was the principal change identified by local populations. Causes associated with this change were similar to those cited for fishing (demographic pressure, increased number of instruments, and introduction of new methods). Poaching by military and other outside groups were also reported as causes for decreasing populations. In addition, bushmeat commerce was identified as the reason for young men's decreasing participation in collective hunting, traditionally a subsistence activity, as more individual-oriented techniques (e.g. firearms and wire snares) are favored when hunting for commercial gains.

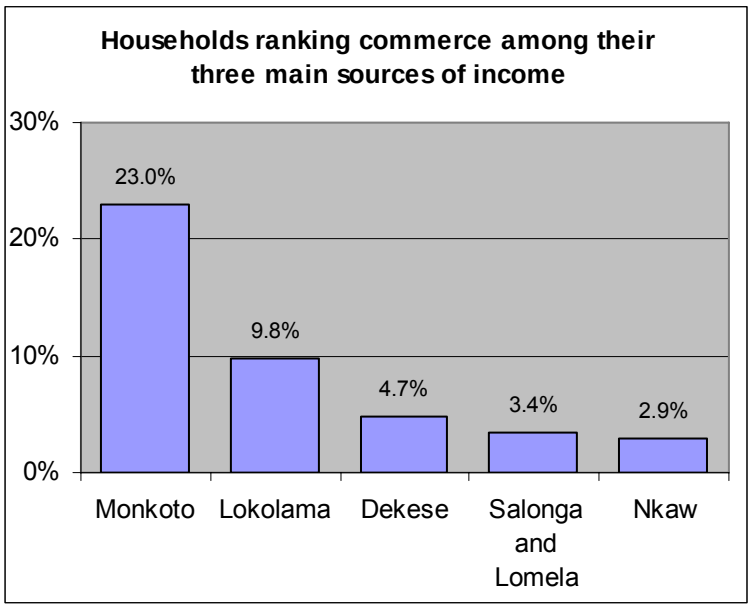
d. Opportunities for partnership: The local population's concern for decreasing wildlife numbers, as well as the existence of traditional controls governing access to forests and wildlife, represent an opportunity to work with local communities on improved and sustainable systems of management. A strong attachment to the land as well as persisting traditional beliefs and practices should constitute a starting point for community-based natural resource management initiatives.

e. *Constraints and Conditionalities:* Demand for bushmeat originates from outside the landscape, particularly from urban areas such as Mbandaka and Kinshasa and from mining zones like Tshikapa. While traditional authorities do exert some control over hunting and trapping by neighbors and foreigners, more problems were cited for the control of this activity than any other. Poaching was reported in all study areas, and, an important subset, poaching by military and ex-military, was reported in the Nkaw Sector, Monkoto, and along the Salonga and Lomela Rivers. If community governance and management of forests is to be promoted through the establishment of CBNRM or community-forest areas, it will need to be complemented by higher level policing and anti-poaching capacity as well as parallel lobbying actions by landscape partners. It will be equally important to address the problem of bushmeat demand coming from outside the landscape if the unsustainable pressure on wildlife is to be successfully reduced.

5. Commerce

a. *Principal products exported from the landscape:* agricultural products, bushmeat, and fish.
b. *Principal products imported into the landscape:* manufactured goods, including fabric, plastics, hunting and fishing equipment, salt and soap.
c. *General characteristics of commerce:* Commerce is limited at the local level, making more distant markets attractive to local populations. However, the challenges of reaching distant markets make long-distance commerce an almost exclusively male activity. Individuals transport commercial products on foot, or by pushing or riding bicycles, traveling up to 700 km. Travel to larger market towns is facilitated by navigable rivers, with people and goods moving on rafts (built on top of dugouts), dugout canoes (rarely motorized), freight boats, and *baleiniers* (larger motorized boats). The absence of transportation alternatives for carrying large loads from the interior to river ports, limits volumes traded and because of this the majority of merchants deal in small quantities. Barter is practiced across the landscape, with the terms of trade unfavorable to local populations.
d. *Commerce as an income source:* Commerce ranks low as a source of income for landscape households, with the exception of Monkoto Territory, where 23% of households mentioned it among their three main income sources (figure 6).

Figure 6



e. *Locally perceived changes and constraints:* In the years after independence and more markedly with Zaireanization (1973-4), agricultural commerce decreased and companies left the area, giving way to individual, small-scale activities that

remain the norm today. During the same period, the focus of commercial activities shifted from agriculture to hunting and fishing.

Lack of access to information on market prices in larger towns and cities, as well as unforeseen travel costs and illegal taxing are among the causes of the wide range in profit margins reported by merchants.

f. Opportunities for partnership: Activities that aim at reducing isolation and lack of information concerning market prices and trade opportunities will address two of the principal concerns of local populations: disadvantageous terms of trade and absence of appropriate infrastructure to evacuate agricultural products. How these two problems are addressed will directly impact the success of CBNRM initiatives.

g. Constraints and Conditionalities: The size of the landscape and its isolation necessitates a prioritization of areas and types of intervention. Furthermore, CBNRM initiatives need to be paired with viable systems of commerce and transportation. These, in turn, need to include an assessment of potential risks of any changes or increases in exploitation to the natural resource base and the long-term well-being of local populations. For example, the re-opening of trade routes will most likely result in an influx of merchants, fishers, and hunters from outside the landscape, threatening local communities' capacity to protect and control the use of their natural resources.

Access to land and resources

1. *Traditional mechanisms of access*: Traditional leaders continue to control community access to forest and freshwater resources. Local households have, for the most part, open access to natural resources located within their village's territory. People from neighboring villages and foreigners wishing to access land and resources must solicit permission from traditional authorities. Depending on the village and resource, access may be granted with or without payment. Traditional authorities also have the power to deny access to individuals. Isolation has contributed to the continued existence of these systems of governance. However the influence of external forces is growing across the landscape, particularly in more accessible areas and zones closer to urban centers.

   Stricter regulations were found in areas where resources are perceived as decreasing or threatened by outside groups. For example, the more accessible Nkaw Sector (proximity to town of Oshwe and the Lukenie River) reported more controls of fishing and hunting than in the neighboring Lokolama Sector. Access was also more restrictive where populations perceived resources as being limited. For example, villages in Dekese reported the highest degree of restrictions on hunting and fishing, at the same time as voicing the greatest amount of concern over growing pressure on natural resources by a growing (local) population.

2. *Salonga National Park:* SNP was mentioned as an impediment to the subsistence and economic activities of villages relocated during the park's creation and those with traditional forests and waters within it's boundaries. Prohibited access to their former lands was linked to the decreased availability of wildlife and fish as they have been forced to concentrate their activities in a smaller area, shared by many.

   - The villages of Ingodji, Ilongaba and Djongo Nord (Dekese Territory), located within 10 km of SNP borders, associated the creation of SNP with the decreased availability of wildlife.
   - Participants from the villages of Efeka and Botsima, in the Salonga and Lomela areas, respectively, mentioned that local populations were forbidden to access resources in Salonga National Park, adding that this prohibition was not honored by

ICCN personnel. The SNP was mentioned as a cause of decreased availability of resources (game and fish) in 28.1% of household interviews in both areas. Participants believe that the creation of the SNP reduced the area available for fishing, putting more pressure on freshwater habitats outside of the park.

- Ikomo Lomoko (Lomela River) residents continue to pay restitution to the original owners of the land and fishing grounds that they presently use, after being displaced from SNP in the late 1960s[6].

Villages located farther from the park's boundaries did not identify SNP as having a impact on their subsistence and economic activities.

3. *Large scale extractive activities:* The disappearance of large scale extractive activities in the landscape dates back to the late 1960s and the Zaireanization years. The landscape's local population has very limited experience with extractive industries with most knowledge limited to the nostalgic memories of its older generations. Although the future arrival of logging companies and agribusiness may be perceived as a positive change due to these memories, the lack of experience, information, and understanding of the implications, advantages and disadvantages of collaboration with extractive industries renders communities unprepared for negotiation and decision making putting their lands, resources, culture, and livelihoods at risk.

[6] The displacement of many villages preceded the official declaration of SNP.

I. Introduction

The present study was conducted in seventy three villages and two towns[7] located within the Salonga-Lukenie-Sankuru (SLS) Landscape, which contains the Salonga National Park (36,560 km2), the only protected area providing refuge for bonobos (*Pan paniscus*) (CARPE, 2005). The park was declared a World Heritage Site in 1984 and World Heritage Site in Danger in 1999 due to increased threats from poaching and illegal encroachments (UNESCO, 1999).

The baseline socio-economic study for the Salonga-Lukenie-Sankuru Landscape responds to the goal of the Central Africa Program for the Environment (CARPE) of the United States Agency for International Development (USAID) of *"Sustainable natural resource management practiced throughout Central Africa in order to promote sustainable economic development and alleviate poverty for the benefit of people of the region and the global community."* It also responds to the Congo Basin Forest Partnership (CBFP) goal of "*providing people sustainable means of livelihood through well-managed forestry concessions, sustainable agriculture, and integrated ecotourism programs"* by identifying opportunities for partnerships between conservation efforts and community livelihood needs. Another member of CBFP, the European Union, through its program "*Renforcement des capacités de gestion de l'ICCN et appui à la rehabilitation d'aires protégées en RDC*" and with the global objective of "*contributing to the protection of biodiversity in the Democratic Republic of Congo*", has targeted support to the SLS landscape with a particularly emphasis on Salonga National Park. It this context it supports the reinforcement of ICCN's capacity to work with local communities, situated on the park's periphery, to sustainably manage their natural resources.

Because both programs focus on natural resource management and conservation, the study concentrated on household and village-level activities related to the extraction and use of natural resources. Part of the study consisted as well of understanding current levels of governance and community organization in order to identify possible future partners in sustainable management activities. Information on social organization and economic activities did not exist for much of the landscape or preceded important historical and economic events that have directly influenced resource trends and their use.

The content of this study is based on the application of qualitative and quantitative methods in randomly selected villages across the Salonga-Lukenie-Sankuru Landscape (SLS). Methods included household surveys, gender differentiated focus groups, interviews with merchants, meetings with local community based groups and authorities, and general field notes. Research instruments were designed to allow local interpretation help answer some of the questions that were stated in the study's goals to:

- Understand issues around natural resources management (NRM) within the SLS Landscape, specifically, direct and indirect threats and pressures to biodiversity.
- Understand threats to local populations' economic and subsistence activities.
- Understand the links between small and large-scale exploitation of natural resources (NR), routes of access and commerce, visible (legal, official, or more obvious markets and trade routes) and less visible (illegal, unofficial) markets.
- Understand forms of access to land and resources such as concessions, plantations, etc.
- Identify possible partners for implementation of NRM as well as existing good practices in the area.
- To provide Information that can contribute to comprehensive planning, helping to determine conservation opportunities, feasibility of land use scenarios in order to frame the development of an integrated conservation and development for the landscape.

[7] Merchant interviews and meetings with local NGOs and CBOs were conducted in the towns of Dekese and Lokolama.

The study's results are organized by territory. For each territory basic household demographic information is provided, as well as information on their subsistence and economic activities, commerce, land use rights and access, and changes in the use of natural resources. The study did not include a census of the population[8]; demographic information was collected only from sampled households and villages. Agriculture, collection of non-timber forest products (NTFPs), hunting and fishing activities are broached in detail in order to provide a picture of household and village level subsistence and economic activities linked to forest and freshwater resources. Reliance on these activities, due to limited income-generating sources alternatives, make availability and access to natural resources a key element in people's livelihoods. Changes in local economic activities are addressed at regional and local levels, highlighting local populations' perception of trends in the availability and quality of natural resources linked to their subsistence and economic activities.

Perceived changes fall under three categories. First, there are those changes triggered by "natural" causes such as crop diseases, drought, etc. Secondly, there are changes provoked by historical or national events, such as Zaïreanisation and the economic decline associated with the recent civil war. Finally, and often in association with the second category, are recent changes in local economic practices, current adaptation to regional conditions, and the search for new livelihood strategies that sometimes include the abandonment of traditional customs of resource use.

The effect of changes in certain activities affect people's lives and their adaptation strategies differently. For this reason, agriculture, collecting of NTFPs, hunting and fishing are first looked upon individually. However, village and regional dynamics are complex, and changes in certain activities have caused and continue to trigger changes in others. Local populations connected historical and current changes together, and it is in these connections where the effect of human activities on the landscape's biodiversity can best be understood. Changes and their perceived causes and consequences illustrate how external and internal pressures have affected, affect and will probably determine resource availability in the landscape, as well as trends in extraction and transformation of the natural environment. While people's experience in natural resource use across time helps explain existing pressures, their concerns regarding resource availability and abandonment of certain traditional practices offers an opportunity for partnerships that may/will ensure the sustainability of local economic activities and the protection of landscape biodiversity.

Participants distinguished three principal periods in their recent history as determinants of the state of natural resources use today. Contact with European traders, missionaries, and colonial administrators only lasted a few decades in most of the landscape but change was sufficiently abrupt that this period continues to be an important reference in their perception of their quality of life. European presence signified forced labor and relocation but also availability of manufactured goods, services like health and education, and the introduction of a cash economy. Economic and political conditions after independence and through the 1970s progressively led to geographic and commercial isolation that required people to shift economic activities in order to continue to satisfy their basic needs. Commercial fishing and hunting became viable economic alternatives as revenue from agriculture declined. This shift represented increased reliance on hunting and fishing methods introduced during the Colonial period and post-independence. These changes did not signify major gains to households, which continued to struggle to satisfy basic health and educational needs. Fishing and hunting for

[8] Socio-economic studies conducted by the Wildlife Conservation Society did include a census of villages located on the corridor between the two blocks of the SNP. The results from their census revealed that the actual population of villages was 50% or less than reported in official figures provided by government health services . According to this study, the significant difference in numbers was attributed to the use of extrapolation from census figures of 1984 versus door to door surveys. Another explanation offered was that the local administration may consider inflated population figures beneficial in the coming elections. As for the health area's census, a larger population means a better opportunity to benefit from interventions as well as larger allocations of pharmaceutical products (WCS, 2005:27-28).

commercial purposes did not represent an increase of cash flow either because many of these commercial exchanges were based on barter from the beginning. While some individuals have managed to acquire more wealth through the individualization and commercialization of hunting, the general perception is that the intensification of fishing and hunting has provoked a decrease in the availability of fish and animals and no significant gains. Pressure from external markets is felt across the landscape, particularly in those areas that serve as entry points to traders and outsiders traveling in to exploit resources.

Salonga National Park and the presence of the Institute Congolais pour la Conservation de la Nature (ICCN) are addressed in sections where participants raised issues or concerns in terms of their access to park resources or lands or referred to conflict with ICCN personnel. Boundary issues were particularly important for villages located in close proximity to the Park as well as for populations that were relocated during its creation.

The study concludes with a review of landscape-level changes in local economic activities, adaptation and strategies and their impact on natural resources. The implications of these changes for conservation activities are addressed in this section, along with the potential for collaboration with local populations and groups, and actions needed at a larger scale, to address threats that originate within and beyond the landscape's limits.

II. Methodology

The socio-economic study was based on the application of a series of research instruments in randomly selected villages within the landscape by teams of Congolese team leaders and local research assistants, periodically accompanied by the lead consultant. The research instruments were comprised of questionnaires for heads of households and merchants, and focus group templates for men and women separately. Research activities were complemented by participant observation and the collection of geographic data. All research instruments aimed at capturing, within a limited time frame, information that would facilitate the understanding of social structures of the area, types of economic and subsistence activities, the manner in which people use land and resources, and ideas about economic development held and/or currently fostered by local populations in relation with their use of local natural resources.

Draft research instruments were first developed in a workshop organized by the SLS Landscape Lead, WWF, at its offices in Kinshasa, in March 2005, during which ICRAF facilitators and some members of the CLIFS[9] study collaborated with CBFP partners and other participants in the design of socio-economic research methodology (Steel et. al. 2005). These instruments were later revised, adapted, and translated to Lingala by the Lac Tumba and Salonga socio-economic research teams. After the first fieldtrip, additional changes and modifications were incorporated to improve the quality of interviews and facilitate data entry in the field. Questions and concerns raised by participants, as well as specific issues regarding natural resource management in the area, helped refine questions and data organization.

Ongoing collaboration between the Lac Tumba and Salonga-Lukenie-Sankuru socio-economic research teams has enriched the fieldwork experience as well

Household interview Lokolama Sector

[9] Congo Livelihood Improvement and Food Security Project. ICC Consortium, IRM.

as analysis activities by standardizing methods and instruments that allow comparisons across landscapes as well as the establishment of links between certain economic activities that span the two landscapes. Participation of the SLS Landscape Leader in some research activities and trips has helped the field teams improve their understanding of the links between socio-economic data and future conservation activities. The field teams have also used geographical positioning systems to update village location information and collect data on roads and other features.

A. Definitions

Household questionnaire: A household was understood as a group of people sharing a place of residence, the earnings and products of their work and other resources held in common, as well as a cooking fire (www.webref.org/anthropology/h/household.htm, CLIFS, 2005). The household questionnaire included questions on household composition, recent migration, and group membership. It also focused on households' subsistence and economic activities, asking detailed questions about agriculture, hunting, fishing, and collection of NTFP. This instrument was used to collect quantitative information in order to identify trends and make comparisons across the landscape as well as to allow for future monitoring and the measurement of the impact of interventions. This questionnaire also included qualitative, open-ended questions regarding perceived changes in the availability of resources and in subsistence and economic activities.

Merchant questionnaire: A merchant was understood as a person that buys products/goods from villages to sell them in other villages or markets. Because this study centered on the use of natural resources, merchants trading in manufactured goods were included only when part of their goods consisted of agricultural, hunting, fishing, or non-timber forest products. The merchant questionnaire therefore aimed at complementing the understanding of local and regional commerce of raw and transformed natural resources. This questionnaire included a section for general demographic information on the merchant, years practicing commerce, his or her participation in merchant associations, etc. The second section consisted of a table that interviewers filled in based on close-ended questions regarding the trajectory of their products from their purchase to the final sale.

Focus groups: Focus groups were facilitated by one of the SE team members that guided a group of people in the discussion of a specific topics. These did not substitute household surveys, but rather served as a complement by helping to respond to some of the *why* questions posed by researchers (Bernard, 1995: 228, see also Kreuger's guide to focus groups, 1988). In the context of this study, focus group discussions helped answer some of the "whys" posed by landscape leaders and partners. The focus group included four main sections: 1) a discussion guide to collect information on the village's history; 2) a series of open-ended questions concerning agriculture, hunting, fishing and collection of NTFPs at the village level, focusing on changes in these activities as experienced over time; 3) traditional forms of governance and access to local resources

Women's focus group, Lokolama Sector

including land and waterways; and 4) the existence of local CBOs and NGOs. Questions in the focus group addressed behaviors and practices at the community level, in order to complement the information gathered from households and contextualize these responses within the larger framework of the village. Through focus group discussions, landmark events[10] were used as references to talk about observed changes over time.

The focus group guide included additional questions to help the moderator(s) verify that different events of the village's history were covered, including its founding[11], national and regional events such as the arrival of missionaries, and to elicit more detail from participants. Moderators were encouraged to ask for examples and clarification without putting too much emphasis on one economic activity over the other. The fact that all questions pertaining to economic activities followed the same format helped reassure participants that the research team was not there to enquire solely about (possibly perceived as negative) activities such as hunting or fishing. The same landmark events were used when referring to agriculture, hunting, fishing, and collection of NTFP (for example, did [agricultural][hunting][fishing][collection of NTFP] activities in this village change after [the arrival of missionaries][the construction of the road][Independence]?). The time devoted to each activity was set by participants, and while staying close to the focus group guides, moderators allowed them to elaborate on those subjects that appeared more important to participants.

B. Selection of villages and participants

Villages were randomly selected from available geographic information on the landscape. During the March 2005 workshop a sampling rate of 30% was chosen at two scales: villages within 10 km of SNP (47) and 30% of the remaining landscape villages (77). The differentiation was made to ensure enough coverage of villages located in the proximity of the Salonga National Park, in order to have sufficient information on the impact of the park on those villages and vice versa. Also, this distinction would allow the study team to determine whether resource use differs with greater proximity to the park, and if this poses different threats to conservation and livelihoods. Villages already surveyed as a part of WCS socio-economic activities were excluded from this study. In total, seventeen villages located within 10 km of the park's limits participated in the study, representing 36% of the original sample and 11% of all landscape villages located within 10 km of SNP (table 3).

Table 3 Villages within 10 km of the PNS

Area	Villages
Territory of Dekese	Djongo Nord, Ingondji, Ilongaba
Territory of Boende (Salonga and Lomela rivers)	Bamata, Beele, Besoyi, Bokela, Botsima, Efeka, Ibali, Ibali 1, Ikomo-Lomoko, Ilonge Centre, Lonkanda, Malela Centre
Territory of Oshwe (Lokolama Sector)	Esama, Manga

When arriving at new locations or villages, team leaders contacted administrative (*chef de localité)* and local traditional authorities (*chef de terre)* to explain the purpose of their visit and to request their permission to conduct the focus groups with men and women. Apart from local authorities and village elders (*notables)* other participants in the men's focus group normally ranged from a dozen to over 50 people, and sometimes over a 100

[10] Landmark events help reduce memory errors regarding dates and periods by referring to important historical events in the village (Bernard, 1995:235). The focus group discussion started with questions on the history of the village; important events were then used as reference points when discussing changes in natural resources and associated resource-extraction activities.

[11] Open-ended questions allowed participants to begin either with their mythological origins or with more recent legends and historical events.

participants[12], depending on village size and dynamics. Active participants, however, normally did not exceed 10 to 15 people. Similarly, in women's focus groups it was usually a few participants that actively contributed, with others assenting or disagreeing with the more outspoken women. In cases of disagreement between participants, team leaders underlined the importance of listening to everyone's opinion, while taking notes of differing positions. Emphasis was made on the importance of taking descriptive notes (Bernard, 1995:188-190) to complement the survey data. Questions and concerns raised by participants, as well as specific issues regarding natural resource management in the area, helped refine questions and data organization.

Within villages, the number of participating households was based on the total number of households. Each field researcher was assigned to a section of the village where s/he visited every other, second or third households, depending on the size of the village. With the exception of large towns, where teams concentrated on NGOs and CBOs and focus groups, the research teams interviewed 27% of households in each participating village. Villages with fewer than 10 households were interviewed in their totality. While the goal was to include 30% of households from each villages, this was not always feasible because of time constraints or because people were not available for interviews. Covering all required households was particularly difficult during the first days of fieldwork, when team leaders accompanied local research assistants as part of *in situ* training.

Participants in the merchant interviews were not randomly selected but invited to participate based on the type of commerce they practice. Because the study also aimed at understanding existing trade routes and regional commercial dynamics, merchants from outside the landscape were also interviewed if they were involved in trade activities within the study's axes. Potential participants were also identified during focus groups, through village leaders, and opportunistically when encountered on roads between villages.

C. Logistical and methodological challenges

Long distances, difficult road conditions and lack of communication have limited access to some of the more isolated villages in the sample, resulting in a reduction of the total number of participating villages to 73 (59% or the original sample). Sample villages that have disappeared or were incorrectly located on old maps were substituted by the nearest village (as in the cases of Rélégués and Esolabwe in the Dekese area, Ika on the Salonga River, and Boseki in the sector of Nkaw, Oshwe).


Field researcher: Dekese sector

Some of methodological difficulties encountered during the study included the presence of participants that report very limited cash-generating activities, making it difficult for them and researchers to rank subsistence practices in terms of income generation. Other questions on revenue and barter activities throughout the questionnaire helped triangulate data to provide additional insight into household economics. Ranking activities in terms of time allocation and revenue was particularly challenging in the case of the collection of NTFPs since many people reported it only as an occasional or opportunistic activity, carried out by most people but commercialized

[12] The largest group recorded was that of Itunga, in the Territory of Dekese (110 participants).

infrequently due to the limited seasonality of the different products (m.104-111 Mbungusani and Iyoko).

Locating merchants was problematic because very few villages have markets or stores and itinerant merchants were difficult to identify and recruit within the time spent in each village.

D. Data entry and analysis activities

Research team members based in Kinshasa also participated in data entry between and after completing fieldwork activities. This activity began with elementary training in quantitative data entry, transcription of qualitative notes and focus groups, and collaboration with Lac Tumba team leaders in the codification of responses, particularly for animal and fish species. Socio-economic data was analyzed at the household, village, and area[13] levels. Descriptive notes were transcribed using a framework that included name of researcher, village and date when the notes were taken.

To facilitate later recovery, the team members included the number of the question related to each note or quote (Bernard, 1995:192-193). Numerical and text codes were used to enter survey information. Since this was their first experience in coding for the majority of the research team members, a more open list of coding was chosen, that was later re-classified after the fieldwork and initial data entry was completed. While this was more time consuming, it also allowed easier, faster access to the original sources and texts during analysis, including the clarification of certain codes and the correction of errors. Data was entered in Office's Excel worksheets, which allowed field team members with little data entry experience to participate in this stage of the research process. The participation of Congolese in field and data entry activities enriched the quality of the data obtained because names and terms were kept in the original language of participants.

Socio-economic data was analyzed first through descriptive statistics at the household, village, and axe levels. Focus group data and qualitative notes from the household and merchant questionnaires were transcribed and coded by activity. Whenever possible, verbatim quotes were maintained to illustrate quantitative tables and charts summarizing findings. Other analysis methods included looking for correlation between commerce, consumption and reported decreases in resources.

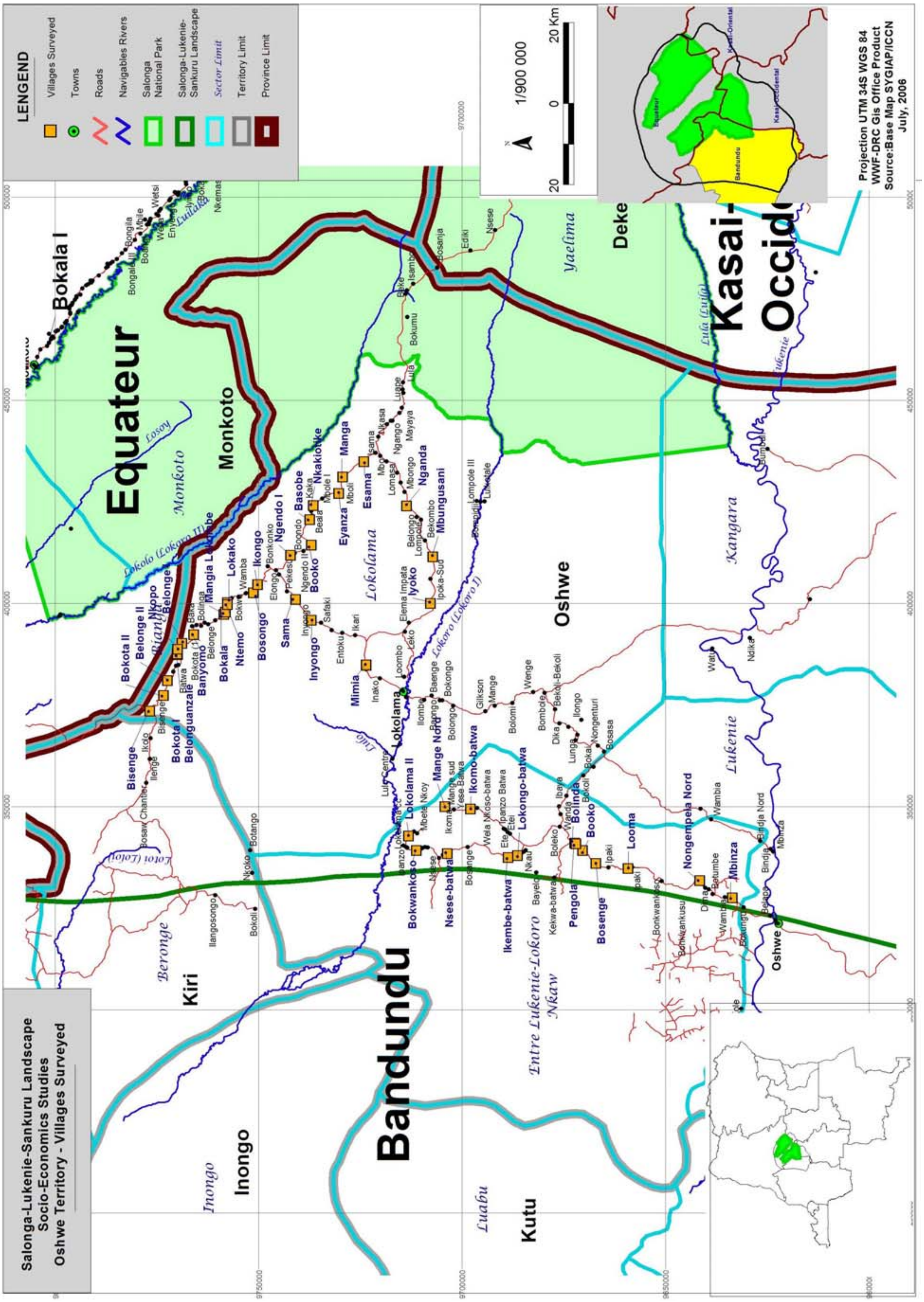
[13] Part of the Territory within the Landscape limits.

III. Findings

Oshwe Territory: Lokolama and Nkaw Sectors

This section includes results from the Lokolama and Nkaw sectors both located south west of the southern block of the Salonga National Park, in Oshwe territory.

Province	Bandundu
District	Mai-Ndombe
Territory	Oshwe
Sector	Lokolama, Nkaw
Groupements	Bolendo, Bolongo
Villages: Lokolama	Banyomo, Basobe, Belonge 1, Belonge 2, Belongwandjale, Bisenge, Bokala, Bokota, Booko, Bosongo, Esama, Eyanza, Ikongo, Inyongo, Iyoko, Lokako, Manga, Mangia Lokombe, Mbungusani, Mimia, Nganda, Ngendo, Nkakaotike, Nkopo, Sama
Villages: Nkaw	Pengola, Nsese, Nongempela Nord, Mbinza, Mange Nord, Looma, Lokongo, Lokolama II, Ikomo, Ikembe, Bosenge, Bolinda, Bokwankoso, Boko


Salonga-Lukenie-Sankuru Landscape
Socio-Economics Studies
Oshwe Territory - Villages Surveyed
LENGEND
Villages Surveyed
Towns
Roads
Navigables Rivers
Salonga National Park
Salonga-Lukenie-Sankuru Landscape
Sector Limit
Territory Limit
Province Limit
1/900 000
20 Km
Projection UTM 34S WGS 84
WWF-DRC Gis Office Product
Source:Base Map SYGIAP/ICCN
July, 2006
Equateur
Bandundu
Monkoto
Oshwe
Lokolama
Kiri
Inongo
Kutu
Bokala I
Kasai-Occidental

A. Cultural and historical context

The majority of participants from these sectors is of Mongo origin, and belong to the Nkundu ethnic group, represented by over 75% of the population. The second most important group in the territory are the Batwa who make up 19% of the population (figures 7 and 8). Ninety-five different clans were identified in the Lokolama sector, each with a strong affiliation to a specific *groupement*[14]. The Bosonga, Bokota and Nkaw clans were cited by both Batwa and Nkundu participants. In the Nkaw sector, 45 clans were reported, of which two (Bapomi and Bosenge) had membership of both Batwa and Nkundu households.

Figure 7

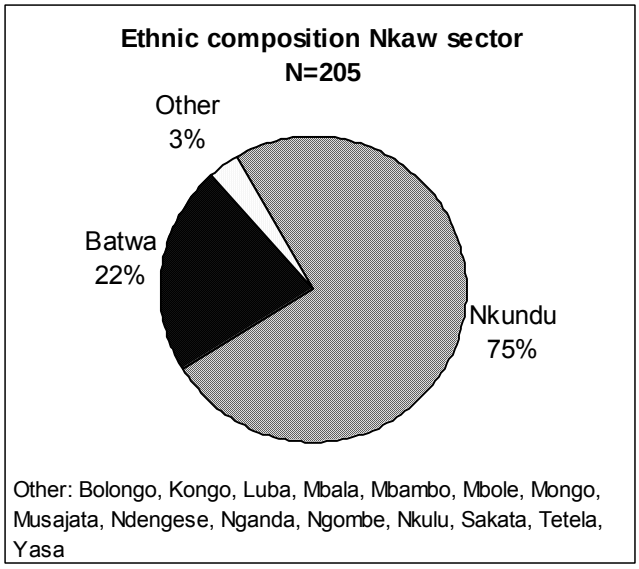
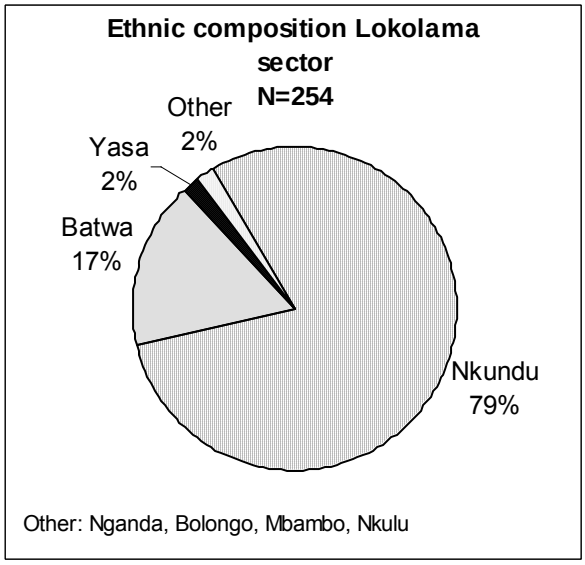


Figure 8



In this part of the landscape traditional clan leadership continues to exist and influence activities at the local level. Power is transmitted through the paternal line, but not necessarily from father to eldest son[15].

Local oral histories indicate that the Nkundu population arrived in the area from the Province of Equateur in a series of migration waves. The majority established new villages, although a few, such as the clan Liese, settled in Basobe village, among the Longunia and Bokole wa Samo. Twenty two of the villages[16] from the Lokolama sector reported fleeing Equateur because of the "war of Ikenge.[17]"

The invasion of Ikenge also displaced some Batwa groups living in association with the Nkundu. Many of the groups that fled the war of Ikenge moved constantly, some of them changing sites five or six times before the arrival of the Belgian administrators, who resettled most of them along the roads under construction. Both Nkundu and Batwa told their own versions of the

[14] A group of various villages with clan ties and a common origin, located in proximity to each other.
[15] The colonial administration affected local leadership by sometimes changing chiefs based on their willingness or lack of willingness, to collaborate with Belgian administrators (no_author, 1959:35; Engels, 1922:20).
[16] From Lokolama: Banyomo, Belonge I, Belonge II, Belongwandjale, Bisenge, Bokala, Bokota 1 and 2, Booko, Bosongo, Eyanza, Ikongo, Inyongo, Lokako, Manga, Mangialokombe, Mimia, Nkakaotike, Nkopo, Ntemo, Sama, and the clan Liese from Basobe.
From Nkaw: Boko, Bokwankoso, Bolinda, Bosenge, Ikembe, Ikomo, Lokolama II, Lokongo, Loooma, Mange Nord, Mbinza, Nongempela Nord, Nsese, Pengola
[17] Ikenge was a Tetela leader who invaded the Mongo Kingdom, fought the Ekonda, and who later fought their Nkundu neighbors (Vinck, 1992; Mpoto Iyango, 2001:90) causing important migration movements from the territory of Kiri (Bandundu), sometimes through the territory of Monkoto (Equateur) or up the Lukenie River (Bandundu) into Oshwe. This war took place right before or during the first arrival of Europeans in Equateur.

story. While the Nkundu from Belonge 1 explained that *"they had fled the war of Ikenge in the company of their Batwa slaves,"* The Batwa from Belonge 2 told a different story:

> *"We, the Batwa, come from Equateur. There we were threatened by the Nkundu and the war of Ikenge. After leaving Equateur we settled in a village called Ndobokumu, where we fought the Nkundu. We built a barricade so we seriously hurt them. When they realized how fierce we were, they sent a Nkundu woman as a present to calm our anger. Her name was Ngoole. We hung her from a tree and shot arrows until she died, this discouraged the Nkundu. Afterwards, they started going by our villages without threat. As long as we live apart, we have good relations." (men's focus group, Belonge 2)*

Some Batwa groups also reported moving village sites with the goal of escaping the Nkundu who kept them as slaves:

> *"We come from Equateur. Before, we lived in Yembe, in the Territory of Monkoto. We lived in a village called Mangi Ilombe. Our ancestors refused the orders of the Nkundu and moved to Yembe Lofombo, in the Territory of Kiri in Bandundu, because the Nkundu wanted us to be their servants[18], but we refused, we wanted to be independent. When we arrived in Yembe Lofombo the chef there also forced us to work in his fields. We refused and decided to live isolated, in our own place. That's how a group of pygmies came to the Territory of Oshwe, to Lokolama, and another group stayed in the Kiri, in a village called Bisenge 2." (men's focus group, Bisenge)*

Other villages, like Nkopo and Ikongo in Lokolama, and Penzola in Nkaw, reported that they split before finally settling in their current villages. Some members re-located into near-by villages. Other groups split before arriving in the Lokolama and Nkaw territories, with the result that some members resettled in Bikoro (Equateur), and others in Dekese (Kasai Occidental). Links between ancestral clans who resettled in close proximity to each other persist today, with some villages maintaining exogamous links with each other.

[18] "pygmées attachés"

Box 1 The history of the Bolendo Groupement (Lokolama Sector)

Long time ago three men went hunting; they left their village with their white dog "Luale." The hunters' names were Nkamienga, Nkantomasoso, and Nkaomelongo. On that particular day they couldn't catch anything. Night was falling when their dog disappeared, so the three men started to call him, "Luale! Luale!" After some time a voice replied "who calls the dog?" and so the three hunters replied, "It is us, the owners of the dog." The mysterious voice invited them to approach it and then asked them to go back to the village and bring back the village's clans.

At the time there were only three clans in the vicinity of the village. When the three hunters arrived at the village they called the clans, but the clans refused to meet the mysterious voice. The first clan, the Mpombe, refused saying that they only ate corn. The second clan, Boondo, refused claiming that they only ate palm nuts. The third clan, Nsamongo, refused saying that they lived off hunting.

After this rejection, the three hunters went back to give their report to the voice, and so the voice asked them to go and call the tribes that lived close to their village. There were five tribes: Mputshi Assa, Nkampeli, Etenionianga, Nkole, and Nkaoko. They all took off to see the mysterious voice that spoke like a human. When they arrived close to the voice they received new names. The three hunters who found the voice belonged to the tribe Nkaoko, which was the local tribe from the village of Ngendo. They became known as the "Boyela" which means "the first to arrive where the voice [or "the monster that talked like a human," in the Mimia version] was. The Nkampeli tribe received the name of Yassa, which means "great noise" because they had not chosen the right path, creating much noise walking through the forest. The tribe of Etenionianga received the name of Nkaka, which means "too many difficulties" because they had walked through thorny plants to get to the voice. They, too, had chosen the wrong path to the voice. The voice renamed the tribe of Nkole, Esombo, which means "Tondolo, one of the families of ginger" because they had walked on the right path. The tribe of Mputshi Assa received the name Bolongo, which means "order" because they arrived in line, or in order. After receiving their names, the same voice ordered them to climb a palm tree one by one, and to try to cut the palm nut regime. All tribes, except Mputshi Assa - who didn't intervene in the cutting- failed in their attempt to cut the bunch. Only the tribe of Esombo succeeded in cutting the bunch from the palm tree. In the same way, this tribe was the only one that succeeded in pulling apart the nuts.

After this event, power was divided among the tribes as follows: The Yassa received from the voice the leopard's skin, the hunting eagle, and the giant pangolin. Before crowning the *chef de terre*, a python had to cross the village. The Nkaka received the same things, but before crowning their *chef*, blood had to flow, a battle had to take place. The Esombo received the same things, but in order to crown their *chef*, he had to carry two palm nuts around his neck. To the Bolongo the voice said, "You are the young ones, you can eat everything." That's why the Bolongo have no food prohibitions; they received the power to eat everything, even centipedes.

The voice then said to the Boyela, "you found me, now you will transport me. My name is Eliah Lokolo; take me to your tribe." The mysterious voice ordered the other tribes to return to their villages. On the way back to the village of the Boyela, the voice jumped into a river named "Loyile" and gave the following instructions: In that place (Loyile) people were forbidden from stealing, killing, criticizing, or cursing anyone. Whoever infringed these instructions would die or be cursed. The mysterious voice then followed the Boyela back to the village of Ngendo, where it still lives.

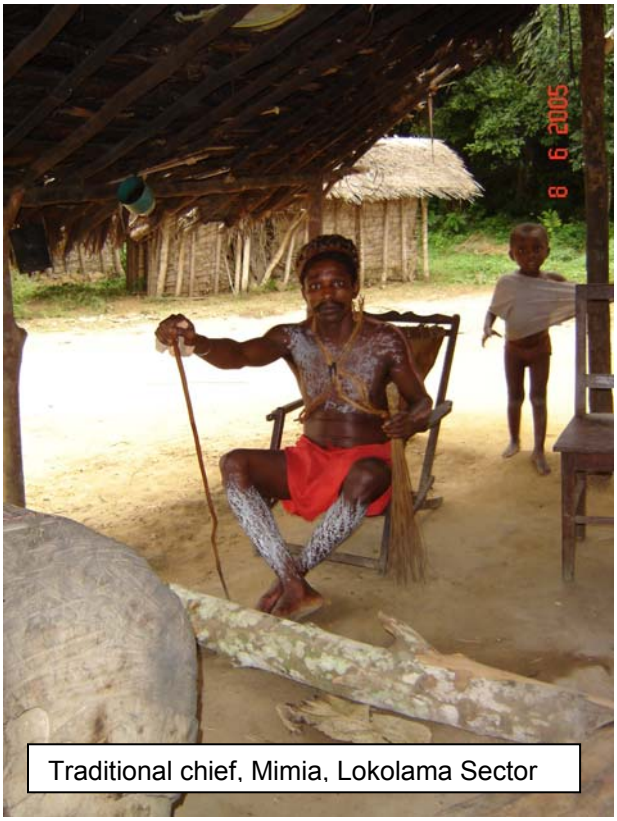
The Boyela also received the power to determine or announce the seasons (dry and rainy), but they were forbidden from ever having white dogs. The sharing of power took place in Ngendo, precisely. The place of sharing is called "Bolonga mpo bokapako." After the monster jumped into the river the tribes returned to their villages and didn't meet again until the white men brought them out of the forest to build the roads.

Sources: Focus group and field notes from the villages of Ngendo and Mimia

The last known displacement is attributed to the construction of roads by the Belgians which began in the 1930's and continued into the 1950's:

> *"It was by request of the Belgian State that we accepted coming to the road to build it under the whip. A white man called 'Empuka Mpuka' directed the works, together with his rifle 'Ibibi Pupupu.' The white man forced us to search for copal [resin] and palm nuts, and, before cars came through, to carry the products to Lokolama." (men's focus group, Bokala)*

« At the time, there was the problem of forced labor. That's why the whites resettled us by the river Yenge, to grow cotton[19]. We stayed there for seven years. Towards 1943, the whites moved us again to settle by the roads. Everybody was resettled then. We moved once more, from a hill 2 km away to the place where the village is now." (men's focus group, Looma)



Traditional chief, Mimia, Lokolama Sector

Some resettlement created conflict between villages when already established groups had to share their forest and resources with the newcomers, as is the relationship between the villages of Inyongo and Sama[20]. In the 1940s the village of Sama was relocated by the road in land that belonged to Inyongo, whose *chef de terre* demanded payment for the use of the forest. The Belgian administration tried to solve the problem by assigning Sama 7 km2 of land outside Inyongo's forest, but this, in turn, caused problems with the Yassa. The *chef de terre* of Yassa started demanding payments every time they hunted in that forest. The problem went to court in 1949 when the Colonial administration invalidated the rights of the *chefs de terre* to demand payments for the use of their forest.

Villages located between the Lokoro 1 and Loole rivers, and along the Lokoro 2 were among the resettled villages, and included those from the groupement Bolongo, as well the villages of Banyomo, Belonge 2, Belongwandjale, Bokala, Booko, Bosongo, Eyanza, Ikongo, Lokako, Nkakaotike, Nkopo and Ntemo (Lokolama Sector) and all the participating villages from Nkaw.

Some villages in the Nkaw sector occupy former *Relégués* villages, where individuals deemed as undesirable or troublesome by colonialists were sent in a form of internal exile. With independence, people regained their freedom and returned to their villages of origin, vacating cultivated land that was later resettled by local groups[21].

The latest resettlement reported was that of Bisenge, in the Lokolama sector, and that of Mbinza, in Nkaw, both after independence. In the case of Bisenge, a first request from the Congolese government to relocate from an "isolated" location was refused on the grounds that the village would be resettled far from its traditional forest. The population finally agreed to move to the road when missionaries offered to build a school and a clinic in the new village. As for the village of Mbinza, the final move happened during the time of President Kasa Vubu, when, according to participants, the president of the National Assembly[22], Victor Komoriko, requested that the village move from the Lukenie to Nkaw.

[19] Cotton was first introduced between 1912 and 1915 in the Sankuru region. By 1948, the Belgian Congo was the third largest producer in Africa (Infor Congo 958:76). Cotton production depended on forced labor, a system that persisted until independence.
[20] The village of Mundja, where an ICCN station is located, was also among the displaced villages.
[21] Villages of Boko, Bolinda, Bosenge and Mbinza
[22] July 1961-September 1962

The first contact with Europeans corresponded to the arrival of colonial administrators and Catholic and Protestant missionaries. Table 4 includes the names of the first administrators and missionaries to arrive in the Lokolama and Nkaw sectors.

> *"We know about a Belgian ("un flamand") people called Nyakoma - Nzakomba means God - [He received that name] because he could do whatever he pleased: kill, bury people alive…he behaved like a god on our land. » (Men's focus group, Ntemo)*

Table 4 First Europeans to arrive in villages

Name[23]	**Place**[24]	**Year and Role or position**
Batalatala (because of the glasses he wore)	(L) Bosongo	1940s. First Belgian ("Flamand") to arrive in Bosongo to organize the resettlement of the village.
Imenga	(L) Eyanza	1932. Organized the resettlement of the village.
Nyakoma (because he behaved like a god)	(L) Ntemo	No date. Organized the resettlement of the village.
Père Jules (Nkayulu)	(L) Mbungusani, Banyomo, Belongwandjale, Bokala, Booko, Manga, Mangialokombe, Esama, Eyanza, Ikongo, Lokako, Nkopo (N) Bokwankoso, Mange Nord	1930s-1940s. First Catholic priest in the area.
Nkoy Elombe and Ademan	(N) Bolinda, Bokwankoso, Mange Nord	1940s. Catholic priests.
Mr. Grens (or Greens) (Tata Madefu, "Beard")	(L) Bokala, Booko, Manga, Mangialokombe, Eyanza (N) Mange Nord, Nongempela Nord	1930s-1940s. First Protestant missionary to arrive in the area.
Mr. Henri Nielsson and his wife Ngua Mpakasa	(L)Belonge 2, Lokako	No date. Protestant missionary.
Delengue	(N) Bosenge	No date. Belgian administrator.
Mr. Bonoyet	(L) Belonge 2	1959. Organized the resettlement of the village.

Other missionaries mentioned were ISAMPELA, Jean Pierre; Pères Henri, Pierre, Joseph, Emile, Paul, Atanga Iso, and Lutuluki Kumu; Mr. Roy; and Swedish Protestant missionaries who build the Mimia mission. According to local narratives, Catholic and Protestant missionaries "passed by" some villages and created missions in others. Villages remained either Catholic or Protestant until the arrival of fundamentalist evangelical churches.

The arrival of Europeans in the area marked the beginning of agricultural production for commercial purposes. The extraction of rubber started between World Wars I and II[25], and predominantly involved the exploitation of indigenous wild trees. Only one rubber plantation existed in the sector, in the village of Mantantale. The rest of the companies were trading

[23] Names and dates as provided by participants.
[24] (L)= Lokolama Sector, (N)= Nkaw Sector
[25] Some men from the sector's villages participated in WW II along Belgian troops. Upon return to the Congo, they resettled in the town of Lokolama.

businesses that bought local products and sold[26] manufactured goods in exchange (table 5). In the beginning, locals transported copal (resin extracted from the tree *Copaifera demeusi*) rice[27], fibers, and palm nuts to the port in Lokolama, but with the construction of roads, trucks started to arrive and monthly markets were created in every village. In the words of a participant from Ikongo,

> *"All trade was in the hands of the Portuguese, the Belgians (Flamands) were here only as administrators, and for the construction of the roads."*

Table 5 Companies and traders in the area 1930s-1970s

Villages[28]	Companies	Type of business
(L) Inyongo, Iyoko, Mbungusani, Nganda, Basobe, Belonge 1, Bokala, Bosongo, Eyanza, Ikongo, Manga, Mangialokombe, Ntemo (N) Bolinda, Bosenge, Looma, Mbinza, Nsese, Lokongo	Compagnie Africaine Coreman (C.A.C)	Portuguese company that arrived in the 1930's. They had a port on the Lokoro I. Purchased copal, fibers, rubber, palm nuts, and rice from locals and sold manufactured goods. The company collapsed after Zaïrianization when MOKE Paul (a man of Sakata origin) took over. A second version says that CAC was bought by MOKE Paul in 1970 and collapsed 5 years later.
(L) Basobe, Belonge 1, Bisenge, Bokota 3, Esama, Bosongo, Ikongo, Lokako, Manga (N) : Boko, Bokwankoso, Bolinda, Bosenge, Ikembe, Ikomo, Lokolama II, Lokongo, Loooma, Mange Nord, Mbinza, Nongempela Nord, Nsese, Pengola	Markeens Matos COPLABO Mr. Antoine Mandaila Isankale Forseka, Nogeira, CONACO, Nogera, Kitoko	Purchased copal, fibers, palm nuts, rice, and groundnuts. Continued to do business into the 1970s
(N) Nongempela Nord, Bokwankoso	IBONDO, Paul	(Senegalese?) businessman who was a middle man between local growers and the Portuguese.

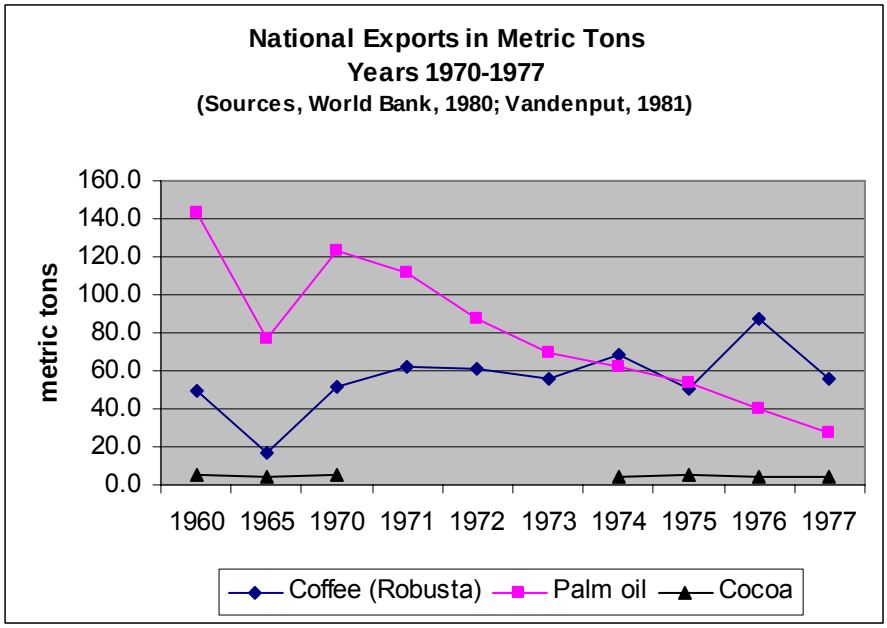
Coffee was introduced in the 1950s by the Portuguese (a Mr. Sion was mentioned in a few villages in the Lokolama sector). Coffee was mostly grown by individual local farmers who sold to traders that came to their villages after harvest. Only three commercial scale plantations were reported in the Nkaw sector[29], and none in Lokolama. As with rubber, palm nuts, and other agricultural products, coffee was not transformed locally. After independence, companies continued to buy agricultural products from villages, sometimes continuing for a few years after Zaïrianization, an event that precipitated in economic decline and renewed isolation for the villages in the sector.

> *"Towards 1973, the country faced a chaotic event that brought suffering to all villages: everything that belonged to whites was taken over by nationals, who didn't manage it well. From that moment onwards, our village started to suffer." (men's focus group, Banyomo)*

[26] Historical data indicates that the majority of commercial exchanges involved barter. Cash only began circulating when colonial administrators took over as agents from private companies, and even then, barter remained important in many areas and for many transactions (see for example Annales Aequatoria (17) 1996).
[27] Present in the Congo since the second part of the 19th century (Infor Congo 1958:78)
[28] (L)= Lokolama Sector, (N) = Nkaw Sector
[29] Bokwankoso, Ikenge, and Pengola

Zairianization also resulted in the decreased availability of manufactured goods that were formerly sold or bartered by merchants buying agricultural products. Participants' accounts of Zaïrianization paralleled those described in a 1980 World Bank report concerning the economic crisis of the then Zaire (World Bank, 1980). According to the report, by the 1980s most commercial activities in the agricultural sector had ceased. Figure 9 shows the trend in national exports for the years before and after Zaïrianization.

Figure 9



Despite recollections of the brutality of some colonial administrators, participants recall the colonial period as positive, because they had access to markets, schools, and healthcare. While cash crop production continued into the 1970s, participants reported a persistent decline in production resulting in less cash and an increasing reliance on barter. Participants from Basobe, Booko, and Nganda added that the end of agricultural trade resulted in the increase of bushmeat trade.

Life in the villages of this sector has not changed significantly since then. Efforts by Catholic groups to restart coffee production were short lived and did not result in financial gains for producers. The war of 1996-2002 signified further isolation for these villages, but it was not mentioned as being as salient an event in the local history as the colonial and post-independence periods. The only references to the war were in relation to members of the military poaching in village forests.

B. Present day context: General demographics and social organization

Villages in these sectors remain located along colonial-period roads (presently reduced to paths), and vary in size from 4 to 58 households in Lokolama and from 5 to 89 in Nkaw. Village-scale infrastructure of note include churches, and in some cases, meeting areas for men and for the local *chef de terre*[30], a school, and a dispensary[31]. Local authorities include the *Chef de localité*, the principal representative of the Congolese government, as well as the *Chef de terre* and elders (notables), recognized locally but not considered part of the state's administrative hierarchy. The *chef de terre* constitutes the strongest traditional authority and appears to exercise significant influence over the local populations through the control of land distribution

[30] Noted in Mbungusani, Iyoko, Mimia, Sama, Ngendo, and Manga.
[31] While Mimia "Mission" included a hospital, teachers' houses, a warehouse, and an old saw mill, the Mission is not considered part of Mimia "Cité" from an administrative perspective.

for agriculture and certain hunting and fishing activities, regulating internal conflict, as well as immigration into the village.

The level of power assigned to the *chef de terre,* however, seems to vary from village to village. In Mimia, for example, the roles of each clan are still clearly defined: the chef the terre comes from one clan, the assistant chef de terre from another, a third clan is in charge of managing the forest, a fourth one in charge of local customs, and a fifth one responsible for tending to the well-being of the chef de terre.

Other villages, like Inyongo, reported abandoning the system in favor of having only a chef de localité and notables. Beyond the village level, and apart from sporadic visits from the Lokolama-based authorities (seat of the sector), the presence of the State is almost inexistent.

In terms of Batwa-Nkundu relations, Batwa participants in both sectors talked about their historical struggle against Bantu control and domination, and their ongoing problems with discrimination and marginalization.

> *"Our customs are different from those of the Nkundu, we separated from them because they wanted to treat us as inferior people. The fact that there's a Nkundu village named Bokota is pure coincidence, there's no connection with us. It's like two people sharing the same name by chance"* (men's focus group, Bokota 2)

Participants demonstrate a strong attachment to the land and its resources, referring to their village forests' limits when talking about hunting and in some cases, fishing zones. For example, participants from the villages of Ngendo and Bisenge (both in the Lokolama sector), explained that locals were allowed to fish *"in those areas that belong to the village, but not farther than that."* (focus group men, Ngendo) while in Bisenge participants from the women's focus group said that people from neighboring villages were not allowed to fish in Bisenge's fishing sites because *"each village has its own part of the Lokoro."* During the course of household interviews people also made mention to specific sites for fishing, including old village sites and areas designated to specific clans: *«[We fish] in the part of the Lulo that belongs to our clan, and in streams close to the village ».* (016 Inyongo)

Even though agriculture has played an important role in the local economy since colonization, people identify themselves as hunters and meat-eaters, *"Nous sommes carnivores."* Cultural practices related to hunting include the widespread use of bows, arrows and spears manufactured by local blacksmiths, cultural norms for dividing game caught during communal hunts, and the right of the local *chef de terre* to specific parts of totem animals hunted individually and communally. However, commercial demand for hunting and fishing products is transforming the way people practice these activities, as well as their perceptions of threats to their livelihoods and their villages' well-being.

Table 6 General demographic information

	Lokolama Sector	**Nkaw Sector**
Average age of head of household	45.9 (men), 40.1 (women)	46.7 (men), 45.1 (women)
Female heads of household	6%	4%
Average household size	7 (SD=3.91)	6 (SD=1.79)
Nuclear families	62%	65%
Polygamist families	7%	9%

Average educational level of head of household	D4[32] (men), elementary school (women)	Elementary school (men), some or no elementary school (women)
Group membership	Participation in groups and associations equals 1.2 per household in both sectors. Most membership corresponds to religious groups (68% in Lokolama, 94% in Nkaw), followed by sports and youth groups (14% in Lokolama and 8% in Nkaw). Only 5% of households in Lokolama and 4% in Nkaw report participating in three or more groups	

Size of households, as well as their composition, varied greatly. In Lokolama, the average size was 6.89 members (standard deviation 3.91), while in Nkaw the average was 5.89 members (standard deviation 2.97). The number of members per household varied between 1-29 in Lokolama, and between 1-16 in Nkaw (table 7).

Table 7 Household size

Members per household	% Nkaw	% Lokolama
1 – 3	25.4	14.6
4 – 6	33.7	39.8
7 – 10	33.7	32.7
11 – 15	6.8	9.8
16 – 20	0.5	2.4
21 – 25	0.0	0.4
> 25	0.0	0.4

The composition of households also varied from case to case. Non-nuclear households sometimes included elderly parents, younger siblings of the head of household, siblings of his/her spouse, married children with their families, grandchildren, nephews, nieces or cousins.

Families are patrifocal (women settle in the husband's village), and exogamy is still practiced in the area, with 23% of participants in Lokolama and 24% in Nkaw reporting that their mothers moved out of their villages of origin because of marriage (table 8). While recent migration into villages has been infrequent[33], 25% of participants in the Nkaw sector reported plans to move out with their principal reasons being a desire to improve their lives and to seek work elsewhere. In the Lokolama sector, 21% of participants expressed an intention to move out of their villages, but no major driver of migration was identified. The age of heads of household planning to move varied greatly in both sectors[34]. The majority of heads of household planning to move out were men (86% in Lokolama, 90% in Nkaw).

Table 8

	Father from the village	Mother from the village
Lokolama	82%	66%
Nkaw	78%	71%

Participants who expressed no desire to leave their villages said in the majority of cases that they wanted to stay because it was their village of origin, their family was there, or because they had responsibilities in the village, such as traditional positions of authority or within the local churches.

C. General information on household and village level subsistence and economic activities

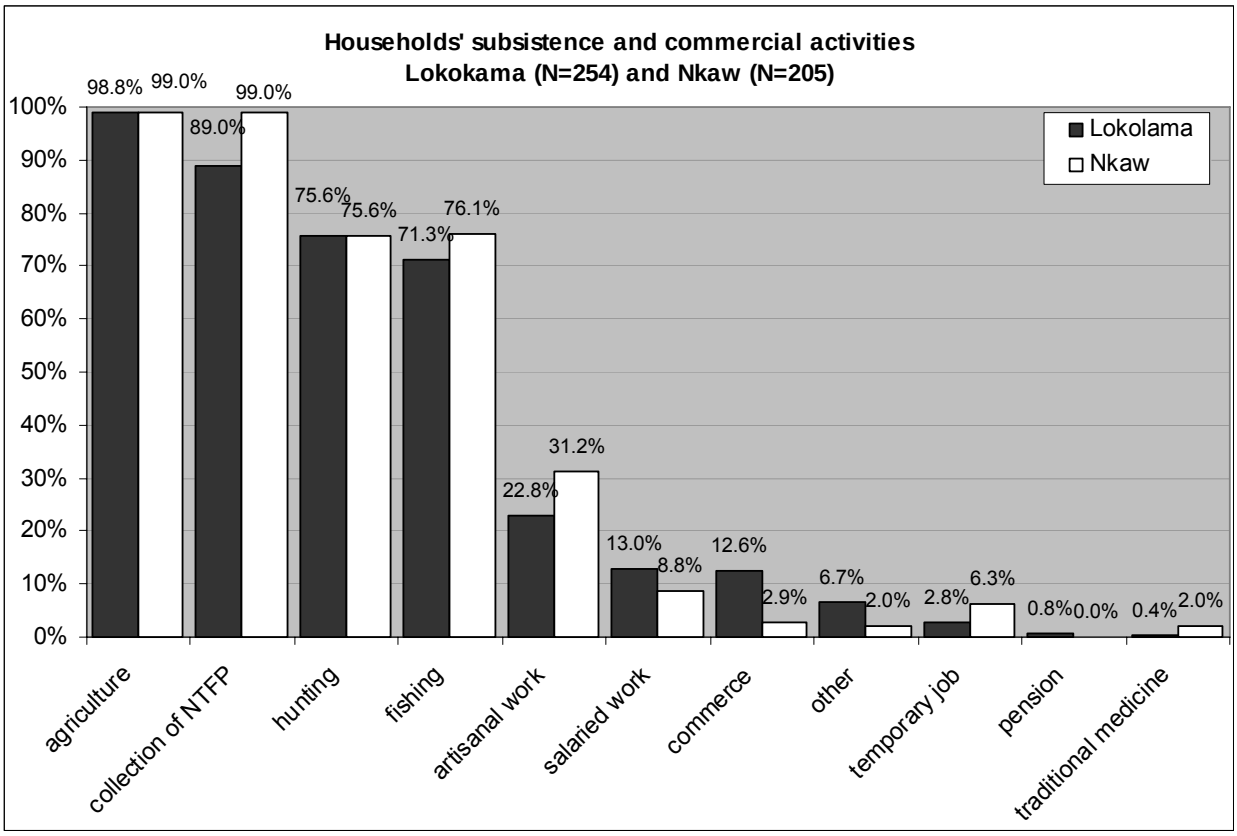
Households in both sectors report on average four commercial and/or subsistence activities, with agriculture and collection of NTFP cited most frequently. Hunting and fishing represent the third and fourth most cited activities (figure 10).

[32] short cycle of secondary education

[33] Compared, for example, with data from the northern section of Lac Tumba Landscape where 45% of participants were living in villages other than their fathers' villages of origin.

[34] Lokolama: average age 41, standard deviation 11.06; Nkaw: average age 39, standard deviation 7.29

Figure 10



The number of activities per household was higher where one or more members were also engaged in salaried work or temporary jobs. Table 9 includes the activities reported by households with at least one wage earner. Participation in commerce by households with one wage earner was higher than average.

Table 9

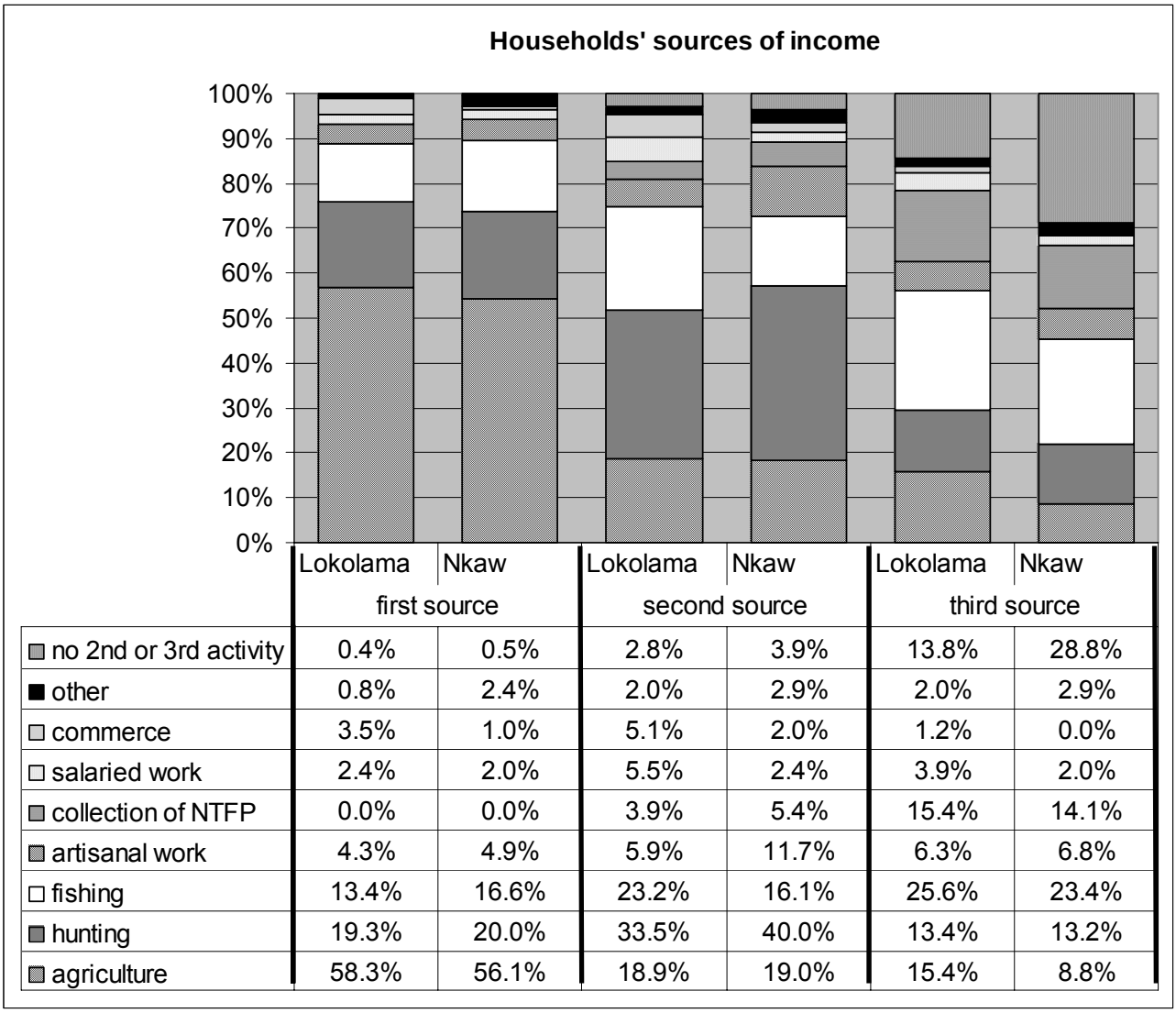
Households with at least one wage earner also engaged in	Lokolama sector N=33	Nkaw sector N=18
Agriculture	97%	93%
Hunting	53%	67%
Fishing	61%	63%
Collection of NTFPs	76%	97%
Commerce	24%	7%
Artisan work	24%	23%
Traditional medicine	0%	7%
Other	3%	0%

1. Income generation and time allocation

Most income generating activities in the area involve NR exploitation, notably agriculture, fishing and hunting. The collection of NTFPs is widely practiced for subsistence purposes, but it's importance in terms of first sources of revenue for the household ranks below agriculture, fishing, hunting, artisanal work, commerce and salaried work. It is important to note that 14% of households in the Lokolama sector and 29% in Nkaw reported only two activities as sources of income. Figure 11 shows the principal sources of income of households in both sectors[35].

[35] Totals exceed 100% because 18 households ranked equally two or three activities.

Figure 11



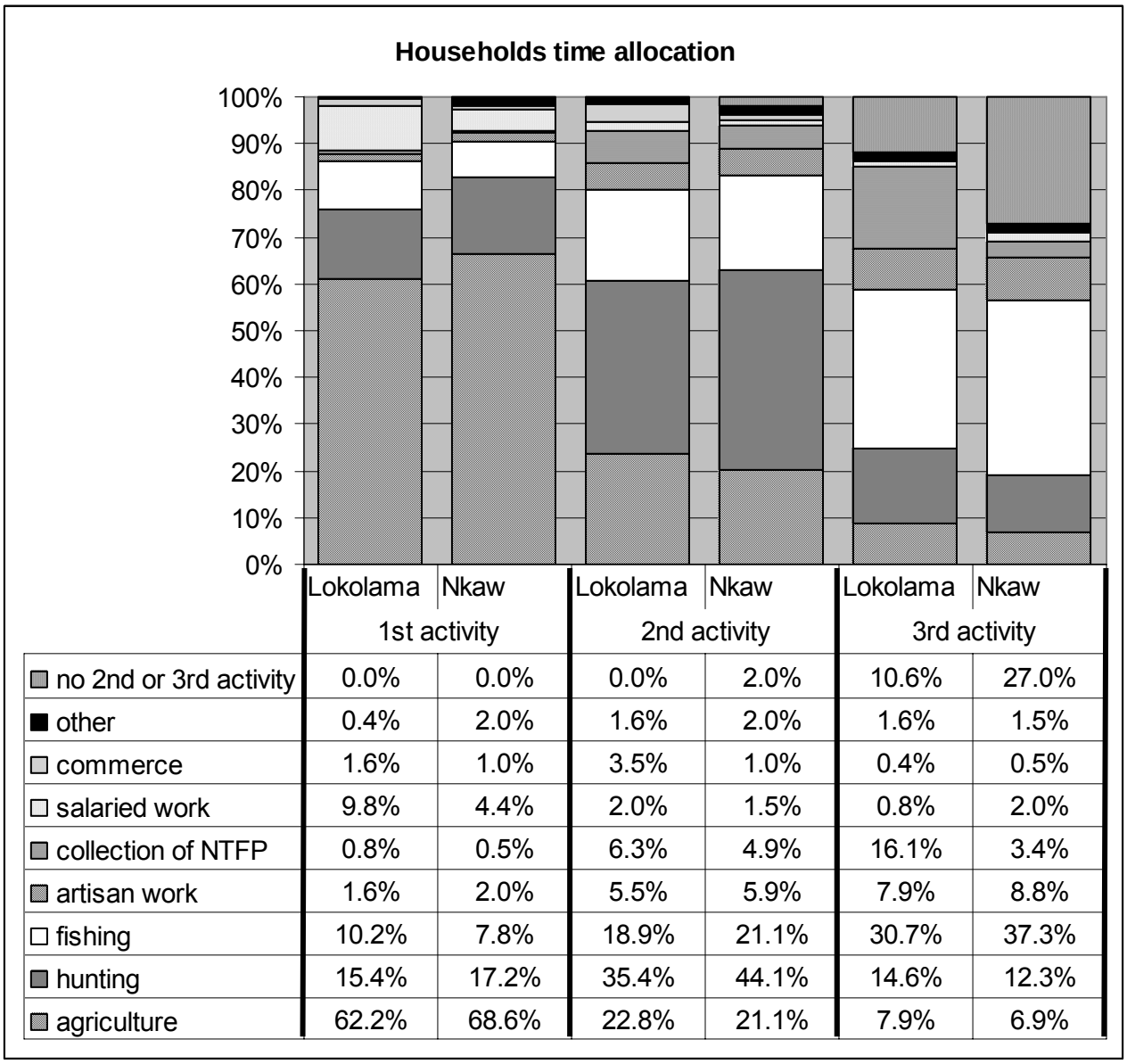
	Lokolama	Nkaw	Lokolama	Nkaw	Lokolama	Nkaw
	first source		second source		third source	
no 2nd or 3rd activity	0.4%	0.5%	2.8%	3.9%	13.8%	28.8%
other	0.8%	2.4%	2.0%	2.9%	2.0%	2.9%
commerce	3.5%	1.0%	5.1%	2.0%	1.2%	0.0%
salaried work	2.4%	2.0%	5.5%	2.4%	3.9%	2.0%
collection of NTFP	0.0%	0.0%	3.9%	5.4%	15.4%	14.1%
artisanal work	4.3%	4.9%	5.9%	11.7%	6.3%	6.8%
fishing	13.4%	16.6%	23.2%	16.1%	25.6%	23.4%
hunting	19.3%	20.0%	33.5%	40.0%	13.4%	13.2%
agriculture	58.3%	56.1%	18.9%	19.0%	15.4%	8.8%

Agriculture is both considered an important source of income and a highly time consuming (figure 12) activity. Even though agriculture is reported to be the main income generating activity, actual revenue is low due to the absence of local markets and the relative isolation of the area, rendering the evacuation of products unprofitable and economically risky. The profit margin from hunting and fishing, although significant greater, shows no clear tendencies. This may explain why people continue to mention agriculture as their main source of income, while citing significant earnings when buyers of fish and bushmeat arrive in their villages and/or they themselves embark on trading trips outside their groupements.

> *« We don't sell all the time, sometimes we eat [bushmeat] sometimes we share it. »* (120 Inyongo)

Salaried work, although time-demanding, appears to render little income and benefits, except for products and goods obtained from local parents who pay in kind for their children's school fees.

Figure 12



	Lokolama	Nkaw	Lokolama	Nkaw	Lokolama	Nkaw
	1st activity		2nd activity		3rd activity	
no 2nd or 3rd activity	0.0%	0.0%	0.0%	2.0%	10.6%	27.0%
other	0.4%	2.0%	1.6%	2.0%	1.6%	1.5%
commerce	1.6%	1.0%	3.5%	1.0%	0.4%	0.5%
salaried work	9.8%	4.4%	2.0%	1.5%	0.8%	2.0%
collection of NTFP	0.8%	0.5%	6.3%	4.9%	16.1%	3.4%
artisan work	1.6%	2.0%	5.5%	5.9%	7.9%	8.8%
fishing	10.2%	7.8%	18.9%	21.1%	30.7%	37.3%
hunting	15.4%	17.2%	35.4%	44.1%	14.6%	12.3%
agriculture	62.2%	68.6%	22.8%	21.1%	7.9%	6.9%

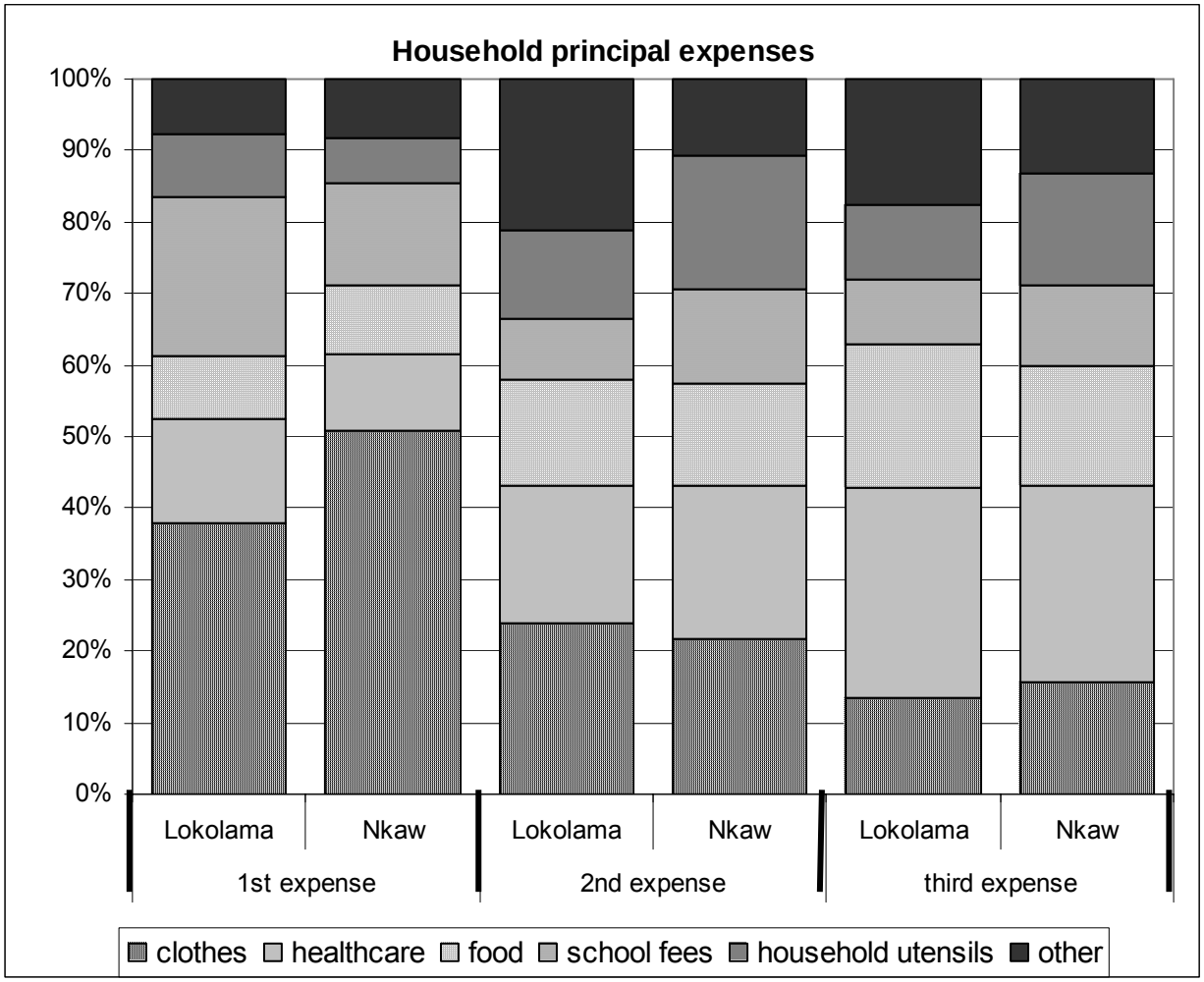
Correlation between income and time was strong for the three principal activities[36]

2. Household expenses

Households' earnings are used to buy clothes and food, and to pay for healthcare and school fees (Figure 13). Clothes represent the principal expense for 37% of households in Lokolama and 50% of households in Nkaw, and were mentioned among their three principal expenses by 81% of households in Lokolama and 87% in Nkaw. All participants reported healthcare as one of their three principal expenses. Concerning education, 42% of households in Lokolama and 38% in Nkaw reported school fees and materials among their three principal expenditures.

[36] Lokolama: First source/first time r=0.98, second source/second time r=0.97, and third source/third time r=0.93; Nkaw: First source/first time r=0.98, second source/second time r=0.98, third source/third time r=0.88

Figure 13

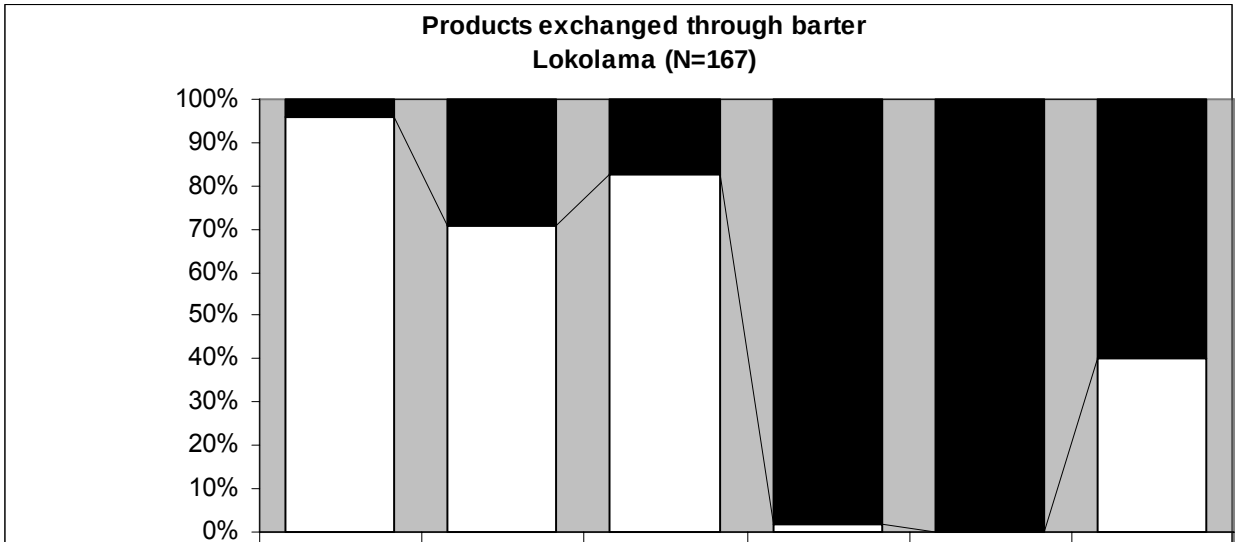


Other expenses include salt and soap, home improvement, assisting family members, merchandise for trade, fishing instruments, church contributions, entertainment, paying back loans, hunting instruments, meat, mutual aid, and agricultural implements. Savings were reported by 6.3% of households in the Lokolama sector and 7.2% in Nkaw. Given the isolation of villages in this area, many commercial transactions rely on barter. Sixty-nine percent (69%) of households in the Nkaw sector and 66% in Lokolama reported practicing barter to obtain manufactured products and services.

> *"Traders arrive here by foot or bicycle to buy fish. They exchange it for clothes, fish nets, soap, pots and pans, and other manufactured goods. These traders come from Kasai, from Lokolama, from Oshwe or from Kinshasa" (women's focus group, Nganda)*

Figure 14 and 15 illustrate the principal products given or "sold" by local populations (agricultural products, fish and bushmeat) in exchange for, mostly, manufactured goods brought by neighbors engaged in commerce or by merchants traveling from large market towns in the south and in Kinshasa. Fishing and hunting instruments, and salt and soap are also products frequently obtained through barter.

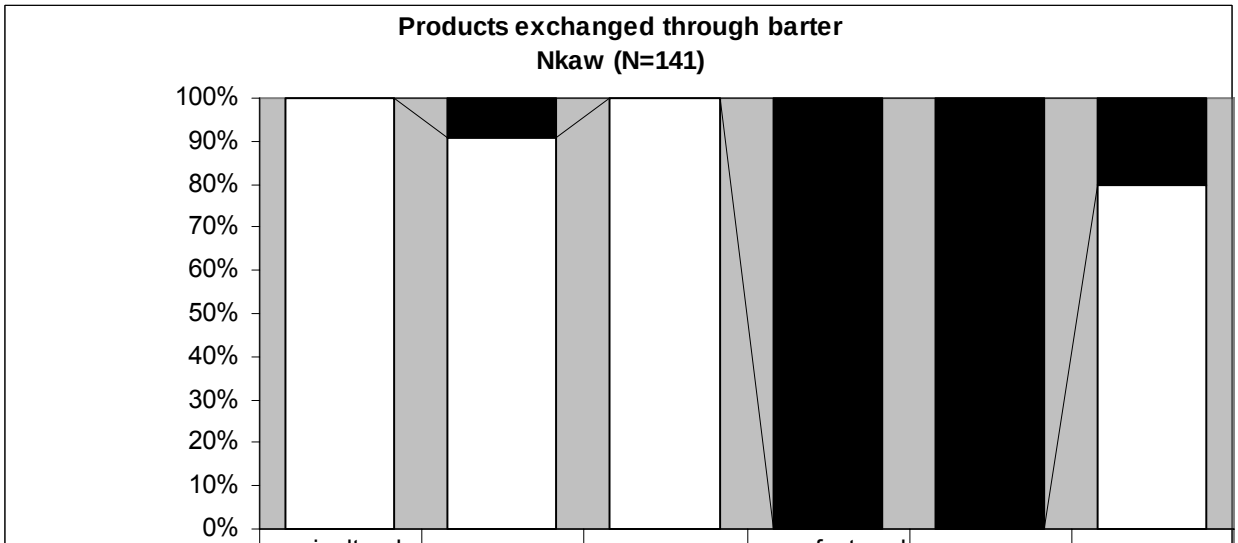
Figure 14



	agricultural products	fish	bushmeat	manufactured goods	salt	other
■ received ("bought")	1.8%	6.0%	7.2%	89.2%	24.0%	5.4%
□ given ("sold")	43.7%	14.4%	34.1%	1.8%	0.0%	3.6%

Figures on table correspond to the % of households that reported exchanging each product.

Figure 15



	agricultural products	fish	bushmeat	manufactured goods	salt	other
■ received ("bought")	0.0%	2.1%	0.0%	94.3%	15.6%	0.7%
□ given ("sold")	79.4%	20.6%	17.0%	0.0%	0.0%	2.8%

Figures on table correspond to the % of households that reported exchanging each product.

Some examples of barter transactions include peanuts for soap, cups, or salt; manioc and corn for lamp oil, clothes or fishing nets; manioc for fish or dishes; fish for plastic jugs; and bushmeat for cloth. While the exchange of agricultural products, fish, bushmeat or NTFPs between neighbors was not considered disadvantageous, the terms of trade of barter imposed on local populations by traders is regarded as unfair. Participants believe that merchants benefit from village isolation to impose unfair exchange rates that undervalue bushmeat, fish and agricultural products.

> *« We're not happy with the barter system. We lose to those who impose the system; we're exploited by it. We sacrifice our [agricultural] products for lack of money." (123, Sama)*

When discussing revenue from fishing and hunting, participants made reference to the products they obtain in exchange, and not to money. For example, a fisherman from Mimia reported earning the equivalent of two bicycles during the last fishing season (114).

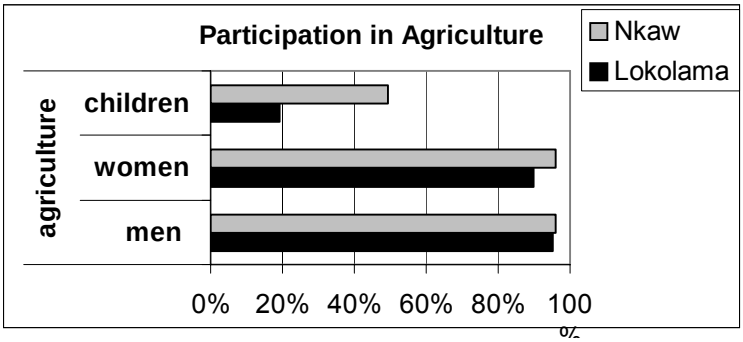
Participants in focus groups also mentioned that bushmeat buyers came into the zone with ammunition, hiring local hunters and later paying them with ammunition and/or part of the hunt. Observations during fieldwork confirm that isolation of these villages from important market towns. Isolation limits people's choices on what they can buy and from whom. Most businesses that bought from local producers between the 1950s and the 1970s left after Zairianization. Efforts by church affiliated groups to restart production of cash crops in the early 1990s were short lived and did not represent noticeable improvements to local populations' livelihoods. The impact of trade and limited commercial opportunities is discussed in more detail in the next sections.

D. Principal subsistence and economic activities

1. Agriculture

Among households' economic activities, agriculture as well as the collection of NTFPs involve more members of the family: men, women and some children participate (figure 16). Only four households in the territory did not report agriculture as either a subsistence or economic activity.[37]

Figure 16



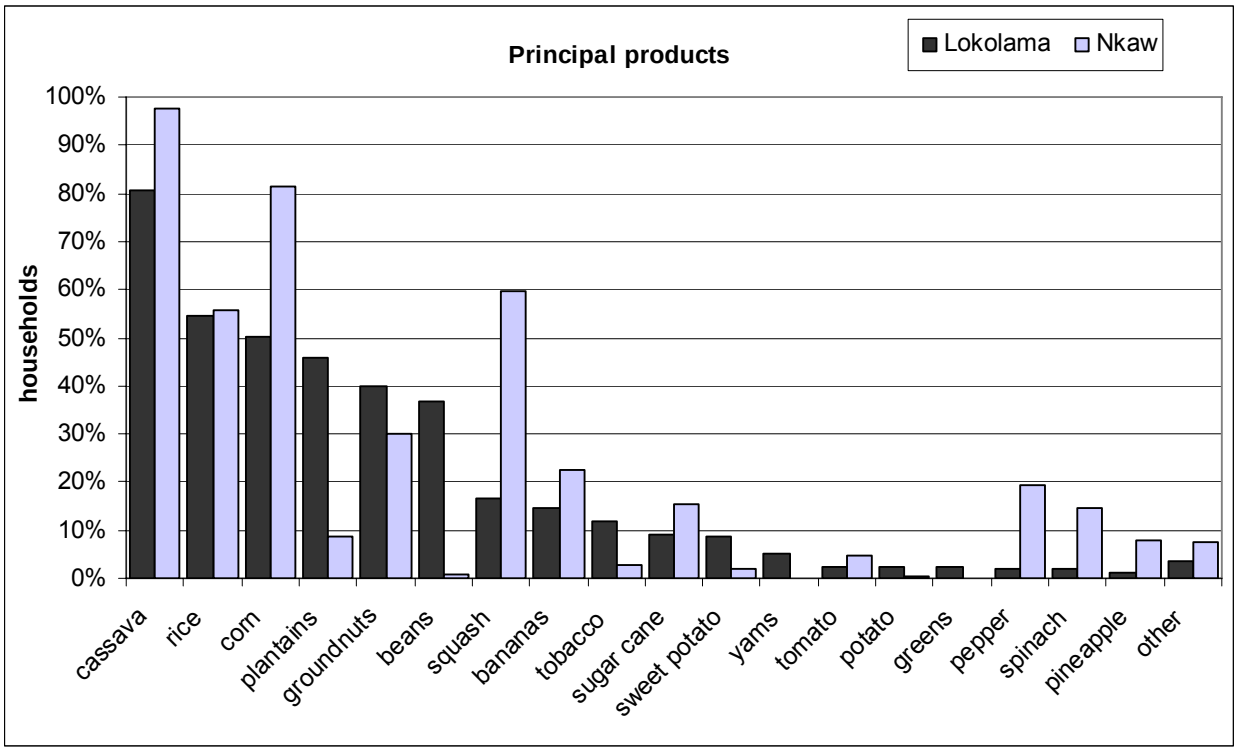
Most agricultural products found in villages today have been present in the area at least since the second part of the XIX century[38]. Cassava (*Manihot esculenta)*, the principal staple food in the area, was introduced by Portuguese traders who brought it from the Americas in the XVII century (Vandenput, 1981:339). Maize (*Zea mays),* and upland rice (*Oryza sativa)*, also imported crops, are also important products for local consumption. Some cash crops produced in the region during the colonial period such as coffee *(Coffea robusta)* and palm nuts (*Elaeis guineensis)* retained their economic importance until the 1990s when political instability contributed to the decline of their marketability. Of all products raised today, beans are considered the most profitable crop.


Bean field Lokolama Sector

Agricultural tasks are differentiated by gender, with men engaged in clearing and preparing agricultural fields and women involved in planting, weeding and harvesting. Men also set traps for crop-raiding wild animals. Cassava is the most prevalent crop in both sectors, while corn and squash are grown by significantly more households in Nkaw (81% and 60% respectively) than in Lokolama (50% and 17% respectively). Plantains and beans are, on the contrary, important products in Lokolama but not in Nkaw (46% versus 9% for beans, and 37% versus 1% for plantains). Figure 17 includes the principal crops[39] produced by households engaged in agriculture[40].

[37] Of the 458 sampled households in the territory, 3 from Lokolama and 1 from Nkaw did not practice agriculture. The four households mentioned buying these products locally.
[38] See, for example, descriptions of the District of Equateur in *La Belgique Coloniale,* 1897)
[39] Other products mentioned in Lokolama were biteku-teku (*Amaranthus hybridus)*, coffee *(Coffea robusta)*, and hemp (*Hibiscus cannabinus* 5.3%). In Nkaw, amaranth, mbala (sweet potato, *Ipomoea batatas)*, and groundnuts were also mentioned.

Figure 17



The majority of households practice inter-cropping, growing different crops together in the same field. In the Lokolama area, households combine all products in one field, where an average of 3.9 different products are grown together. The highest number of crops per household was found in the village of Sama (6.28 products) while the lowest corresponded to Iyoko (3.1 products). Households in Nkaw reported an average of 4.3 products grown, with the highest number of products reported in Loma village (5.71 products), and the lowest in Lokolama 2 (2.44 products). Basic subsistence crops such as cassava and maize constitute the most commonly cited products.

The prevalence of other crops such as groundnuts and squash varies from village to village or from groupement to groupement. Potential economic gain is the reason given for crop diversification, such as the introduction of beans. Beans are reported to yield greater revenue than other crops.


Colonial period road, Mimia, Lokolama Sector

Field size averaged under 1 ha (table 10). More households in the Lokolama sector reported fields of over 2 ha than in Nkaw, similarly, more fields in Lokolama are over a kilometer away from households than in Nkaw. Most

[40] Differences between sectors may be linked to the time of the year during which interviews were conducted. Research activities in the Lokolama Sector took place between May and August 2005, while activities in Nkaw were conducted between November 2005 and February 2006.

agricultural fields are located within villages' traditional land use zones (table 11). Fields are accessed by paths in the forests, and sometimes the degraded road system, that in many places has become a narrow path only usable by foot or bicycle.

Table 10

Size of fields in ha	% households	
	Nkaw	Lokolama
0.001-0.25	24.6	22.2
0.26-0.5	38.4	37.4
0.51-0.75	9.4	6.6
0.76-1.00	14.3	13.6
1.01-1.5	8.4	5.1
1.51-2	2.5	3.5
> 2 ha	2.5	11.6

Travel to larger market towns is facilitated by navigable rivers, with people and goods moving on rafts (built on top of dugouts), dugout canoes (rarely motorized), freight boats, and *baleiniers* (larger motorized boats).

Limited transportation from fields to villages and from villages to larger markets or navigable rivers was identified as an important factor affecting agriculture's contributions to household economies, and it is considered one of the major barriers to agricultural development.

In terms of land ownership, 82% of households in the Lokolama sector said they own their fields, 97% of participating households in Nkaw reported the same. The second most mentioned scenario was simple use without rights, mentioned by 19%[41] of households in Lokolama. In the Nkaw sector, only one case of this type of usage was documented. Local perceptions on land ownership and use rights are discussed in the section addressing access to land.

Table 11

distance in km	% of households	
	Nkaw	Lokolama
0 - 0.05	1.5	4.9
0.051-0.1	5.4	1.9
0.101-.5	26.1	18.4
0.51 – 1	23.2	29.6
1.01 - 1.5	15.3	16.0
1.51 – 2	14.3	13.6
2.01 - 2.5	6.9	13.6
2.51 – 3	4.4	0.5
3.01 - 3.5	3.0	1.5

Members of all participating communities mentioned fallow periods of between 5 and 10 years as a means or preserving soil fertility. A few households reported crop rotation and the introduction of certain plants and trees as methods for improving the quality of the soil. The use of chemical products was not found in either sector.

Agricultural trade

Interviews with merchants trading agricultural products revealed that the most frequently commercialized products are cassava, corn and rice, followed by beans and groundnuts. Quantities bought from local producers varied between 1-80 sacks, with the highest numbers reported by merchants based in the town of Oshwe, while smaller quantities were reported by merchants buying in more distant and inaccessible villages of the territory. Merchants rely on the same transportation means as producers. Travel to principal destinations such as Kinshasa and Mbandaka is by raft and boat. Transport from the place of purchase to ports is mainly on or by pushing bicycles. Table 12 summarizes the prices and cost of travel of merchants trading in agricultural products.

.

[41] Some households reported one "private" field and one "simple use" field. According to access to land information, people normally farm in parts of the forest cleared by their family, and only when this is not possible do the clear a new part of the forest. Villagers are free to open new land, but restrictions exist for the use of other families' fallow lands. Fallow lands are therefore considered more "private" than primary forest.

Table 12 Prices reported by merchants per unit of sale

Product	Unit	Amounts bought	Purchase price/unit	Destination	Total Cost/unit	Price sold	Revenue per unit	Revenue per trip
Cassava[42]	Sack (70kg)	1-80	$3.33-$5.56	Mbandaka, Kinshasa	$5.45-$10.24	$6.67-$35.56	-$9.78-$27.89	-$252.91-$1,892.15
Corn[43]	Sack (100kg)	10-50	$6.67-$11.11	Kinshasa	$11.45-$27.26	$11.11-$40.00	-$10.29-$26.33	-$514.67-$1309.89
Rice[44]	Sack (100kg)	1-20	$6.67-$11.11	Oshwe, Mbandaka, Kinshasa	$8.93-$17.51	$8.89-$33.33[45]	-$2.70-$26.93	-$117.83-$538.67

Costs incurred during trips included transportation, local taxes (legal and illegal), and in some cases rent of market space and storage costs. Problems associated with trade in general are discussed in section five (Commerce).

Changes and adaptation in agriculture

The major change to agriculture is directly related to decreased production and the disappearance of agricultural commerce. Sixty eight percent (68%) of focus groups in the Lokolama sector and fifty nine (59%) in Nkaw reported decreased production and a inter-linked decline in agricultural commerce as the most significant change. This change is associated with three events, all interconnected: the decline of agricultural production after independence[46], the collapse of agribusiness after Zairianization, and the progressive deterioration of rural roads and transportation services that worsened during the years of civil war. In Nkaw, participants also attributed difficulties in obtaining farming tools and materials to these events because of the lack of foreign companies operating in their area. No other causes were linked to the decline in production.

Regarding changes to subsistence agriculture, participants from the Lokolama sector talked about problems with plant disease of cassava and destruction of fields by wild animals, representing 20% of changes mentioned in this sector. Participants in the Nkaw sector also talked about the problem of fields being destroyed by various species of monkeys like golden-bellied mangabey *(Cercocebus chrysogaster)* and red-tailed monkey *(Cercopithecus ascanius)*, river red hogs (*Potamocherus porcus)* and sometimes bay duikers (*Cephalophus dorsalis)* (table 13), but did not mention plant diseases as much as participants from Lokolama. Destruction of crops was also attributed to rodents, the sun, birds, and insects. Crop-raiding wildlife is controlled through the use of traps, surveillance, and by clearing the areas around fields. Additionally, participants sometimes reported relying on religious practices to deter animals:

« We have a traditional fetish here: we bury in the field a piece of cassava bitten by a wild boar. This will drive them away." (114, Mimia)

Solutions or alternatives to other present day problems, from effective disease control to improved market conditions, are considered beyond a village's power. Other discussions targeted the consequences of the decline of commercial agricultural production on the deterioration of people's quality of life, and the disadvantages of the barter system, which also impacts villages' other sources of income: fishing and hunting.

[42] N=11.
[43] N=8.
[44] N=7.
[45]When retailed per glass (*"verre")*, merchants reported making between $32 and $144 per sac ($0.04-$0.18 per glass, approximately 800 glasses to a sac)
[46] Economic growth reported for the decade of the 1960s was driven by the mining sector, which captured most of the investment and attention of the government. Although the country experienced significant growth by the end of the 1960s, agricultural exports were already 50% below pre-independence levels (World Bank 1980:4)

Table 13

Crop-raiding Animals	Villages Lokolama sector N=27	Villages Nkaw sector N=14
Nsombo[47] (*Potamocherus porcus)*	27	41
Inku[48] *(Cercocebus chrysogaster)*	23	5
Kse kse *(Cercopithecus ascanius)*	10	0
Nkulupa *(Cephalophus dorsalis)*	1	13

The only positive change mentioned in men and women focus groups was the introduction of new crops during the colonial period and immediately after independence. Four villages in the Lokolama sector talked about the introduction of rice, beans, and groundnuts as examples of the diversification of products. The memory of the time when agriculture constituted a reliable source of income to local populations continues to drive people's aspirations for local development. Agriculture is still considered a viable source of income, and it is viewed as more stable than fishing and hunting. Efforts to restart production of cash crops have been scattered and mostly unsuccessful. Recently formed groups of producers are currently seeking alternatives markets or merchants for their products.

[47] River red hog
[48] Golden bellied mangabey

2. Collection of NTFPs

The history of collection of non timber forest products in the Nkaw and Lokolama sectors parallels that of agricultural production in terms of its transition from being a solely subsistence activity before the arrival of Europeans, to becoming an important economic activity during the Colonial and post-independence periods. During the colonial period, the principal products collected were rubber (*Futumia sp)*, copal (a type of resin, *Guibourtia spp.)*, and palm nuts *(Elaeis guineensis)*. Participants classified this activity as collection, or *ramassage,* because they were extracted from wild plants existing in local forests.

« Our ancestors lived from the sale of natural rubber, copal, palm nuts, fibers and peanuts that they sold to companies like CAC, Kitoko, and Ibondo » (focus group men, Bosende)

Sample of resin. Mimia. Lokolama Sector.

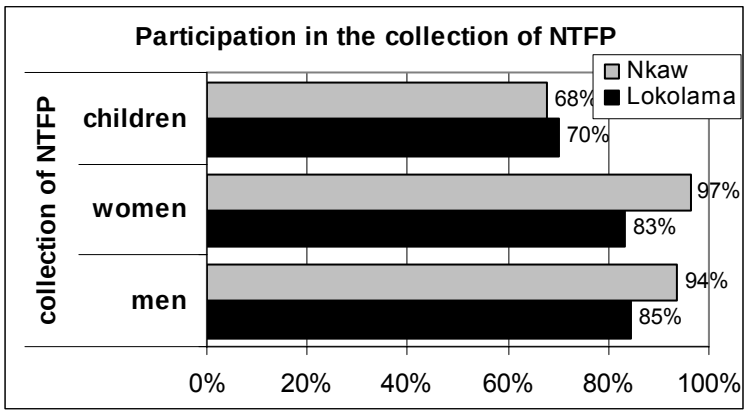
As with agriculture, colonial and foreign companies bought products but did not establish plantations in the territory. The only exception was a rubber plantation in the village of Mantantale. The decline of NTFP commerce over time parallels that of agriculture, becoming a mostly subsistence activity.

None of the participating households reported collection of NTFPs as their first source of income. Four percent of households in Lokolama and five percent in Nkaw mentioned it as the second most important income generating activity. However, collection of NTFPs acquires some importance as the third source of income, with 15% of households in Lokolama and 14% in Nkaw reporting it as their principal tertiary source of revenue.

An additional 27% of households in Nkaw reported the commerce of NTFPs as a complementary economic activity, translating to a total of 46% of households in the sector earning some revenue from the activity, or twice as many as in Lokolama (23%[49]). Products most often commercialized included caterpillars, mushrooms, *Anacardium occidentale,* and a variety of fruits.

[49] The period during which surveys were conducted, as well as the skills of the research team (Lokolama was the first area surveyed in the landscape, Nkaw was the last one), may account for some of the difference.

Figure 18



Collection of NTFPs is done as a separate activity as well as opportunistically when practicing agriculture or traveling to and from fishing and hunting camps. Children participate more in this activity than in any other (figure 18).

Although households report consuming NTFPs frequently during their harvest season, this activity remains less important in people's perception of income and time allocation. Households in the Lokolama sector appear to dedicate more time to this activity with 23.1% of households ranking it among their three most time consuming activities, particularly as a tertiary activity (16.1% of participants). Despite dedicating more time to the collection of NTFPs, households in Lokolama reported on average harvesting fewer products than households in Nkaw (table 14). Collection of NTFPs represents the 4th most time consuming activity in Lokolama, while only 8.9% of households in the Nkaw sector reporting it among its three most time consuming activities.

Table 14 Income generation from NTFP and time allocated to their collection	**Lokolama N=225**	**Nkaw N=203**
Households reporting collection of NTFPs among their three principal sources of income	23.11%	19.70%
Households reporting collection of NTFP among their three most time consuming activities	26.22%	8.87%
Average types of NTFPs collected by household	3.89	4.84
Average number of commercialized products	1.35 (N=39[50])	2.40 (N=94)

Across both sectors, mushrooms[51] were the most frequently collected NTFP, followed by caterpillars, *Anacardium occidentale*, matope (a fruit) and cola nuts. Products used for construction and the fabrication of household implements like grass for roofing and vines were also mentioned among the most collected NTFPs. The principal products collected in both sectors are presented in figures 19 and 20.

[50] Of 52 households that reported collection of NTFPs among their three principal sources of income, only 39 provided information on products sold.

[51] Mushroom varieties/Nkaw: bankonyo, bentolo (mintolo), matoyi ya puku, nengene, bensosi, bamawu, ntukunu, ningolo, and minsensi. Mushroom varieties/Lokokama: bensonsi, nengenge, bentole, ntukunu, and nkoyo. Caterpillar varieties/Nkaw: belanga, bankonzo, bilo, mbinzo (*Imbrasia sp)* mankoyo, manga (mahanga), and beyayu.

Figure 19[52]

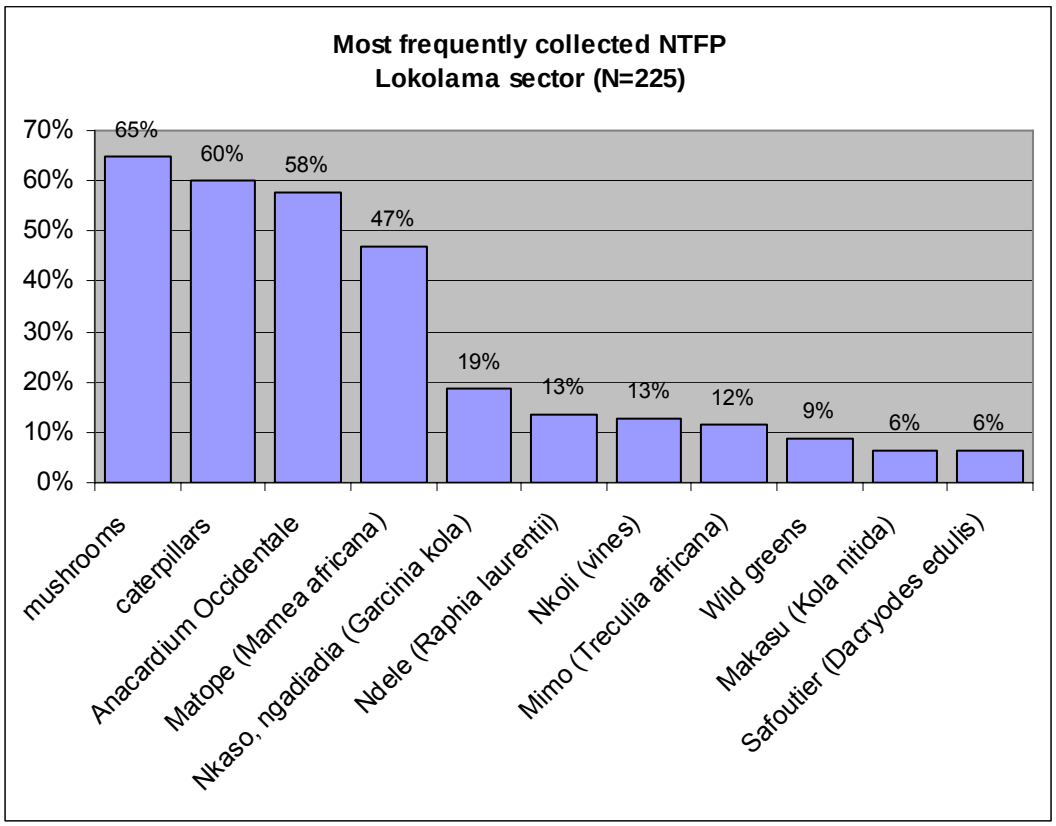
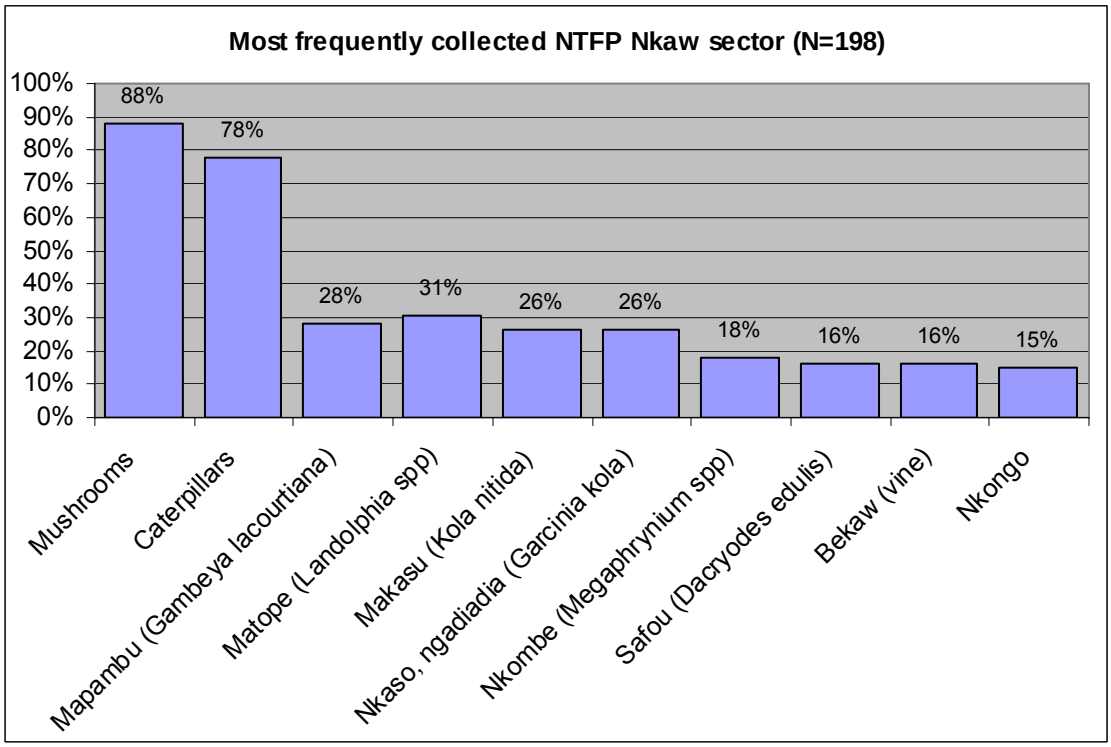


Figure 20[53]



[52] Other products included: Ntende (Fam *Meliaceae*), belingo (*Annona reticulata*), mikungu *(Sarcophrynium macrostachyum*), honey, palm nuts, carcasses, resin, ntondolo (*Aframomum giganteum*), ngai ngai (*Hibiscus sabdariffa*), and kele kumu (oseilles sauvages, *Rumex* sp).
[53] Other products included safoutier, mpunga(*Synsepalum dulcificum)*, ntondolo (*Aframomum giganteum)*, mundenge or belingo (*Annona reticulata*), *ntende* (Fam. *Meliaceae)*, fruit), and mimo (*Treculia africana*).

More households in Lokolama reported collecting NTFPs within 100 meters of their houses than in Nkaw (23% versus 14% of households that collect NTFPs). No correlation was found between distance traveled and frequency of consumption[54]. In Lokolama, households reported traveling slightly shorter distances to collect commercial versus subsistence products (average of 1.1 km versus 1.4 km). Households in Nkaw reported the opposite: finding tradable NTFPs required traveling slightly longer distances than for products collected for local consumption (1.6 km versus 1.4[55]). Villages where people traveled shorter distances to find NTFPs reported collecting more types of products than those who traveled greater distances.

Revenue from NTFPs

Of households involved in NTFP commerce, very few reported earning more than $15 (6750 FC) per season. However, the sporadic nature of harvesting made it difficult for participants to quantify sales[56]. Table 15 summarizes the information on the most often commercialized NTFPs.

Table 15 Principal NTFPs commercialized by Lokolama and Nkaw households

Product	% of households Lokolama sector (N=39)	% of households Nkaw sector (N=94)	Prices
Caterpillars[57]	66.7	89.4	20-300 FC cup
Mushrooms[58]	64.1	93.6	10-50 FC pile or cup[59]
Anacardium occidentale	25.6	12.8	5-10 FC unit

Households sell, for the most part, locally; only five households in Lokolama reported selling NTFPs elsewhere (Kinshasa). Merchants interviewed in villages confirmed the existence of market demand for mushrooms and caterpillars in places such as Kikwit, Oshwe and Kinshasa. Merchants reported buying smaller quantities (e.g. baskets and small buckets) of NTFP in order to fill a sack, the preferred unit for transport to larger markets (table 16).

Table 16 Prices reported by merchants per unit of sale[60]

Product	Unit	Amounts bought	Price paid	Destinations	Costs per unit	Price sold	Revenue per trip
Mushrooms[61]	Sack	1	$13.33-$33.33	Kikwit, Kinshasa	$14.42-$27.78	$10.00 - $66.67	$2.79-$38.89

[54] Lokolama: correlation 0.03 between max distance traveled and monthly consumption. Nkaw: correlation -0.04.

[55] Distances

	Lokolama			*Nkaw*		
	All NTFP	*Not commercialized*	*Commercialized*	*All NTFP*	*Not commercialized*	*Commercialized*
SD	1.80	1.94	1.87	1.79	1.76	1.90
Range (km)	0-15	0-24	0-10	0-15	0.005-10	0-15

[56] Similar problems calculating income from NTFP were reported by Tchatat (1999) in *Produits Forestiers Autres que le Bois d'œuvre (PFAB) : place dans l'aménagement durable des forêts denses humides d'Afrique Centrale* (1999)

[57] Included "chenille" and "belanga"

[58] included "matoyi ya puku",

[59] *Tas*=pile of products. G*obelet*=cup.

[60] Interviewers did not ask for names of specific species names. N=5

[61] N=3

Caterpillars [62]	Sack	1	$4.44-$16.67	Kinshasa, Oshwe	$14.67-$30.07	(ref. note[63])	-$10.93-$61.04

Locally perceived changes in the collection of NTFPs

Of all economic activities, collection of NTFPs was considered the most stable, with the fewest observed changes. No changes were reported by 84% and 93% of participants in the Lokolama and Nkaw sectors, respectively. Households in the Nkaw sector that mentioned change spoke mostly of negative trends: having to walk farther to find products, and diminution or disappearance of certain species of mushrooms and caterpillars. Households in the Lokolama sector also reported rarity and disappearance, as well as seasonal and natural changes as affecting abundance of products from year to year. Locally identified anthropogenic causes of these changes were of two types: transformation of forest for agriculture, resulting in the loss of caterpillar trees and other NTFP sources, and supernatural causes such as witchcraft, the death of traditional leaders, and the loss of respect for traditions by the new generation. A few participants also mentioned increasing populations in their villages, as well as the lack of respect for harvest seasons. Some participants also mentioned "climate change" or the disruption of seasons as the cause of the disappearance of NTFPs. It must be noted, however, that at the household level, only a minority of households that collect NTFPs (16% in Lokolama and 7% in Nkaw) reported changes or concerns over the availability of NTFP.

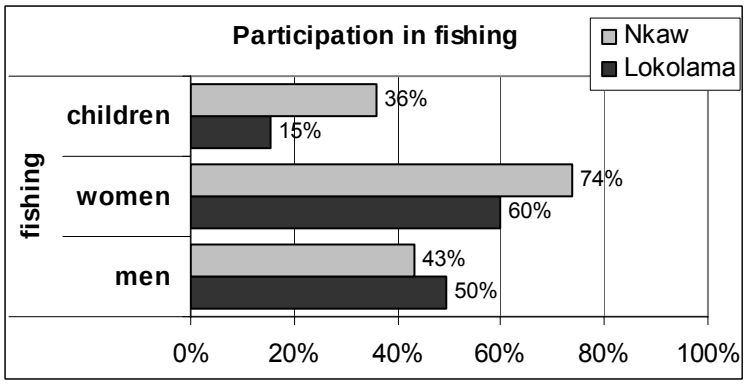
Similar responses were obtained in focus group discussions, where participants identified more changes in agriculture, fishing and hunting, than in the collection of NTFPs. Changes concerning NTFPs represented only 10% of the total reported changes in economic activities in the Lokolama sector and 4% in Nkaw. The five[64] villages in the Nkaw sector that reported changes in the availability of NTFPs cited a decrease in caterpillars associated with multiple causes including land transformation (4 villages), supernatural causes (3 villages), and changes in the weather (2 villages). Twenty-two villages[65] in the Lokolama sector reported changes associated with the availability of NTFPs. All but two of the reported changes dealt with the availability of caterpillars and were associated with changes in the weather (17 villages), supernatural causes (4 villages), changes in land use (1 village), inability to access their traditional forest[66] (1 village), and unknown causes (2 villages).

[62] N=2
[63] Price in Oshwe: between $3.11 and $3.73 per sac. Price in Kinshasa: between $72.00 and $91.11 per sac.
[64] Out of fourteen participating villages in this sector.
[65] Out of twenty seven participating villages.
[66] Participants from Bisenge.

3. Fishing

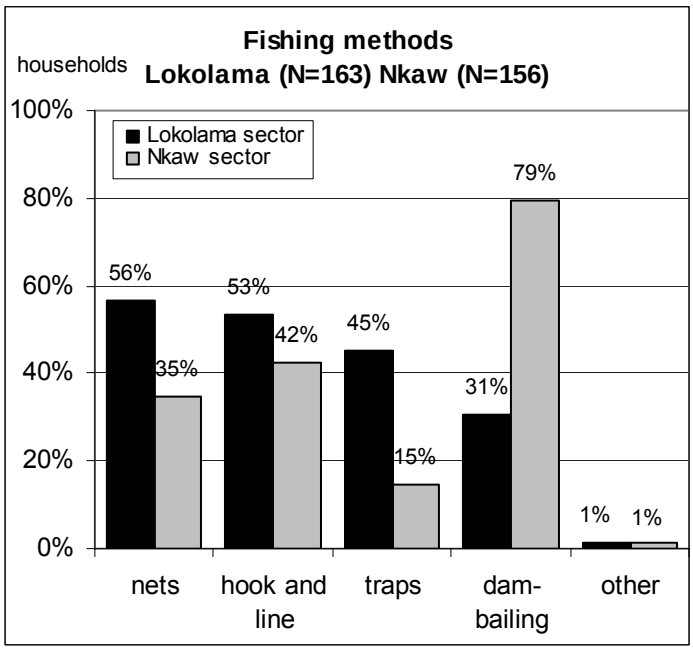
Fishing is the third most practiced subsistence and economic activity in both sectors. Both men and women fish, but with gender-differentiated techniques. Men fish mostly with nets, and lines and hooks while women use traps and practice the "damming and bailing" system or *kopepa* (écopage in French) also called *"nzele nsi,"* a method that consists of building small dams and then bailing out the water using large tightly woven baskets in order to capture trapped fish. Women and children reported a greater participation in this activity in the Nkaw sector than in Lokolama; while more men fished in Lokolama than in Nkaw. Children's participation in fishing in the Nkaw sector was more than double that of Lokolama (figure 21).

Figure 21



Slightly under half of the Lokolama households (46.6%) and over half of the participating households in the Nkaw sector (54.5%) reported relying on a single method of fishing. In Lokolama, 26.1% and 23.0% of households reported using two and three methods, respectively, while 4.3% reported four. In the case of Nkaw, 19.2% reported two methods, 25.6% reported three and 0.6% reported four. The most popular fishing methods are the use of nets, hooks and line, and traps (nasse). Figure 22 includes the types of methods used by households in both sectors.

Figure 22[67]



The bailing-dam system is practiced almost exclusively by women, sometimes helped by their children[68]. As figures 23 and 24 show, activities are gender differentiated among adults.

[67] "Other" methods included the use of poison and spears.

[68] among the local names used for this method are *esaka, ikangala, mbole, mbwo, mbeli, ekolo,* and *isaka*

Figure 23

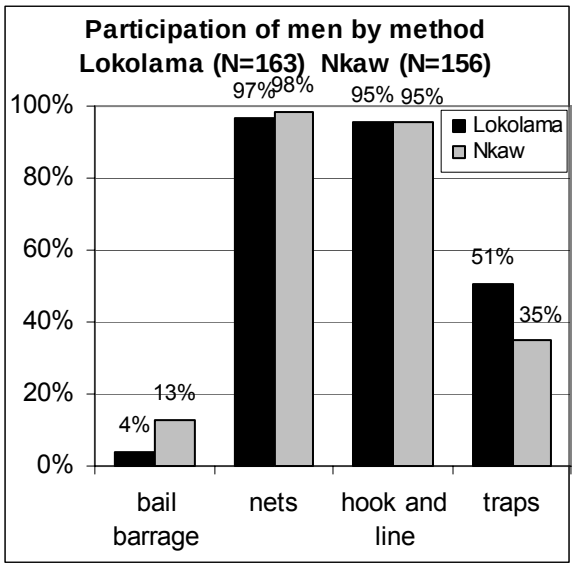


Figure 24[69]

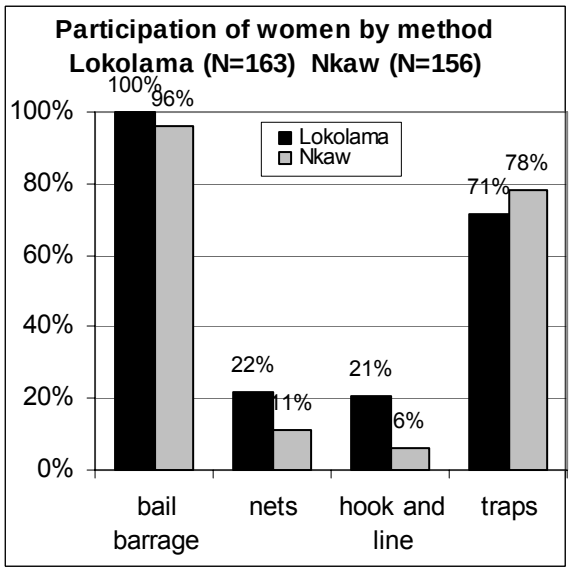
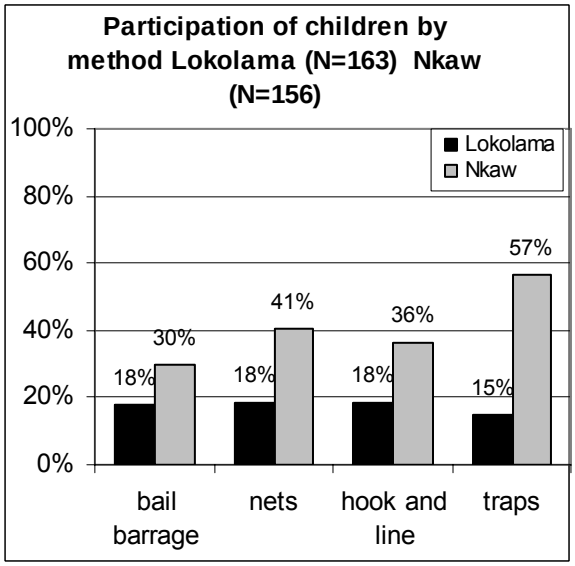


Figure 25



The number of hook and line implements varied from under 10 to over 200 in both sectors. Lokolama households reported from under 10 to over 200 traps as well, while all fishing households in Nkaw reported fewer than 50 (table 17).

Table 17 Number of implements per household

	line and hook (% of households)		Nets (% of households)		Traps (% of households)	
	Lokolama	**Nkaw**	**Lokolama**	**Nkaw**	**Lokolama**	**Nkaw**
Under 10	14.9	0.0	7.3	35.1	68.1	78.2
10 to 49	23.0	40.9	79.3	50.0	11.1	21.7

[69] Another probable cause of the difference in participation may be because data in the Lokolama sector was collected at the beginning of fieldwork. It was during this trip that field teams discovered the need to rephrase questions on fishing. The field teams began specifying that the category "fishing" included damming-bailing only after we realized that some participants did not include it in their responses because locally, fishing and damming-bailing are considered two different activities.

	line and hook (% of households)		Nets (% of households)		Traps (% of households)	
	Lokolama	Nkaw	Lokolama	Nkaw	Lokolama	Nkaw
Under 10	14.9	0.0	7.3	35.1	68.1	78.2
50 to 99	29.9	27.3	12	11.1	9.7	0.0
100 to 199	27.6	28.7	12.2	3.7	6.9	0.0
200+	4.6	3.0	0.0	00.0	2.8	0.0

The number of implements used for the damming-bailing method ranged between one and twelve, with the majority of women using two or three baskets. Despite the higher proportion of Nkaw households practicing this type of fishing, it did not correspond to increased income generation. When referring to areas where they practice fishing by constructing dams, participants talked about using their villages' forests and "all the streams that are within it;" they also provided specific names of sites used exclusively for this method as well as for fish traps.

Participants in the Lokolama sector reported 63 different fishing zones, including the Lokoro 2, Lulo, Lokoro 1, and Loole[70] where all methods of fishing are practiced. Smaller streams and waterways were more frequently used for traps and damming. Table 18 includes their principal fishing zones, the number of villages reporting fishing in those areas, and the percentage of households using them. Households in the Nkaw sector mentioned 65 different fishing zones, not including non-site specific references to village forests. Most fishing reported occur on the Luna, Loole, Botsina, and Lokoro 1 Rivers (table 19). More fishing techniques were usually reported for larger rivers than smaller streams where women and children mostly set traps or construct dams.

Table 18[71] Lokolama fishing zones

Fishing zones	Villages Lokolama N=27	Households (N=163)
Lokoro 2	12	53.4%
Lulo	3	27.6%
Lokoro 1	5	22.1%
Loole	6	20.9%
Lokeli	3	10.4%
Lolama	2	6.7%
Losoo	2	6.1%
Loosa	2	3.7%
Lompwete	2	3.1%
Luaka	3	2.5%
Lolongo	2	2.5%
Koli	2	1.8%
Lobende	2	1.2%
Yetele	2	1.2%

Table 19[72] Nkaw fishing zones

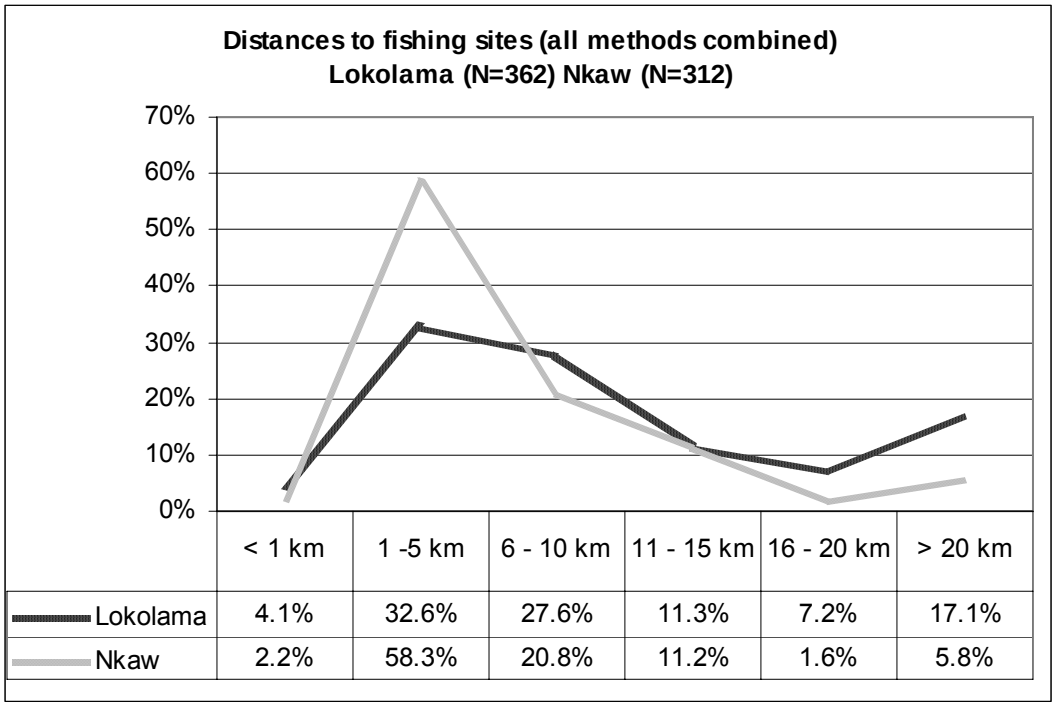
Fishing zones	Villages Nkaw (N=14)	Households (N=156)
Luna	9	74.4%
Loole	8	66.7%
Botsina	6	44.2%
Lokoro 1	5	34.6%
Yenge	6	22.4%
Lopale	5	17.3%
Bokelu	2	10.3%
Lotingo	2	10.3%
Nkimo	2	9.0%
Weliomo	3	5.8%
Bosawani	2	4.5%
Nkotepomi	2	3.2%
Bosaw	2	2.6%
Lilanga	3	1.9%
Libeke	2	1.3%
Wenge	2	1.3%

Distances between villages and fishing sites ranged from under one to twenty kilometers. Estimating average distances between villages and sites proved difficult because participants sometimes gave rough estimates that differed by one or more kilometers from those provided by other members of the same village. Differences in distances are also due to people having fishing camps on the same river but some kilometers away from each other, as well as to

[70] A complete list of rivers and streams used by all participating villages is included in appendix 1.
[71] R= 0.92 between number of villages using a waterway and frequency of use reported by households.
[72] R= 0.94 between number of villages using a waterway and frequency of use reported by households.

neighboring villages using the same resources but in different parts of the rivers. Figure 26 includes the range of distances traveled to fishing sites[73]. The majority of these areas are accessed by foot, through paths in the forest (87% of activities in Lokolama, 82% in Nkaw). Only a few sites were accessed by road (7% in Lokolama, 11% in Nkaw), or by river (6% in Lokolama and 7% in Nkaw).

Figure 26

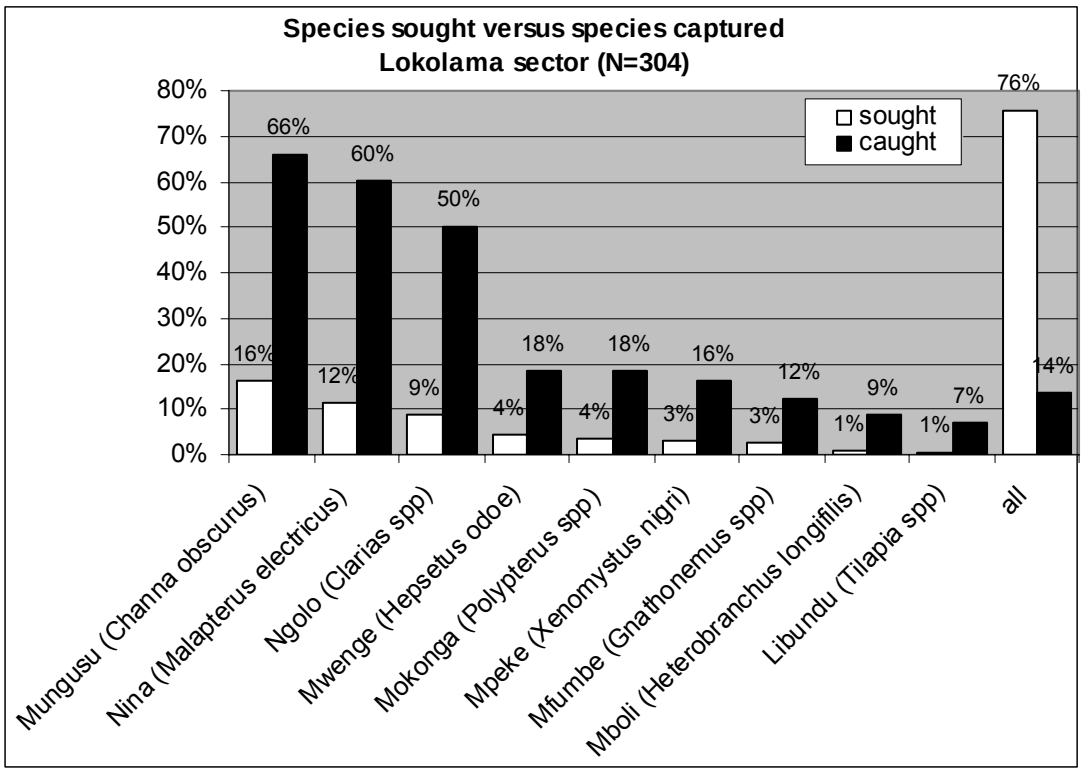


	< 1 km	1 -5 km	6 - 10 km	11 - 15 km	16 - 20 km	> 20 km
Lokolama	4.1%	32.6%	27.6%	11.3%	7.2%	17.1%
Nkaw	2.2%	58.3%	20.8%	11.2%	1.6%	5.8%

Fish preferences: Participants in the Lokolama sector did not report targeting specific fish, but seek "everything." Most frequently caught fish include mungusu (*Channa obscurus)*, nina *(Malapterururs electricus)* and ngolo *(Clarias spp).* Figure 27 includes the ten most frequently caught species in the Lokolama sector.

[73] All methods combined.

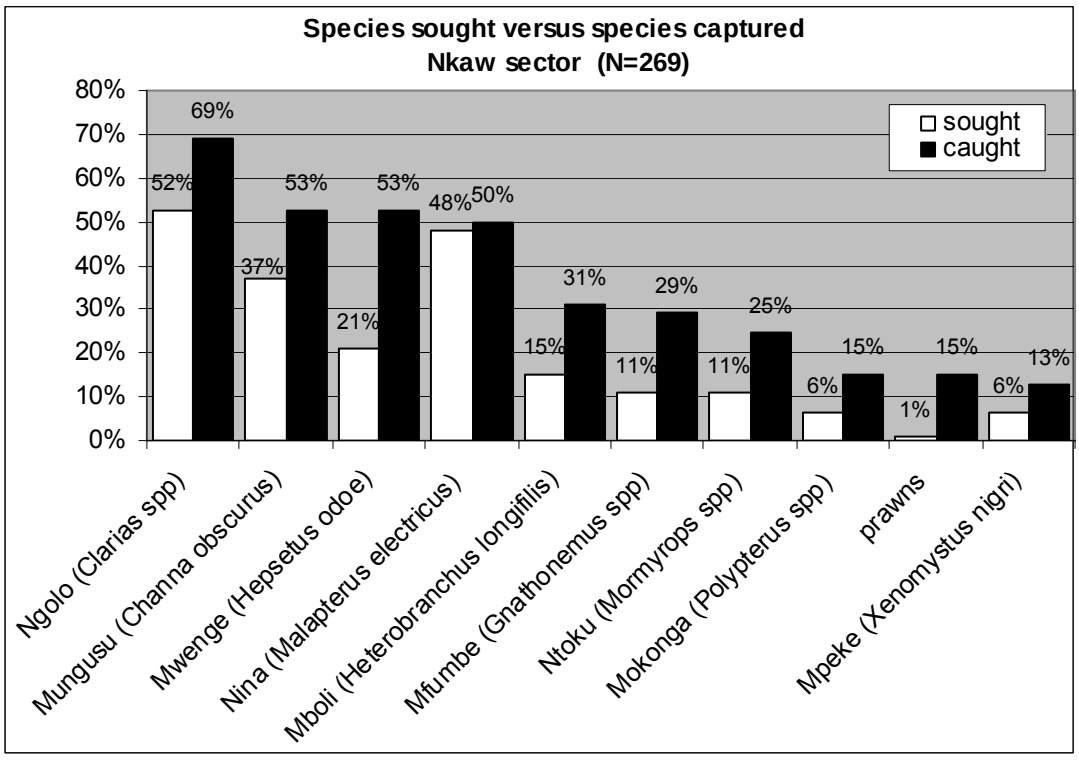
Figure 27



Participants from Nkaw gave more specific answers concerning desired fish species[74]. Mbeke *(Xenomystus nigri)* was the only species sought more than it was actually caught. Ngolo and mungusu were the most desired and frequently caught species, along with mwenge *(Hepsetus odoe)* and nina (figure 28).

[74] Differences between sectors may also be due to field team members becoming more skilled in administering the questionnaire by the time they reached the Nkaw sector, including using appropriate cues and probes to obtain more detail from participants.

Figure 28



Revenue from fishing


Basket for packing fish. Mbungusani, Lokolama Sector

In Lokolama, 57.7% of households that fish (37% of all participating households in the sector) sell a portion of their catch. In Nkaw, 79.5% of households that fish (60.5% of all participating households in the sector) are involved in trade. The number of fish species that households trade ranged from one to seven, with an average of 3.0[75] in Lokolama and 3.4[76] in Nkaw. The majority of fish sold by households is smoked (89.5% in Lokolama and 95.3% in Nkaw) and packed in baskets of different sizes for transport or sold individually for local consumption.

The principal species commercialized in Lokolama are mongusu (88.3%), ngolo (63.8%), and nina (50.0%), and to a lesser degree, mokonga (14.9%), and mpeke (13.8%). The most often mentioned destinations of fish outside the sector of Lokolama were Kinshasa (25 households, or 26.6% of households that commercialize fish), Kikwit and Tshikapa (both mentioned by 12 households), and Kasai (5 households)[77]. Other households reported selling locally to neighbors

[75] SD= 1.23
[76] SD= 1.48
[77] Other destinations included Oshwe (four households), Idiofa, Lokolama, Panu, and Yuki (three each), Ilebo (two), and Mbandaka (one household).

and itinerant traders. Table 20 includes the fish species most often commercialized in the Lokolama sector and the range of prices for the principal units of sale.

Table 20 Commercialized fish species in the Lokolama sector

Fish varieties	% of households Lokolama (N=94)	Price range	
		Basket	Per fish
Mongusu	88.3	$6.67-$333.33[78] (3000FC-15000FC)	$0.11-$6.67[79] (50FC-3000FC)
Ngolo	63.8	$6.67-$177.78[80] (3000FC-80000FC)	$0.11-$4.44[81] (50FC-2000FC)
		Piece of fish	Per fish
Nina	50.0	$0.11 (50 FC)	$0.11-$1.11[82] (50FC-500FC)

The principal species commercialized in Nkaw are ngolo (72.6% of households that report selling fish), mongusu (60.5%), mwenge (35.5%), nina (33.9%) and prawns (30.6%)[83]. As in the Lokolama sector, prices for baskets of fish varied with size. Table 21 includes the fish most often commercialized in the Nkaw sector and the range of prices for the principal units of sale. Only one household in the Nkaw sector reported selling in Kinshasa.

Table 21 Commercialized fish species in the Nkaw sector

Fish varieties	% of households Nkaw (N=124)	Price range	
		Basket	Per fish
Ngolo	72.6	$2.22-$88.89[84] (1000FC-40000FC)	$0.09-$1.11[85] (40FC-500FC)
Mongusu	60.5	$4.44-$111.11[86] (2000FC-50000FC)	$0.11-$3.33[87] (50FC-1500FC)
Mwenge	35.5	(principally sold individually)	$0.09-$0.67[88] (40FC-300FC)
		Piece of fish	Per fish
Nina	33.9	$0.02-$0.22[89](10FC-100FC)	$0.22-$2.22[90] (100FC-1000FC)

For some households commercial transactions are very sporadic and involve only limited exchanges between fishermen and traders. A participant explained, upon being asked about weekly revenues from fishing, that:

> *« The catch of the season, [contained] in a basket, it's done in one day."* (006 Mbungusani)

Interviews with merchants from the same area revealed that they sell individual fish for an average of $0.50 (224FC[91]), with prices ranging from 120FC to 350FC. Merchants that trade fish reported traveling once or twice a year to more distant towns, carrying large baskets of up to 1000 smoked fish by bicycle, canoe, and boat to their destinations. Table 22 summarizes prices and costs reported by merchants.

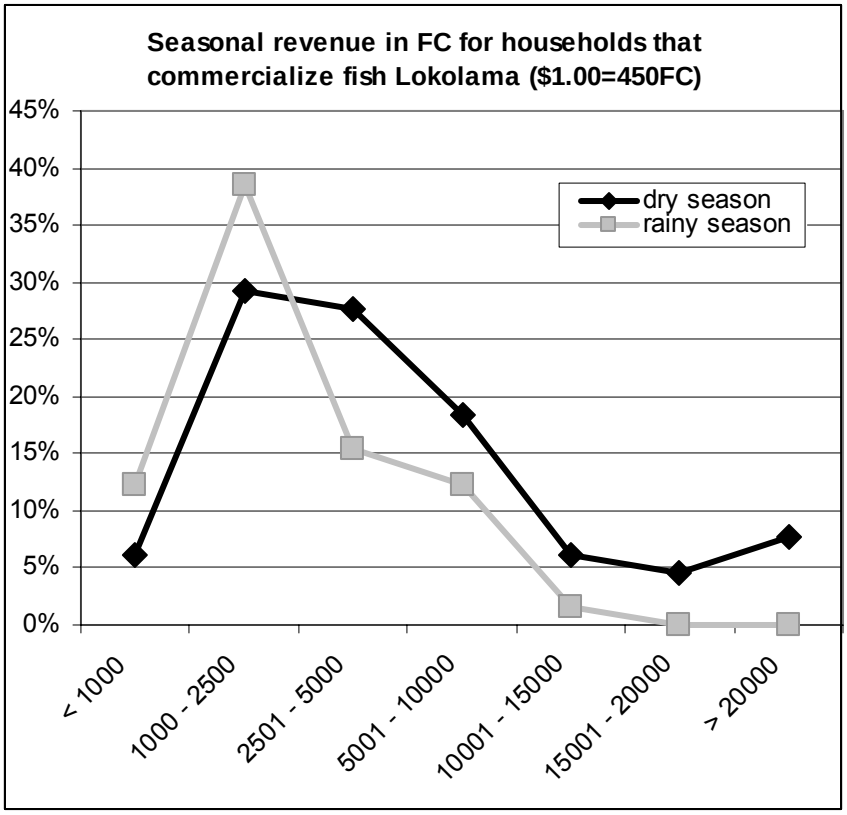
[78] Average $60.16. Median $38.89. SD= $67.03
[79] Average $0.69. Median $0.44. SD= $0.96
[80] Average $48.43. Median $33.33. SD= $45.83
[81] Average $0.56. Median $0.33. SD= $0.80
[82] Average $0.76. Median $0.67. SD= $0.27
[83] Other commercialized fish included mfumbe, ntoku, mboli and mokonga.
[84] Average $32.64. Median $8.89. SD= $37.95
[85] Average $0.20. Median $0.15. SD= $0.17.
[86] Average $49.86. Median $38.89. SD= $45.68
[87] Average $0.45. Median $0.33. SD= $0.48
[88] Average $0.23. Median $0.22. SD= $0.16.
[89] Average $0.09. Median $0.11. SD= $0.05
[90] Average $0.77. Median $0.67. SD= $0.57
[91] SD=75.85

Table 22 Prices reported by merchants per unit of sale

Product	Unit	Amounts bought	Price paid	Destinations	Costs per unit	Price sold	Revenue per trip
Fish[92]	Individual fish[93]	300-2000	$0.11-$0.22	Idiofa, Kikwit, Kinshasa, Mbandaka, Oshwe	$0.24-$0.45	$0.27-$0.78	-$5.67-$566.44

Participants reported fishing year round, although fishing for commercial purposes is mostly during the long dry season (May to August) (figure 29). In the Lokolama sector, there is a positive but not strong correlation at the household level between earnings during the peak season and gains from fishing during the low (rainy) season (r=0.29). Some households that reported gains of over $50 during the dry season did not report any earnings during the rest of the year. Among households that reported fishing year-round 18.5% cited higher gains during the rainy season. Sector-level trends show a stronger relationship between revenue in both seasons (r=0.82).

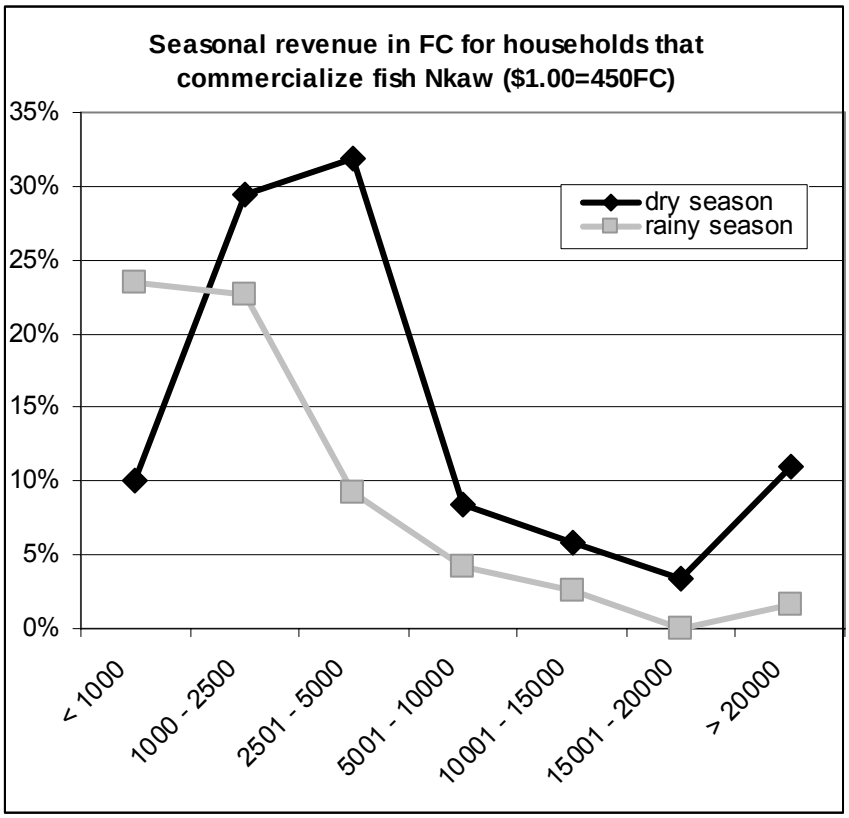
Figure 29



Revenue data from fishing in the Nkaw sector was similar to Lokolama. Over half (66.4%) of the households that reported fish commerce earn under $10 per dry season, and only 10.9% reported gains surpassing $50 (figure 30).

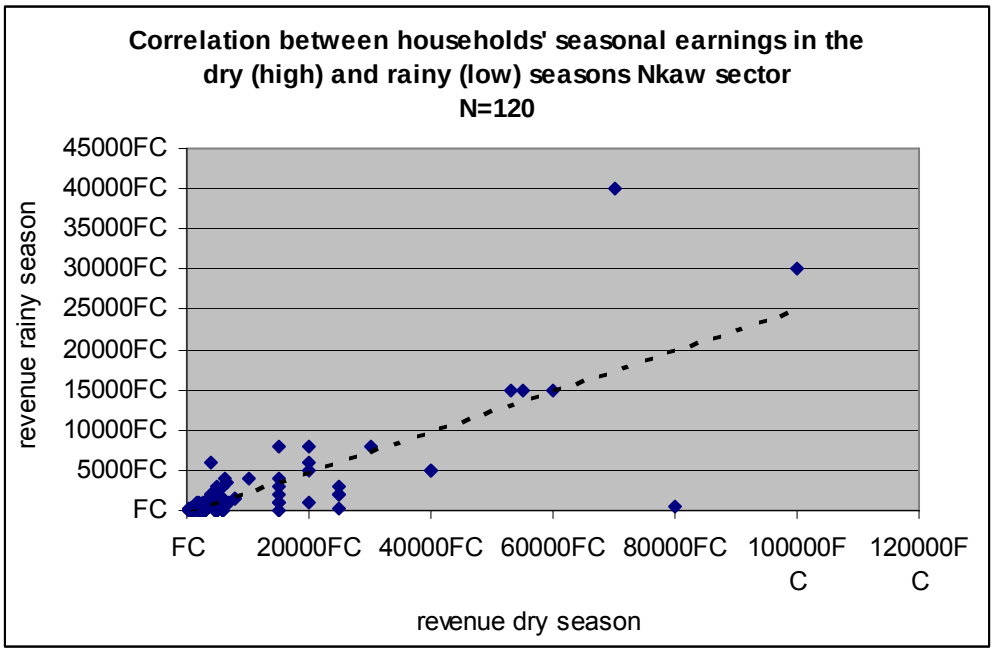
[92] Interviewers did not ask for names of species traded. N=7
[93] Two merchants specified buying "2.5" sized fish, referring to the size of nets as the standard measure of fish.

Figure 30



In Nkaw, 34.5% of households that generate income through fishing during the dry season reported no gains during the rainy season. In this sector, a stronger correlation was found at the household level in terms of earnings during the dry and rainy season (r=0.79) (figure 31).

Figure 31



Consumption of fish

As with fish commerce, subsistence use of fish varies according to the season. In the Lokolama sector, weekly consumption during the rainy season represented only one-quarter (24%) of dry season consumption by fishing households (r=0.72). In the Lokolama sector, 34.0% of

households that fish reported no consumption during the rainy season. In the Nkaw sector, half (49.8%) of the participating households (both fishing and non fishing households) do not consume fish during the rainy season[94].

Table 23 Most consumed fish varieties Lokolama and Nkaw sectors

Species	% Fishing households Lokolama sector[95]	% Households Nkaw sector[96]
Nina	67.8	51.2
Mungusu	52.0	42.9
Ngolo	44.5	65.4
Mokonga	19.8	7.3
Mfumbe	6.2	29.3
Mwenge	2.0	28.3
Mpeke	9.6	3.9

Households in both sectors reported consuming between one and five different species of fish, with an average of 2.4 per household[97] in Lokolama and 3.3[98] in Nkaw. Nina, mungusu and ngolo are the three most often consumed varieties of fish in both sectors. Other important varieties differed by sector, with households in Lokolama reporting mokonga and mpeke, while households in Nkaw reported higher consumption of mfumbe and mwenge (table 23).

Taboos concerning certain fish varieties persist today. In the Lokolama sector, 19% percent of households that fish reported prohibitions. Of 35 taboos recorded among fishing households, four concerned men, six women, and six pertained to children, while the other nineteen applied to all household members. Eight of these restrictions concerned the consumption of nina (*Malapterus electricus)*, believed to cause health problems. Four prohibitions concerned nzombo *(Protopterus dolloi)*, and related to custom and not health. In total, 16% of the prohibitions mentioned related to beliefs about diseases, while eighteen were family or clan taboos[99].

In the Nkaw sector, 47% of all households surveyed reported fish taboos. Of the 97 taboos recorded, the most frequently mentioned prohibitions were the consumption of: mosombi *(Clariallabes melas)* by 45 households; followed by nina *(Malapterus electricus)*, cited by 35 households; and nzombo *(Protopterus dolloi)* by 32 households. The majority of prohibitions mentioned in the Nkaw sector concerned customary or traditional taboos (85.6%), while 12.4% were health related. The most commonly mentioned health problem was rheumatism associated with the consumption of nina.

Belief in fish taboos is on the decline: *"The new generation begins to eat [fish like nina], because things evolve according to them »* (116 Mimia). The loss of taboos and prohibitions is also associated with the growing pressure on fish stocks, described in the next section.

Locally perceived changes in fishing activities

Historical changes in the practice of fishing include the introduction of new techniques of fishing, an increase in the participation of men, and a decrease in fish stocks. Although the rise of commercial fishing activities corresponds to a decrease in commercial agriculture, participants

[94] A weaker correlation was found between consumption in the dry and rainy seasons in Nkaw (r=0.46) for all households that consume fish. Disaggregate data for consumption by households that fish may result in a correlation closer to that found in Lokolama.
[95] 165 valid answers.
[96] 205 valid answers (fish consumption by all households surveyed in the Nkaw sector)
[97] Standard deviation: 1.0
[98] Standard deviation 1.17
[99] The remaining "prohibition" was reported by a family that said they didn't eat nongo because it was two small.

did not mention the political causes associated with agricultural decline as drivers for the diversification and intensification of fishing activities. Instead participants focused on economic factors, including increased numbers of newly arrived merchants wanting to buy fish. In the Lokolama sector, two thirds (67%) of households that fish reported changes, while in Nkaw 70% of all participating households reported changes.[100]. The most frequently mentioned change in both sectors was a discernable decrease in fish stocks, but the causes associated with this change differed between Lokolama and Nkaw. Participants in Lokolama associate declining fish stocks with an intensification of fishing activities by local populations faced with limited economic alternatives.

> *"Before, men didn't practice any type of fishing, it was an activity reserved for women. Before, men only accompanied women to build the fishing camps. Now men fish with hooks, nets and traps. "* (Women's focus group Inyongo)

The second most frequently mentioned cause was increased demand for fish, something participants referred to as the arrival of merchants looking for fish. These are not the same merchants who were involved in agricultural trade before and immediately after independence. While agricultural trade was historically carried out by companies and merchants that bought in bulk and relied on motorized transportation, fish merchants are mostly walking or pushing bicycles and unable to transport large quantities.

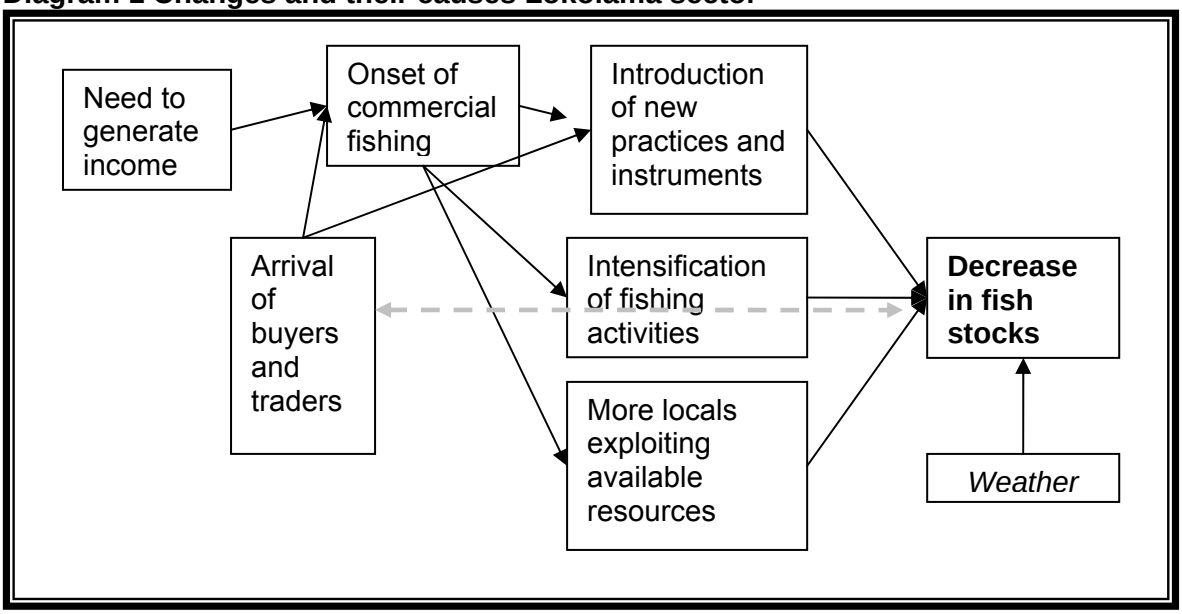
Participants in the villages of Manga, Bokota 1, and Nkopo referred to the arrival of a Senegalese trader (Paul Ibondo) who frequented the area in the late 1960s and early 1970s to purchase crocodiles. According to participants, he was the first trader to introduce nets, which men started to use in the place of traps.

The increasing numbers of equipment used by households, followed by the introduction of new practices, notably nets, hooks and lines, were the third and fourth most commonly cited reasons for change.

Three of the causes associated with the decrease of fish stocks were also considered changes onto themselves. Interestingly, while the arrival of traders was linked to a decrease in fish stocks, the need for new sources of income was not: people associate decrease in availability with growing demand for fish, but not with the need to generate income. However, the interconnection between all these changes and causes is evident: a need to generate income, paired with increased demand for fish, triggered the adoption of new practices and/or the intensification of certain methods, which in turn impacted the availability of fish in local rivers and streams (diagram 1).

[100] After the first field trip, questions on changes in different activities were expanded to include participants that didn't produce but did buy and consume fish and bushmeat.

Diagram 1 Changes and their causes Lokolama sector



According to participants, fishing activities began to increase at the end of the 1960s. The arrival of buyers and traders was placed in the first half of the 1970s, overlapping with the introduction of new techniques and an observed decrease in fish stocks. The only non anthropogenic cause mentioned was the weather. Four villages associated changes in the weather and the seasons as a cause of a decline in fish stocks (table 24).

Table 24 Changes reported by villages in the Lokolama sector (N=27) and their associated causes

		Changes			
		Decrease in fish stocks (27 villages)	**Introduction of new practices and instruments (11 villages)**	**Onset of commercial fishing (6 villages)**	**Intensification of fishing activities (6 villages)**
Associated causes[101]	More locals exploiting resources	19	0	1	1
	Arrival of buyers and traders	12	4	0	1
	Need to generate income	0	5	4	2
	Number of instruments has increased	9	0	0	0
	Introduction of new practices, instruments	2	2	0	0
	Weather[102]	4	0	0	0

[101] Supernatural (3 villages), use of poison (2 villages), bad roads, disappearance of buyers (2 villages), foreigners exploiting local resources, lack of economic resources, loss and/or lack of equipment and capacity, profitability of the activity, and unknown (one village each)

[102] 2 villages mentioned variations in the seasons, and two villages mentioned permanent changes.

Declining fish stocks was also the most frequently identified change in the Nkaw sector. The causes for this change differed from those in Lokolama. While participants in Lokolama associated increased number of fishermen and traders with fewer fish, participants in Nkaw mentioned the use of poison as a cause for the decline in 10 out of the 14 villages (table 25). The second most mentioned reason was an increase in numbers of hardware, followed by the introduction of new practices. The presence of non-local fishermen was mentioned only once in Lokolama[103]. Fishermen defined "foreigners" as coming from villager within the territory, including the nearby villages of Mange[104], Nkaw, and the town of Oshwe.

Diagram 2 Changes and their causes Nkaw sector

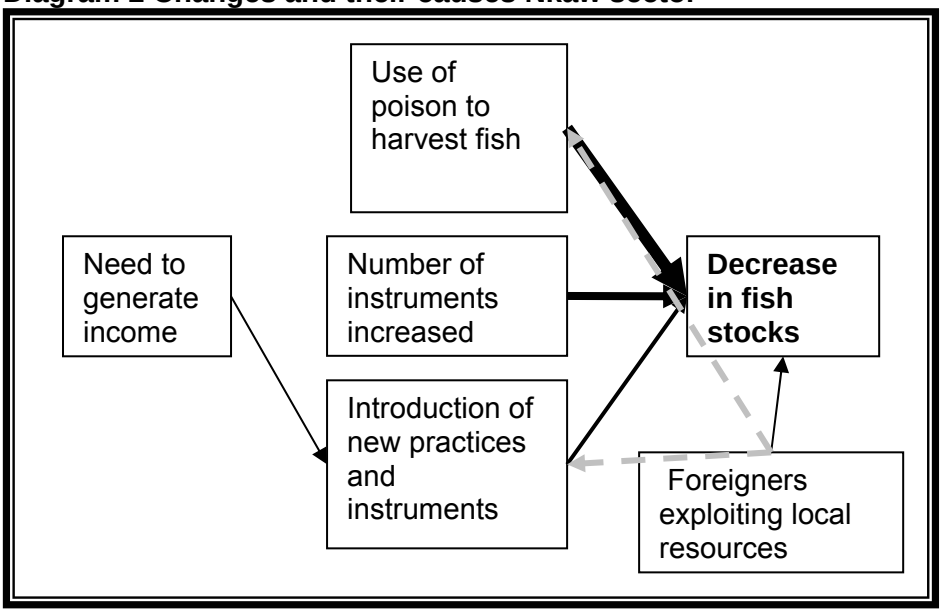


Table 25 Changes reported by villages in the Nkaw sector (N=14) and their associated causes

		Changes		
		Decreased fish stocks (13 villages)	**Lack of equipment (3 villages)**	**Introduction of new practices and instruments (2 villages)**
Associated causes[105]	Use of poison	10	0	0
	Deterioration of roads, disappearance of buyers	0	2	0
	Number of instruments has increased	7	0	0
	Need to generate income	0	0	2
	Introduction of new practices, instruments	3	0	0
	Foreigners exploiting	3	0	0

[103] Participants from Esama talked about he presence of fishermen from Equateur, who started to arrive in the 1960s and introduced nets in the area.
[104] Mentioned by participants from Ikomo Bombole.
[105] Causes mentioned once included supernatural, lack of economic alternatives, the arrival of traders and merchants, and increased number of fishermen.

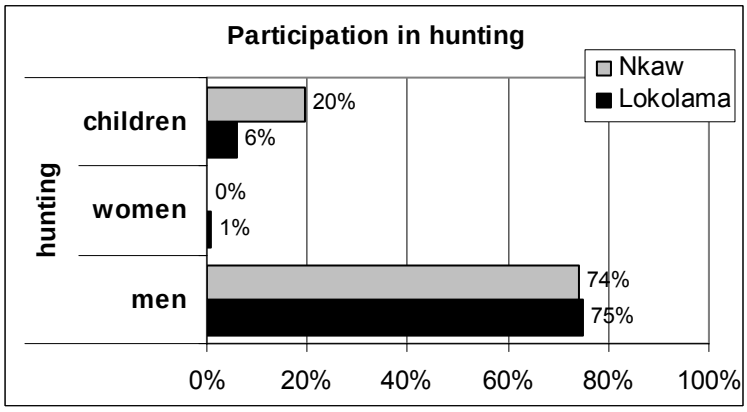
	local resources			

Even though the use of poison was identified as the principal cause of decreasing fish stocks, no fishing households in Nkaw reported using this method and only one reported it in Lokolama.

4. Hunting

Hunting is almost exclusively a male activity (figure 32) practiced as a subsistence and/or commercial activity by 75.6% of households in the Lokolama and Nkaw sectors. Local men engage in both individual and collective hunting, sometimes inviting men from neighboring villages with whom they have clan ties. Methods of hunting include traditional traps, shotguns, bows and arrows, spears, dogs, and wire and plastic ("nylon") snares.

Figure 32

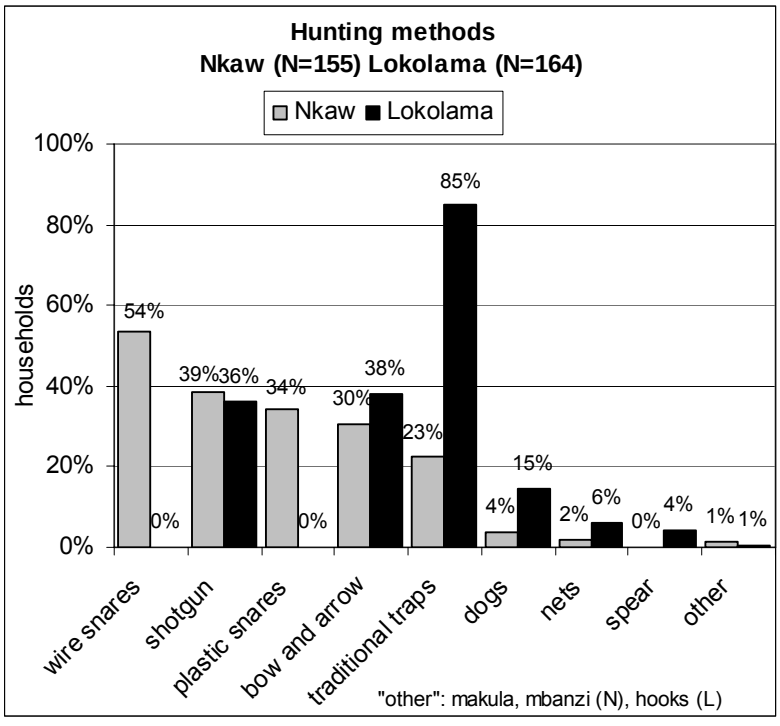


Collective hunting is strongly associated with traditional systems that regard hunting as an activity for subsistence and not commercial purposes. Collective hunting as a wildlife management strategy regulates who hunts what, where, and in what quantity, following a system of sharing that corresponds to local clan hierarchy.

> *« In collective hunting we don't sell the whole animal, while in private hunting we do. »* (104 Nganda)

In addition to households that hunt for consumption and commerce, 18.1% of households in Lokolama and 24.4% in Nkaw reported purchasing bushmeat for household consumption from hunters in their own villages.

Figure 33



Households in Lokolama and Nkaw hunt and trap using one to five techniques, with an average of 1.9 methods per household (Lokolama: SD 0.94; Nkaw: SD: 0.89). The most popular method in Lokolama is traps, used by over three quarters of hunting households. In Nkaw, the most popular method is wire snares, used by over half of households that hunt (figure 33). Participants in Nkaw differentiated traditional traps which are used by 23% of households from snares made with metal wire and plastic, used by 54% and 23% of households, respectively. The percentage of households hunting with bow and arrows was similar in both areas (30% in Nkaw and 38% in

Lokolama), while the use of dogs was more frequently practiced in Lokolama than in Nkaw (15% and 4%, respectively).

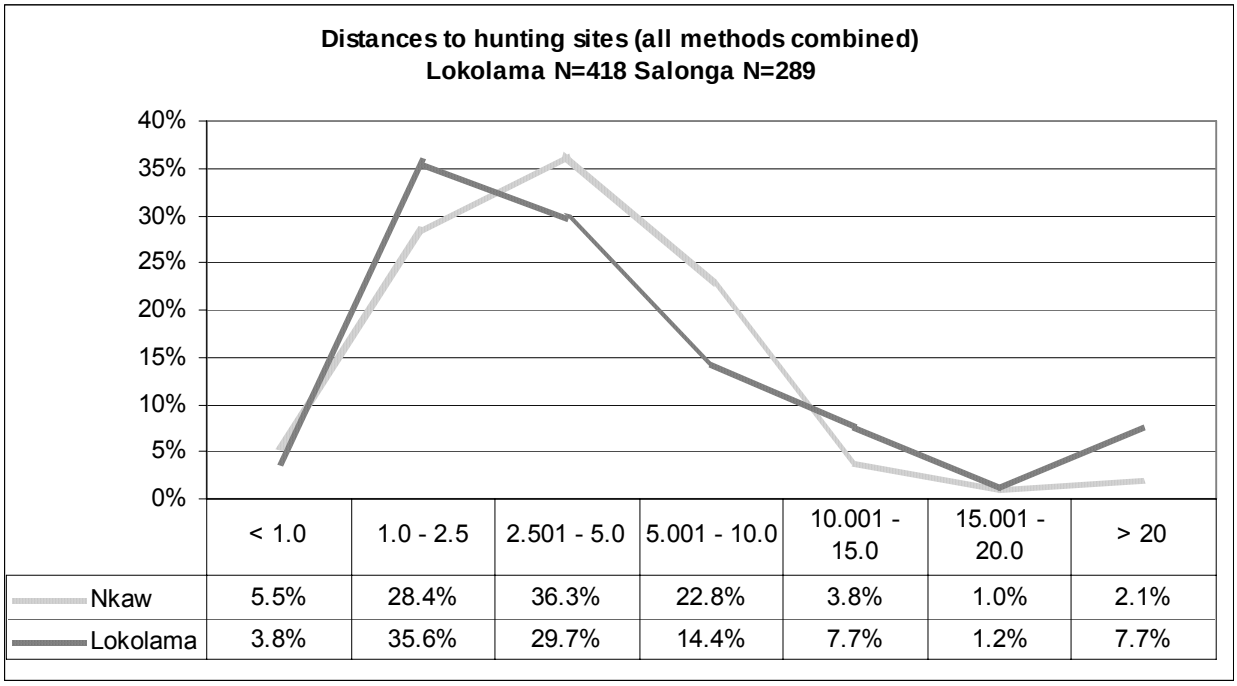
Table 26 Percentage of households who practice different methods only during the rainy season

Method	% Nkaw	% Lokolama
Wire snares	40.5	n/a
Shotgun	19.0	21.1
Plastic snares	33.3	n/a
Bow and arrows	19.1	0.0
Traditional traps	66.7	31.6

Most hunting takes place year-round (74.3% in Lokolama and 64.4% in Nkaw). However some hunting and trapping is seasonal. As illustrated in table 26, a higher percentage of hunting and trapping methods in Nkaw were exclusive to the rainy season.

Men access hunting and trapping areas by forest paths (93%). The majority of participants reported walking from 1 to 10 kilometers to get to their hunting sites, including camps (figure 34).

Figure 34



	< 1.0	1.0 - 2.5	2.501 - 5.0	5.001 - 10.0	10.001 - 15.0	15.001 - 20.0	> 20
Nkaw	5.5%	28.4%	36.3%	22.8%	3.8%	1.0%	2.1%
Lokolama	3.8%	35.6%	29.7%	14.4%	7.7%	1.2%	7.7%

Distances between village homes and hunting sites varied according to method. Variation in distances reported for each method was higher in Lokolama than in Nkaw (table 27), where households also reported traveling shorter distances.

Households that reported hunting with firearms reported owning, on average, one shotgun ("Calibre 12"). In Lokolama, 12 percent of hunters that use firearms reported borrowing a firearm from a neighbor. Similar cases were not found in Nkaw. Between 1 and 10 dogs (average 4.5) were used by dog-hunting Lokolama households (N=24) and 1-6 dogs by comparable Nkaw households (N=6). The number of wire and plastic snares, arrows and traps reported by households is included in table 28.

Table 27 Distances (km) traveled per hunting method

Method[106]	Lokolama	Nkaw
Wire snares	n/a	0.2-30.0
Plastic snares	n/a	0.4-30.0
Shotgun	0-50.0	0.2-25.0
Traditional traps	0-75.0	0.4-25.0
Bow and arrow	0-50.0	0.4-25.0
Dogs	1.0-35.0	0.2-12.5

Table 28 Instruments per household

	% Households Lokolama (N=164)		% Households Nkaw (N=155)			
	Traditional traps (N=136)	Arrows (N=59)	Wire snares (N=83)	Plastic[107] snares (N=53)	Traditional traps N=35)	Arrows (N=47)
<10	8.1	81.4	12.0	13.2	8.6	97.9
11-20	5.1	10.2	15.7	11.3	14.3	0.0
21-30	14.0	1.7	9.6	17.0	22.9	2.1
31-40	10.3	3.4	15.7	7.5	11.4	0.0
41-50	17.6	0.0	12.0	15.1	14.3	0.0
51-60	3.7	0.0	1.2	7.5	8.6	0.0
61-70	7.4	0.0	6.0	3.8	0.0	0.0
71-80	7.4	0.0	8.4	7.5	2.9	0.0
81-90	2.2	0.0	1.2	0.0	0.0	0.0
91-100	11.8	1.7	9.6	9.4	2.9	0.0
101-200	10.3	0.0	4.8	5.7	14.3	0.0
>200	2.2	0.0	3.6	1.9	0.0	0.0

Species preferred by Lokolama sector hunters and trappers include river red hog *(Potamocherus porcus)*; Peter's *(Cephalophus callipygus)*, yellow backed *(C. silvicultor)*, bay (*C. dorsalis)*, and unspecified duikers *(Cephalophus spp)*; brush-tailed porcupine *(Atherurus africanus)*; sitatunga *(Tragelaphus spekei)*; and monkeys. Sixty-eight percent (68%) of households reported no preference, stating that they hunt and trap all species. In terms of species captured, river red hog also ranks first (67%), followed by Peter's duiker (49%) brush-tailed porcupine (17%), sitatunga (17%), and monkeys (14%). Figure 35 compares preferred species to species actually captured in the Lokolama sector. The techniques used to capture the ten principal species mentioned by hunters in Lokolama are summarized in figure 36.

106

	Lokolama Sector				*Nkaw Sector*				
	distance dogs	*distance arrows*	*distance shotgun*	*distance traps*	*distance cables*	*distance dogs*	*distance arrows*	*distance shotgun*	*distance nylon*
Average	8.98	5.34	7.40	6.91	5.13	4.89	4.89	6.35	5.70
SD	8.99	7.25	8.00	9.61	4.09	3.85	3.80	5.41	5.03
N	32	85	83	183	83	6	47	60	53

107 "nylon"

Figure 35[108]

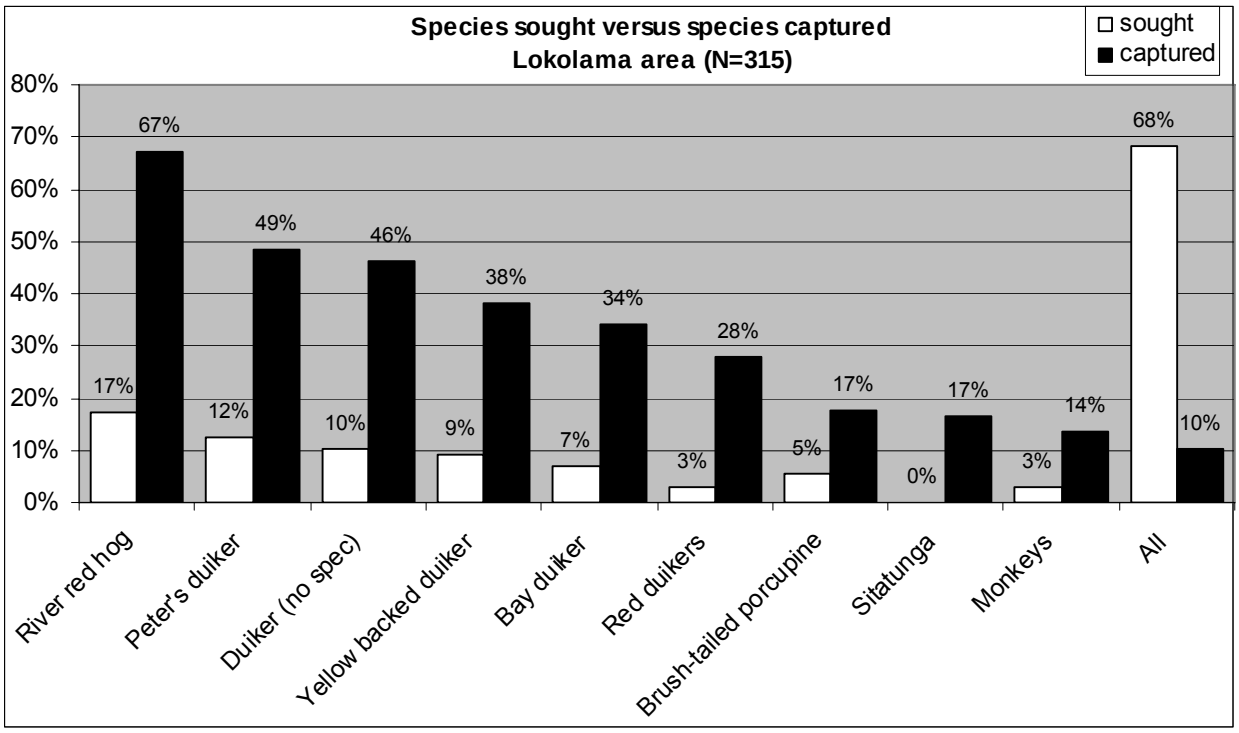
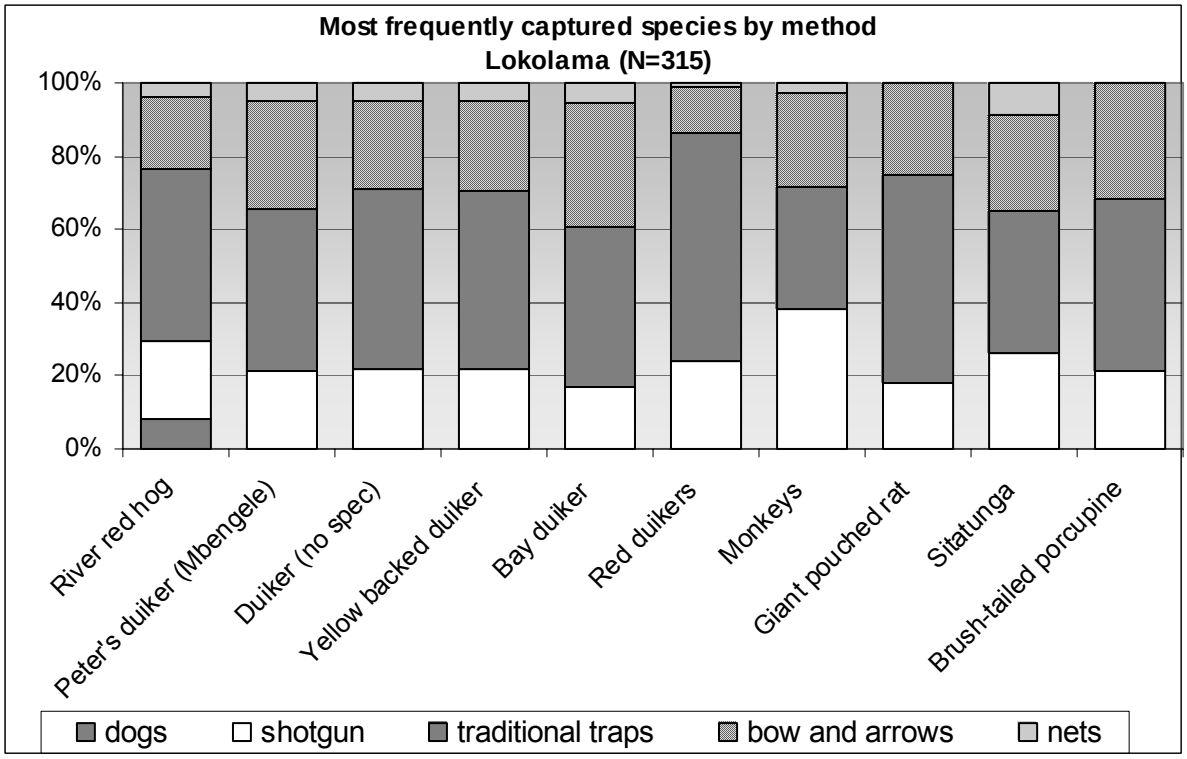


Figure 36



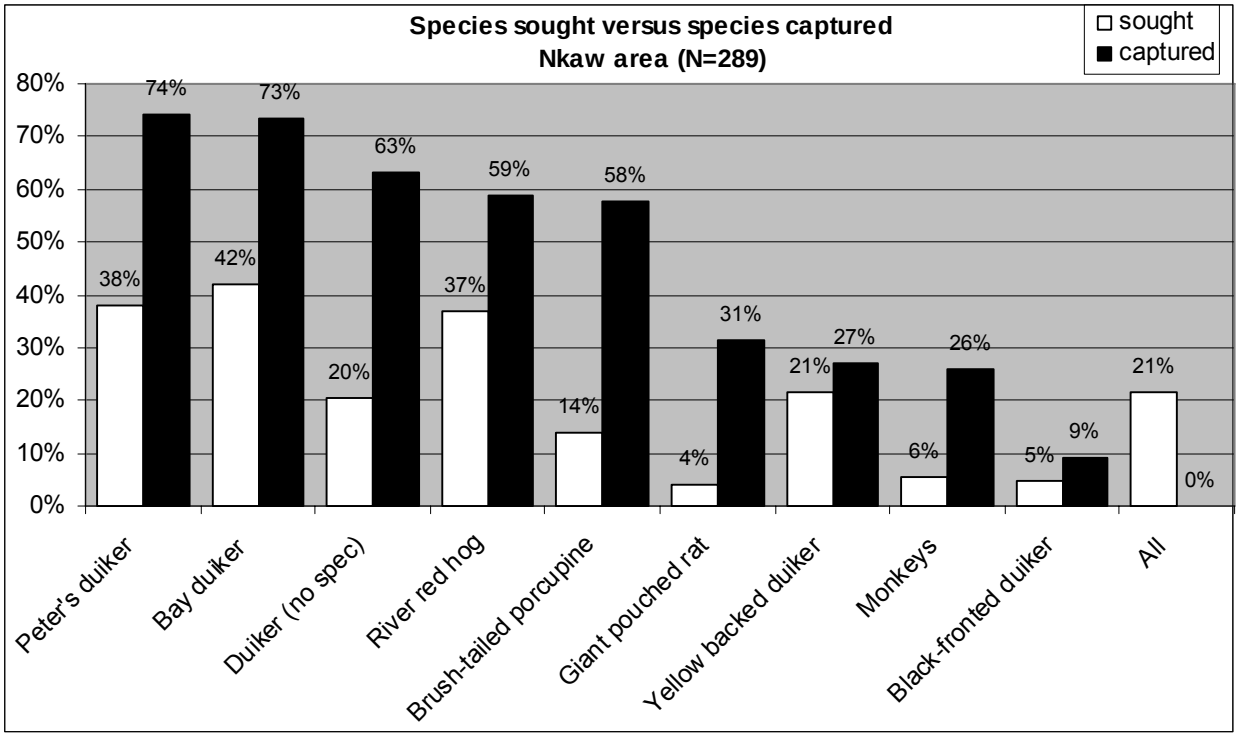
Hunters in both sectors prefer and capture similar species. Differences were found in terms of households that report no preference, saying that they hunt all species (66% in Lokolama versus 21% in Nkaw). Some differences were also found in terms of species caught, like in the case of river red hog (67% in Lokolama versus 59% in Nkaw), sitatunga (17% Lokolama: 1.4%

[108] Other species captured in Lokolama included giant pouched rat (9.5%), yellow-backed duiker (4.1%), leopard (*Panthera pardus)* (2.9%), elephant (1.3%) and African forest buffalo *(Syncerus caffer nanus)* (1.3%).

Nkaw), brush tailed porcupine (17% Lokolama: 58% Nkaw), and giant pouched rat *(Cricertomys gambianus)* (9.5% Lokolama: 31% Nkaw).

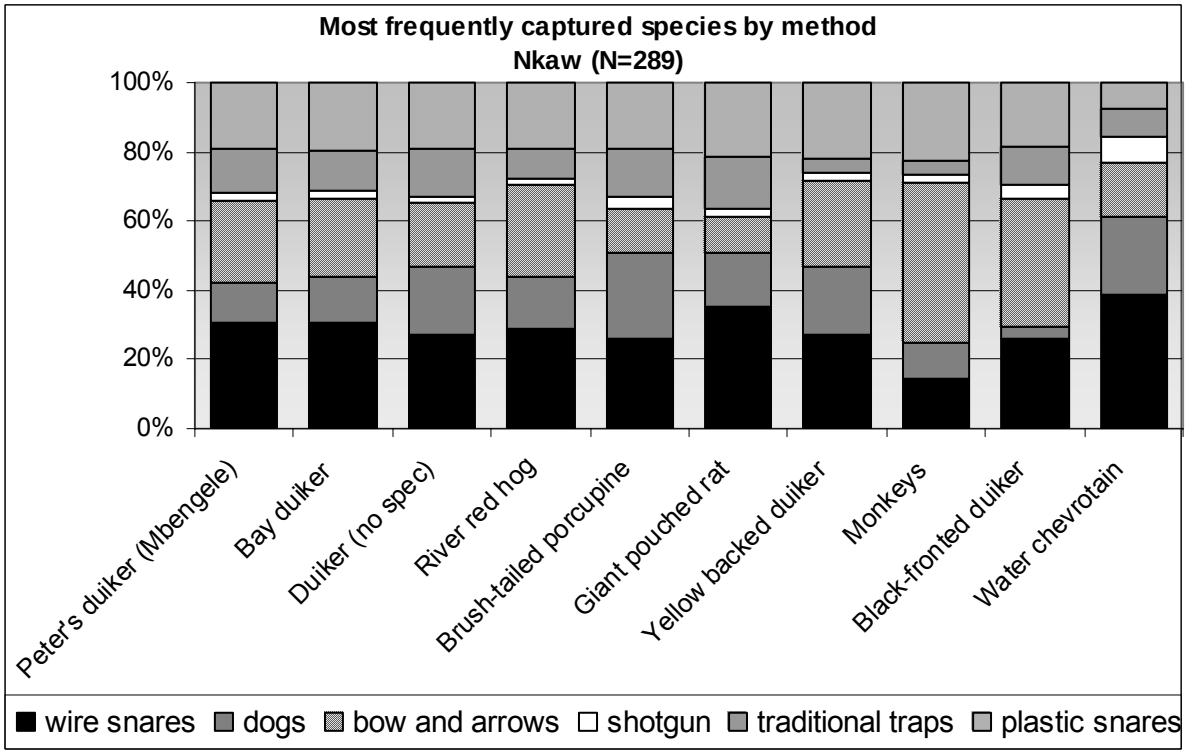
Species sought by Nkaw hunters and trappers included various species of duikers, river red hog, and brush-tailed porcupine. Twenty-one percent of households reported no preference. In terms of species captured, Peter's, bay, and unspecified duikers ranked first (74%, 73% and 63%, respectively), followed by river red hog (59%), brush-tailed porcupine (58%), giant pouched rat (31%), and monkeys (26%) (figure 37). Figure 38 summarizes methods used to capture the ten principal species in this area.

Figure 37[109]



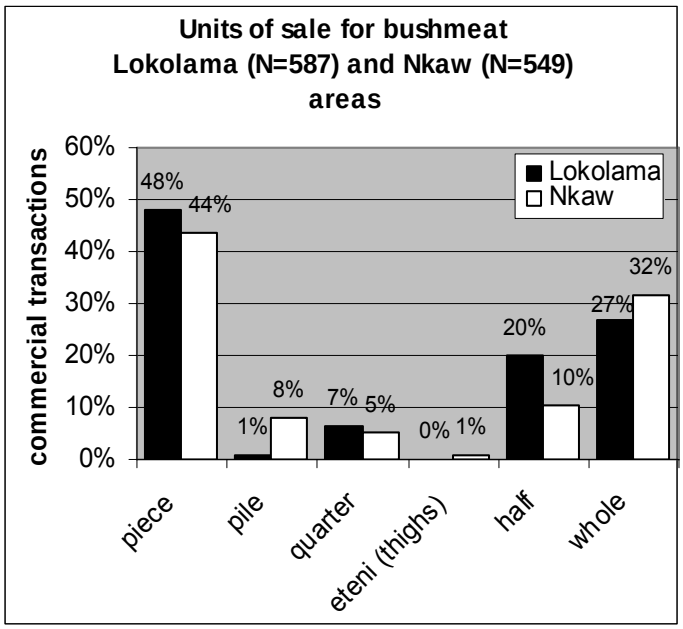
[109] Other species captured in Nkaw included water chevrotain *(Hyemoschus aquaticus)* (4.5%), African civet *(Civetta vivera)* (3.5%), snakes (1.7%), bongo (*Tragelaphus euryceros)* (1.7%), sitatunga (1.4%), mongoose (1.4%), elephant (1.0%), and African forest buffalo (1.0%).

Figure 38



Revenue from hunting

Figure 39



Ninety-three percent of hunting households in Lokolama and 97% in Nkaw commercialize a portion of their capture. These percentages are higher than those reported by households that commercialize a portion of their fish catch (58% in Lokolama and 80% in Nkaw), underlying the importance of bushmeat commerce to household economies. Participants in Lokolama and Nkaw reported selling between one and seven species. The average number of commercialized species was higher in Nkaw (3.38, SD=1.32) than in Lokolama (2.92, SD=1.1). In Lokolama, 81.0% of transactions by local hunters take place in the same village, 3.3% in hunting camps, 2.4% in rural markets, and 12.2% in larger, urban markets.

> *« I sell here in the village. I don't travel to sell except if I need to go to Lokolama for other business" (01 Nganda)*

In Nkaw, 94.6% of transactions occur in a hunter's own village and only 5.4% take place in larger markets. This difference may be due to the relative accessibility of Nkaw villages from Oshwe, which translates into more merchants traveling to their villages to purchase bushmeat. In contrast, Lokolama hunters may need to travel from their camps and villages in search of markets for their bushmeat. Among urban markets mentioned by households in Lokolama were

Kinshasa, Tshikapa, and Kikwit. One household also reported traveling to a specific diamond mine to sell his products (Biponga). Figure 39 includes the proportion of transactions per unit of sale in both areas.

Tables 29 and 30 present the species most frequently sold by households in Lokolama and Nkaw, as well as their unit prices.

Table 29 Most often commercialized species and prices per units of sale ($1.00=450FC) Lokolama (N=153)

Species	% households	Piles and pieces[110]	Quarters and halves of carcasses[111]	Per animal
River red hog	85.0	30-1000FC	200-3500FC	2000-6000FC
Peter's duiker	49.0	50-750FC	600-2000FC	1400-2000FC
Bay duiker	31.4	50-500FC	700-1200FC	1400-2500FC

Table 30 Most often commercialized species and prices per units of sale ($1.00=450FC) Nkaw (N=150)

Species	% households	Piles and pieces	Quarters and halves of carcass	Per animal
Peter's duiker	89.3	10-1000FC	300-2000FC	1500-3500FC
Bay duiker	77.3	10-1500FC	475-2500FC	2000-5000FC
river red hog	57.3	10-500FC	100-3500FC	400-7000FC

Merchants trading bushmeat reported traveling between once a month and once a year between sites of supply (e.g. villages and hunting camps) and market destinations. Only merchants buying and selling within the Territory of Oshwe reported more frequent trips. Quantities traded varied from small-scale merchants traveling with one carcass to Oshwe, to merchants traveling with the equivalent of 50 carcasses to Tshikapa, Kinshasa and other distant markets. Table 31 summarizes prices and costs of bushmeat as reported by merchants. Differences in revenue and problems associated with this trade are discussed in the Commerce section.

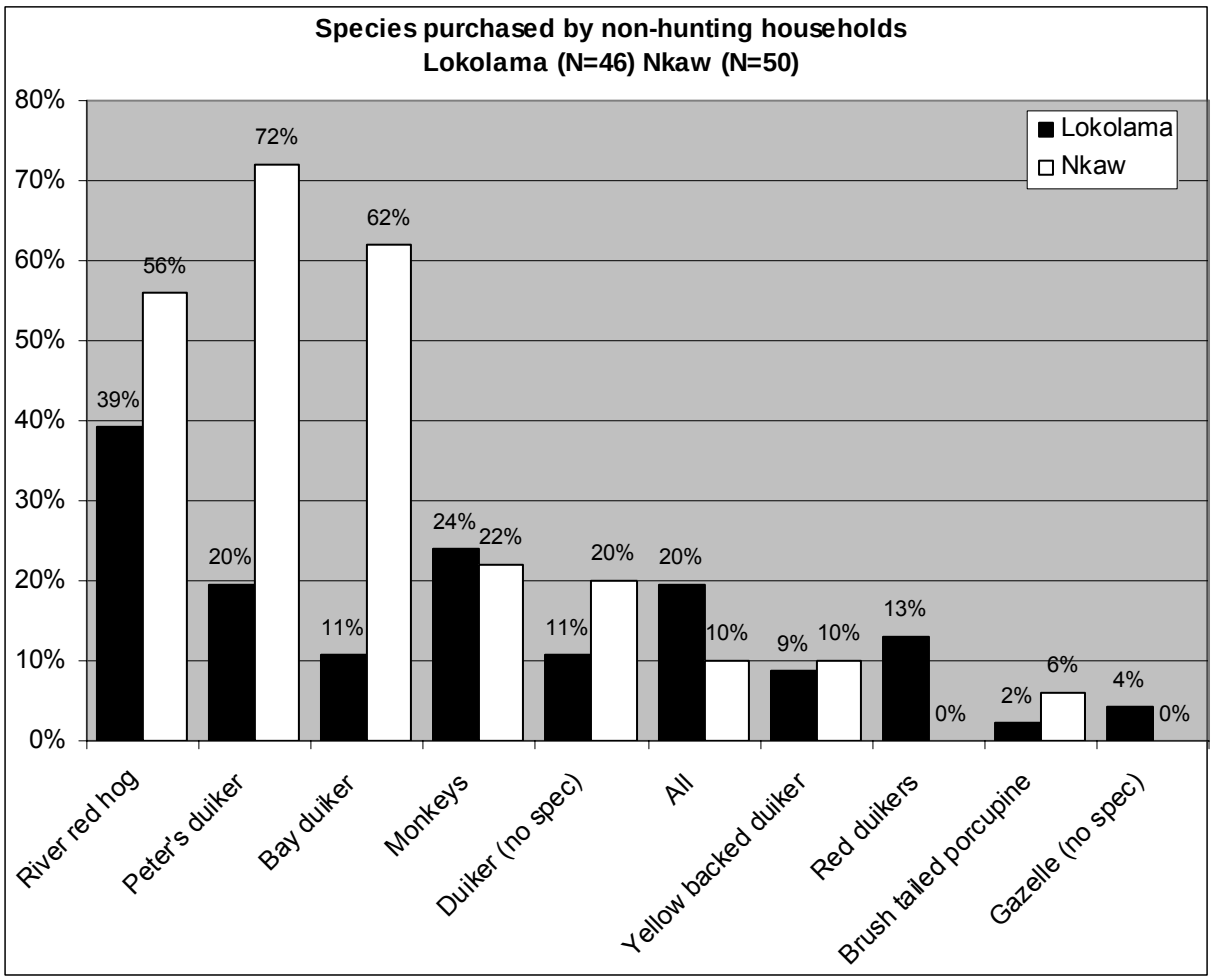
Table 31 Prices reported by merchants per unit of sale (N=28)

Product	Unit	Amounts bought	Price paid	Destinations	Costs per unit	Price sold	Revenue per unit	Revenue per trip
Bushmeat[112]	Whole carcass	1-45	$2.67-$10.00	Idiofa, Kikwit, Kinshasa, Mbandaka, Oshwe, Tshikapa	$1.92-$10.96	$10.22-$15.56	-$0.52-$2.74	-$1.56-$526.78
	Half (bipese)	10-138	$2.22-$5.56		$2.90-$6.54	$2.22-$17.78	-$3.76-$13.45	-$375.78 $1,855.56

Non-hunting households purchase bushmeat from local hunters. Households in Lokolama reported buying on average, 1.5 species, while households in Nkaw reported 2.6. Differences were found in terms of species most frequently purchased in both sectors. Purchases in Lokolama were distributed across more species than in Nkaw, where river red hog, Peter's and bay duiker dominated the market. The most frequently bought species in both sectors appear in figure 40.

[110] Same range of prices for both measures.
[111] Same range of prices for both measures.
[112] Interviewers in Oshwe did not ask participants to specify the species traded.

Figure 40



A slightly higher percent of households in Lokolama reported revenue above 5000FC during both the rainy and dry seasons. In Lokolama, 19.4% of households reported selling bushmeat only during the rainy (high) season, while 21.8% of households in Nkaw reported the same (figures 41 and 42).

Figure 41

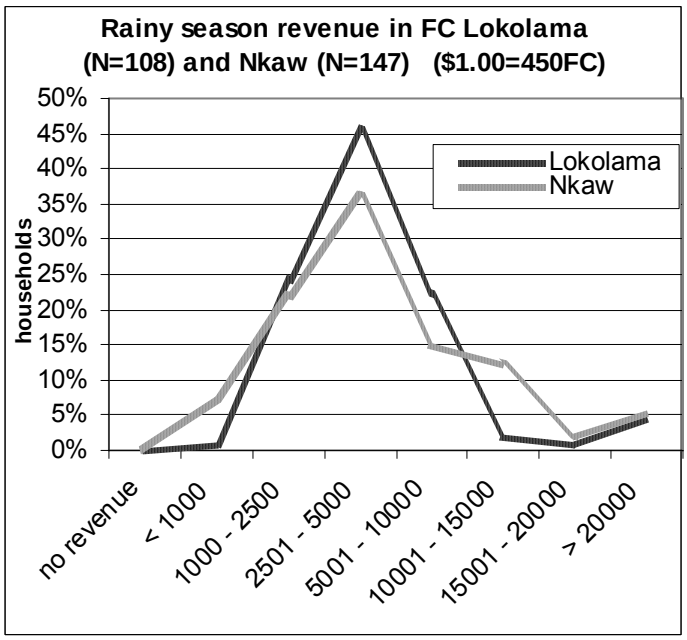
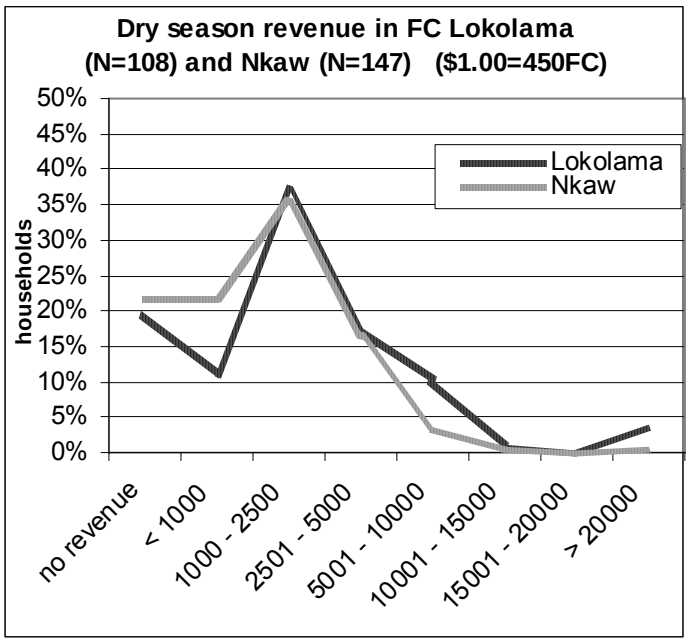
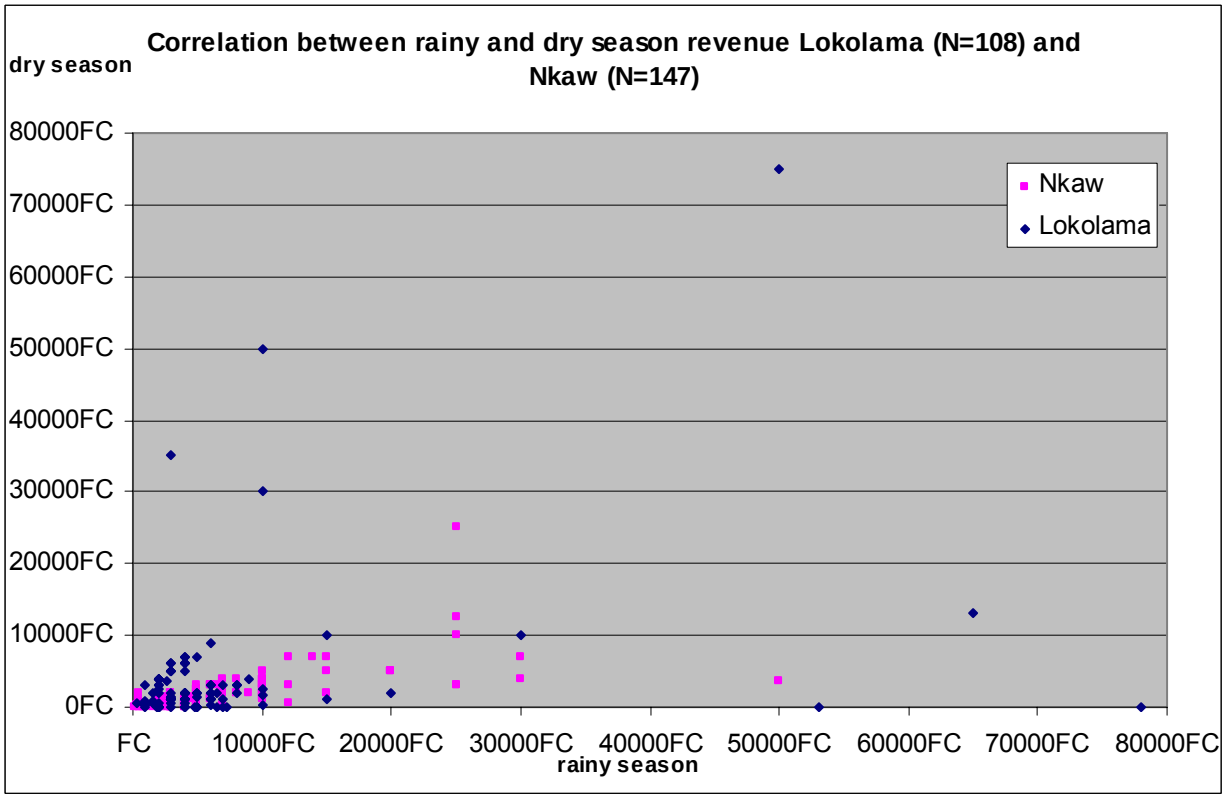


Figure 42



In Nkaw, higher gains in the high (rainy) season often translated to higher profits in the low (dry) season. A stronger correlation between rainy and dry season revenue was found in Nkaw (r=0.65) than in Lokolama (r=0.33), where some households' strategy is to increase their hunting activities during the dry season when scarcity results in increased bushmeat prices (figure 43).

Figure 43

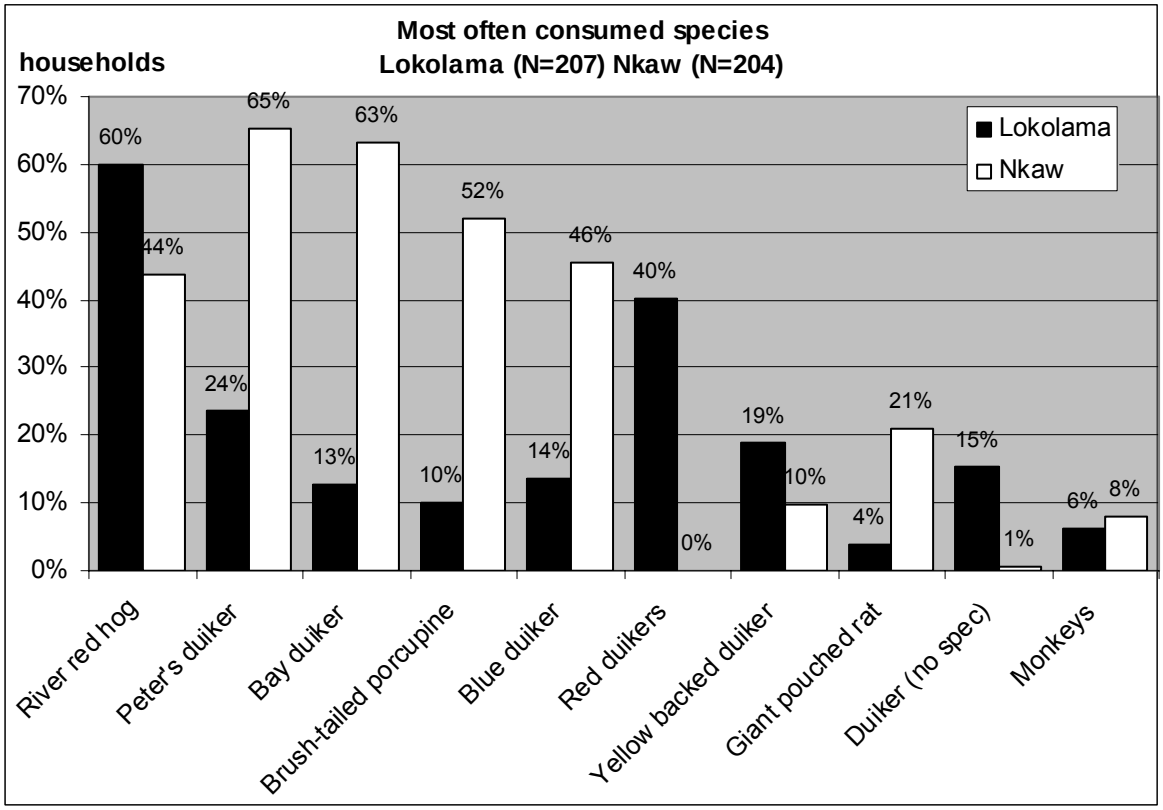


Consumption of bushmeat

In terms of consumption, households in Lokolama reported eating between 1-5 different species (average 2.23, SD=1.0), while households in Nkaw reported between 1-7 (average

3.33, SD=1.3). Differences between both sectors were found in terms of species most frequently consumed. While consumption of river red hog and red duiker prevailed in Lokolama, consumption of Peter's, bay, and blue duikers, as well as of brush-tailed porcupine was much higher in Nkaw. Figure 44 compares most frequently consumed species in both sectors.

Figure 44



In Lokolama, the most frequently used measurements of household consumption were piece (*morceau*) and pile (*tas*) of pieces of bushmeat (62.9% of cases) while in Nkaw households referred to consumption of larger quantities, like quarters, halves and whole animals (64.2%) Amounts of principal species consumed during the rainy and dry seasons appear in tables 32 and 33.

Table 32 Most often consumed animal species Lokolama sector[113]

species	% households (N=207[114])	Weekly consumption rainy season[115]	Weekly consumption dry season
River red hog	59.9	¼-12 pieces	0-5 pieces
Red duiker (no spec)	40.1	1-12 pieces	0-6 pieces
Peter's duiker	23.7	1-28 pieces	0-17 ½ pieces

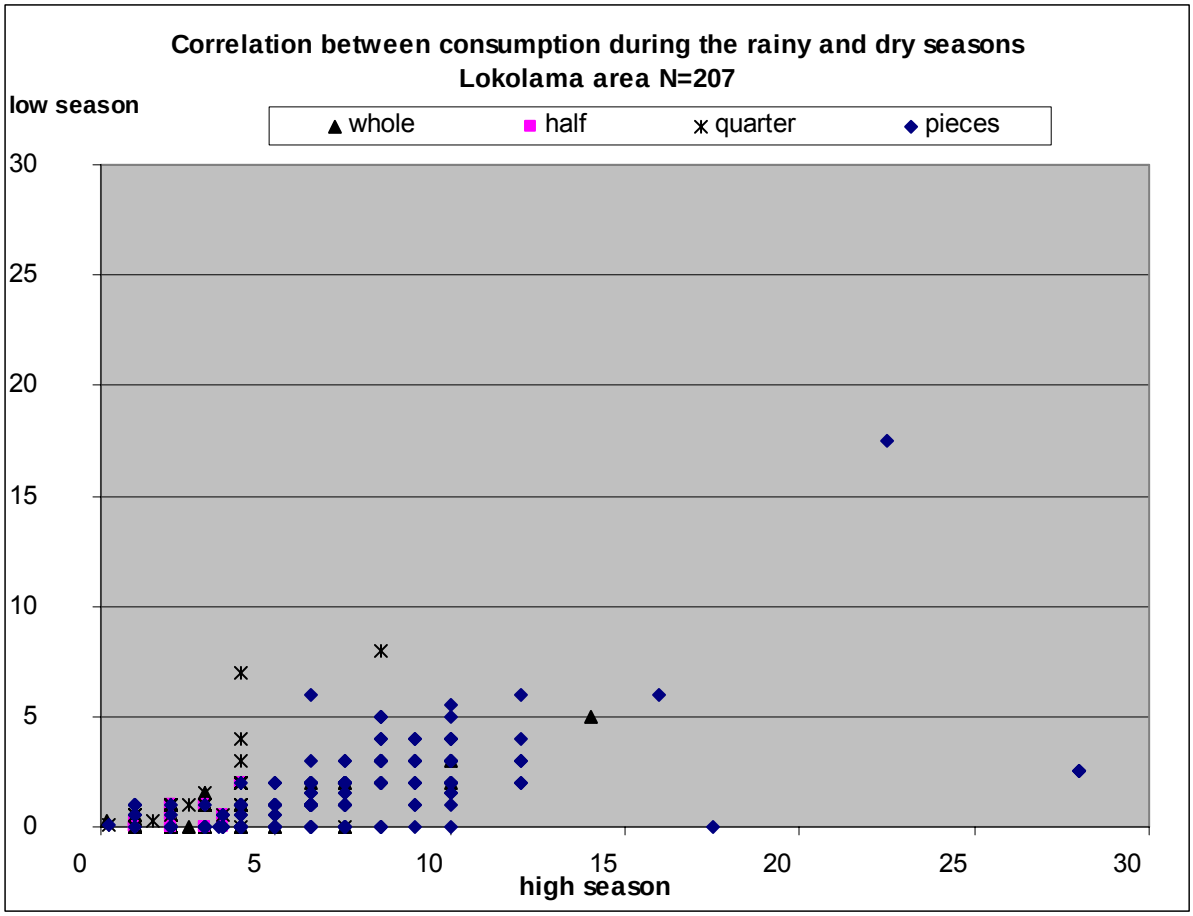
[113] 14% of households in Lokolama reported consuming "all" species; 3.4% reported also reported "gazelle" (probably blue duiker). A single response was also obtained for inkuta, leopard, and yeses (mongoose).
[114] Includes households that do not hunt but that reported consumption.
[115] Most frequently cited quantities of measure were used in each case. Pieces were identified in French as "portion" and "tas."

Table 33 Most often consumed species Nkaw[116]

species	% households (N=204)	Weekly consumption rainy season	Weekly consumption dry season
Peter's duiker	65.2	1-10 quarters	0-3 quarters
Bay duiker	63.2	1/10-35 pieces	0-20 pieces
Brush-tailed porcupine	52.0	1-18 whole animals	0-10 whole animals

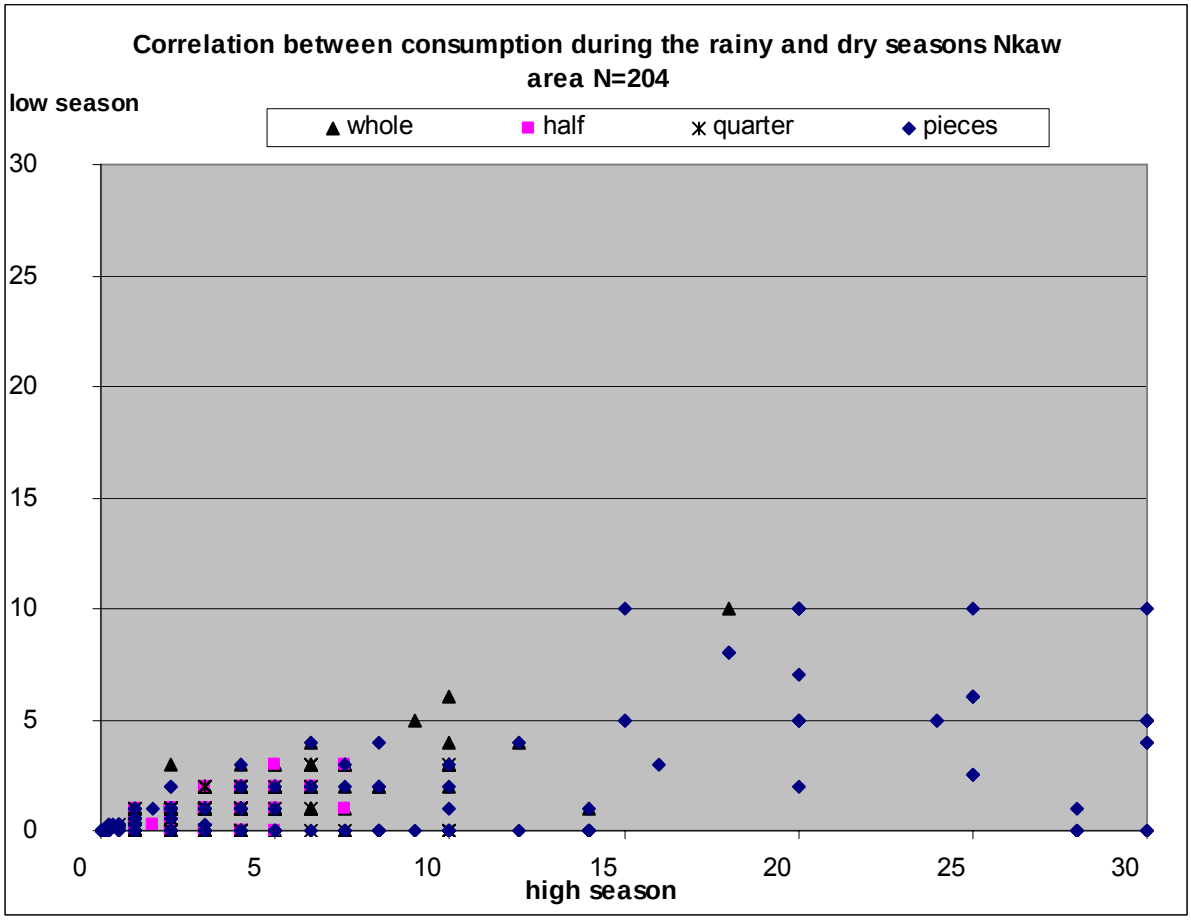
Weekly consumption decreases during the low (dry) season, but households with greater consumption of bushmeat in the high (rainy) season also consume relatively more during the dry season (r= 0.58 in Lokolama and 0.67 in Nkaw) (figures 45 and 46). Consumption of bushmeat during the dry season decreases by 75% in Lokolama and 73% in Nkaw. During the dry season, 54.9% of households in Nkaw and 38.2% in Lokolama reported eating no bushmeat. While some households in Lokolama reported higher revenue during the dry season, no household reported more consumption.

Figure 45



[116] 10.3% of households in Nkaw reported consuming "makako" (or monkey). Fewer than five households mentioned likako, inkuta, gazelle, water chevrotain, *Anomalurus* or *Paraxerus spp,* libobi, Long-snouted mongoose, nkoku, turtle, elephant, unspecified mongoose, nguma, nkoba, viper, and yesse.

Figure 46



Food prohibitions were reported by 73.4% of households in Lokolama and 92.2% of households in Nkaw, For both sectors, 97% of these prohibitions relate to custom. More bushmeat taboos apply to only women: 95.4% in Lokolama and 87.6% in Nkaw. The most often mentioned animals were leopard, African civet, snakes, golden cat, and long-snouted mongoose (table 34).

Table 34 Principal taboo species

Species	% of households Lokolama (N=207)	% households Nkaw (N=189)
Leopard *(Panthera pardus)*	59.4	67.2
African civet *(Civetta viverra)*	45.9	63.0
Snakes	29.0	34.4
Golden cat *(Felis laurata)*	11.1	39.7
Long-snouted mongoose *(Herpestes naso)*	5.8[117]	26.5

"According to tradition, if women eat leopard meat they die instantly. » (105 Mbungusani)

«Women are not allowed to eat carnivores such as leopards and [African] civet because these are totem animals of some clans. These are ferocious animals that only men can eat, because [men] are stronger and able to capture them." (112, Iyoko)

Locally perceived changes in the practice of hunting

In total, 76.9% of households in Lokolama[118] and 77.5% of households in Nkaw[119] mentioned changes in hunting. Of these households, the principal change cited is decreasing wildlife

[117] Mentioned after eagle (8.7%).
[118] N=195
[119] N=204

numbers, articulated in terms of decreased yields per hunting trip, the need to increase trap numbers in order to capture enough game, and the need to travel longer distances to find wildlife (100.0% of households in both sectors). The majority of dates provided for the onset of changes corresponded to the decades of the 1990s and 2000s in Lokolama (65.0%) while in Nkaw the majority of households referred to the decade of the 1980s (61.2%). Participants in Nkaw strongly associated decreasing wildlife numbers with changes in hunting practices (70.0%) including increases in both the length of the hunting season and numbers of hunting and trapping implements per hunter, as well as the shift from collective to individual hunting. Households in Lokolama also associated decreasing wildlife numbers with changes in hunting techniques (41.3%), mentioning bushmeat commerce as an important driver of this change (36.4%) (table 35).

> *"Our ancestors hunted with traps, only for subsistence purposes. They could catch an animal [today] and wait two weeks before hunting again. The number of traps stayed the same. Today, it is the opposite. We hunt daily to have bushmeat to sell. We rarely eat it, because we sell all. Also, the traps are almost everywhere in the forest. This is the reason why there are fewer animals in the forest. This started with the arrival of merchants from Tshikapa, Kikwit and Kasai who 'showed us money' and introduced the "bipese" system. [Before] we used to divide the catch in portions, but since we started selling, we have replaced portions with halves (bipese)."* (123 Sama)

Table 35 Causes associated with the decreasing wildlife numbers in Lokolama (N=148) and Nkaw (N=157) sectors

	% Lokolama	% Nkaw
Changes in hunting practices	41.3	70.0
Bushmeat trade	36.4	15.7
Poaching	15.0	12.8
Supernatural	2.2	0.0
Unknown	1.2	0.0
Demographic pressure	1.0	0.5
Military	0.0	0.4
Need to generate income	0.2	0.1

The third most important identified driver of decreasing wildlife numbers is poaching (15.0% in Lokolama and 12.8% in Nkaw). Poachers differ from other hunters in terms of the type and number of weapons used and the scale of their activities. Local participants often associate poaching with the use of military-type weapons by outsider individuals and groups involved in large-scale hunting for commercial purposes.

Local hunters are rarely categorized as poachers, even if they sell part of their capture. The few instances when locals were considered poachers were when they were involved in activities led by outsiders, either as guides, hosts, or participants. The difference between local hunters and poachers is evident in the identification of causes of decreasing wildlife: while changes in hunting practices, demographic pressure, and a need to generate income refer to locals' activities, poaching refers to outsiders' practices and their encroachment on local forests. Local and outside interests overlap in the case of bushmeat trade, which concerns local hunters, outsider merchants and suppliers of ammunition, and poachers' activities, too.

Two percent of changes in Lokolama were associated with supernatural causes:

> *« The problems we are having capturing ngulu (river red hog) and nkulupa (bay duiker) come from a curse on the chef de terre...The chef de terre didn't share a captured snake according to custom and from then on [our yields] are not like before."* (117 Mimia)

The highest percentage of changes was reported in the village of Manga (Lokolama) where all participating households reported changes in hunting activities. The village of Iyoko (Lokolama) reported the lowest percentage of changes (one household only).

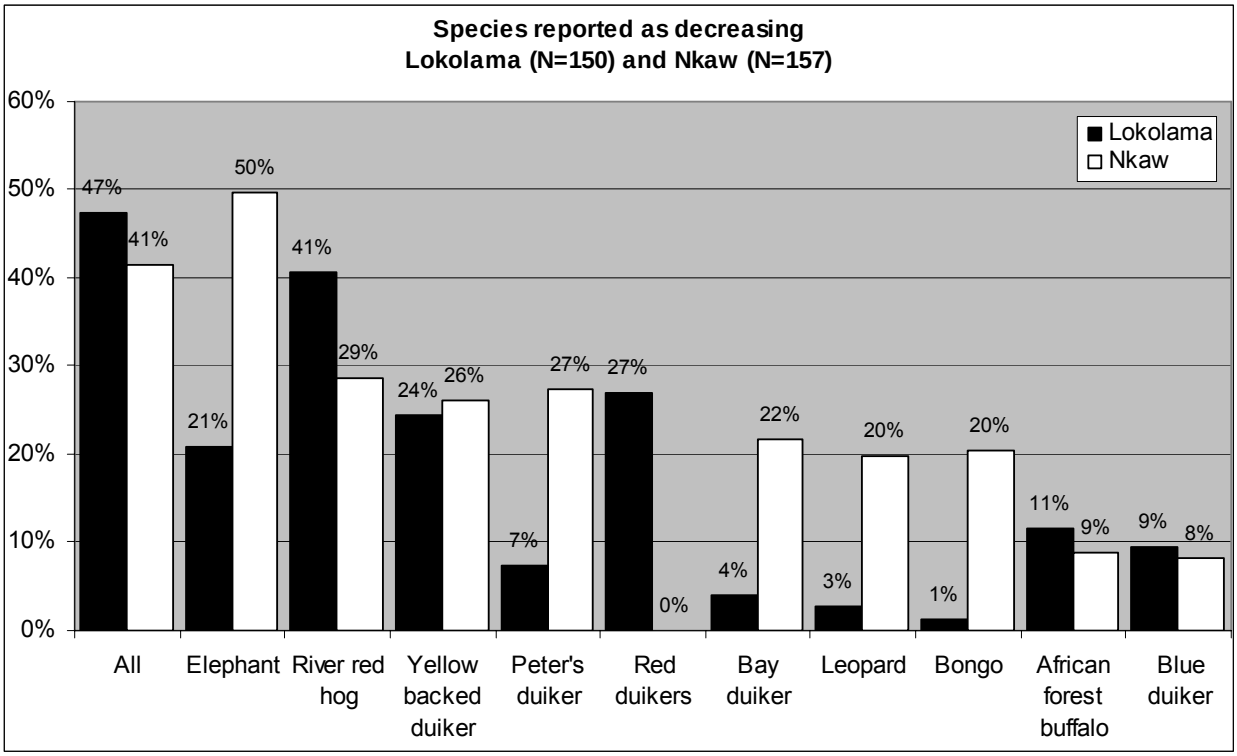
Household participants that reported no changes in hunting activities believed that varying yields are attributable to change and adherence to cultural norms and that animals were still abundant in local forests.

> *« There is no decrease or increase of animal numbers in our forest…it all depends on your [way of] life. If you are in order with the ancestors, you will do well. If you are not, you won't." (108 Iyoko)*

> *"There are no changes. It all depends on your daily luck. Our forest is rich in animals and it is up to the hunter to be in order with his wife [and] his [traditional] chef."* (119 Inyongo)

Forty-seven percent (47%) of households in Lokolama and 41% in Nkaw said all species were decreasing in numbers. When citing the decline of specific species, Lokokama households mentioned most frequently river red hog, yellow backed duiker, and elephant. In Nkaw, elephant was ranked first, followed by river red hog, and Peter's and yellow backed duikers (figure 47).

Figure 47



Changes mentioned during focus groups echoed answers provided by households. However, while the principal change mentioned by individual households was the decrease in animal numbers in their forests, focus group responses in Lokolama highlighted the abandonment of collective hunting as the most important change, caused by a need to generate income. Decreasing wildlife was the second most frequently mentioned change in focus groups, associated with the introduction of new methods, increasing numbers of equipment (e.g. wire snares, shotguns), and poaching. The third most frequently mentioned change was the onset of the bushmeat trade, associated both with the household level need to generate income as well as with the growing demand for bushmeat from markets outside the landscape (table 36).

Household level responses focused on changes in hunting practices as principal drivers of decreasing wildlife, mentioning among these changes the abandonment of collective hunting. Group discussions generated answers to why hunting practices have, and continue to transform. While household-level participants rarely talked about the need to generate income as the root cause of change, focus group participants saw the need to generate income as the

reason for the abandonment of collective hunting as well as of the shift from subsistence to commercial hunting.

Table 36 Changes reported by villages in Lokolama (N=27) and their associated causes[120]

		Changes		
		Abandonment of collective hunting (18 villages)[121]	**Decreasing wildlife (16 villages)**[122]	**Bushmeat trade (12 villages)**
Associated causes	Need to generate income	15	1	9
	Arrival of merchants	1	4	9
	Introduction of new technology (e.g. firearms)	1	11	0
	Poaching	0	10	0
	Increased numbers of equipment (e.g. wire snares)	0	7	0
	Supernatural	1	5	0
	Increased numbers of local hunters	0	5	0

Focus group participants in both sectors mentioned the late 1980s and early 1990s as the beginning of the abandonment of collective hunting. They also recorded the arrival of bushmeat merchants as occurring several years before the shift from collective to individual hunting.

In Nkaw, male and female participants identified the same changes as their Lokolama counterparts. In the case of Nkaw, however, decreasing wildlife took precedence over the abandonment of collective hunting as the most important change. The principal cause associated with decreasing wildlife was increased numbers of equipment, mirroring household level responses in the sector. The second most frequently mentioned cause of this change was poaching. Poaching activities were defined as those carried out by military and outsiders coming into the area with firearms including automatic rifles. Participants from the village of Mbinza also associated the arrival of poachers from Oshwe with the onset of logging activities in the 1980s.

As in the case of Lokolama, the main driver of the abandonment of collective hunting in Nkaw is the need to generate income. The same cause, income generation, is also the principal reason given for the third most important change, bushmeat commerce. Trade in wildlife was also linked to increased numbers of wire snares, firearms, and hunting equipment in general (table 37).

[120] Other changes mentioned during focus groups in Lokolama included the shift from commercial agriculture to bushmeat trade as a source of income (one village), lack or loss of hunting and trapping equipment (one village), and an increase in number of inku monkeys (golden-bellied mangabeys) (one village).
[121] Another cause associated with the abandonment of collective hunting for individual hunting was the lack of economic alternatives (one village).
[122] Other causes associated with a decrease in animals are political change (two villages), and the decrease of commercial agriculture (one village).

Table 37 Changes reported by villages in Nkaw (N=14) and their associated causes [123]

		Changes		
		Decreasing wildlife (14 villages)[124]	**Abandonment of collective hunting (8 villages)[125]**	**Bushmeat trade (6 villages)[126]**
Associated causes	Increased numbers of equipment	14	0	2
	Need to generate income	0	8	3
	Poaching	7	0	0

While poaching is identified as a cause of decreasing wildlife numbers, most answers given by participants relate to their own hunting practices, which have intensified in the past two decades, as the principal cause of this decline.

[123] Other changes mentioned during focus groups in Nkaw included a decrease in alternative commercial activities (three villages), lack or loss of instruments (one village), and exploitation of local resources by outsiders (one village)

[124] Other causes associated with the decrease in wildlife include the arrival of merchants, the decrease in agriculture as a commercial activity (one village each), and the exploitation of resources by outsiders (two villages).

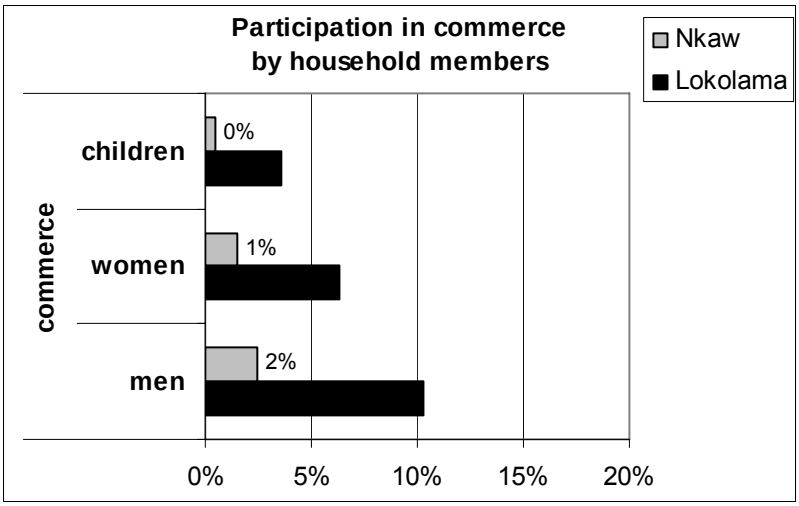
[125] Another cause associated with the abandonment of traditional practices is the arrival of merchants, mentioned by one village.

[126] Other causes associated with the bushmeat trade are the deterioration of roads and the decrease in commercial agriculture (one village), and the arrival of merchants looking for bushmeat (one village).

5. Commerce

Commercial activities in Lokolama and Nkaw include the trade of agricultural, fish, bushmeat and NTFPs sold or bartered for manufactured goods that are brought into the area by merchants traveling by foot or bicycle. More participants reported participating in commerce in Lokolama than in Nkaw (figure 48). Given the characteristics of commerce in the area (challenges of reaching distant markets, limited transportation, and infrequent commercial exchanges at a local level), long-distance commerce is almost exclusively an all-male activity (table 38).

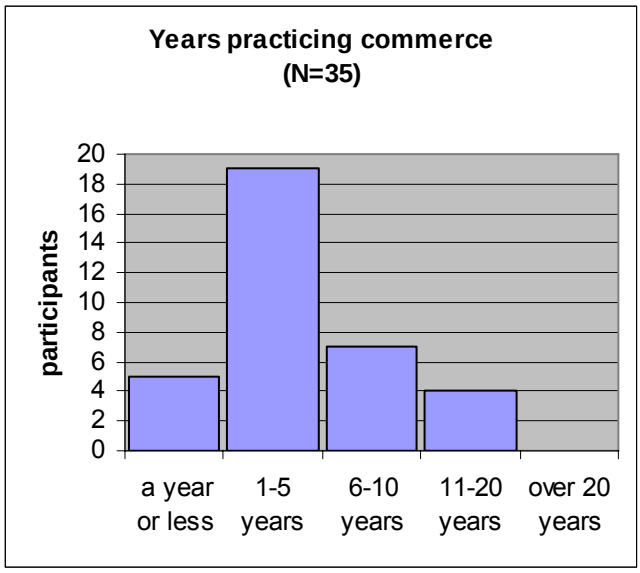
Figure 48



Individuals transport bushmeat and fish by bicycle and on foot, while the family remains in the village. Exceptions were documented in cases when families migrate seasonally to establish stalls in the Lokolama market, while purchasing bushmeat and fish to resell in their towns of residence. Women also sell artisan products such as baskets and locally made cooking utensils.

Table 38 General information of merchants (N=35)	**%**
Male	82.4
Average age	34.7 years
Foreign to the area	76.5
Average educational level	Secondary (65.3)
Commerce is their principal activity	82.4
Members of merchant associations	5.9
Original source of funds	Self-financing (79.4)
Volume of trade	
Retail	85.7
Semi-bulk	17.1
Bulk	5.7
Products traded	
Hunting	79.4
Agricultural	55.9
Fish	26.5
NTFPs	14.7

Figure 49



In terms of the initial capital, most merchants self-financed their business.

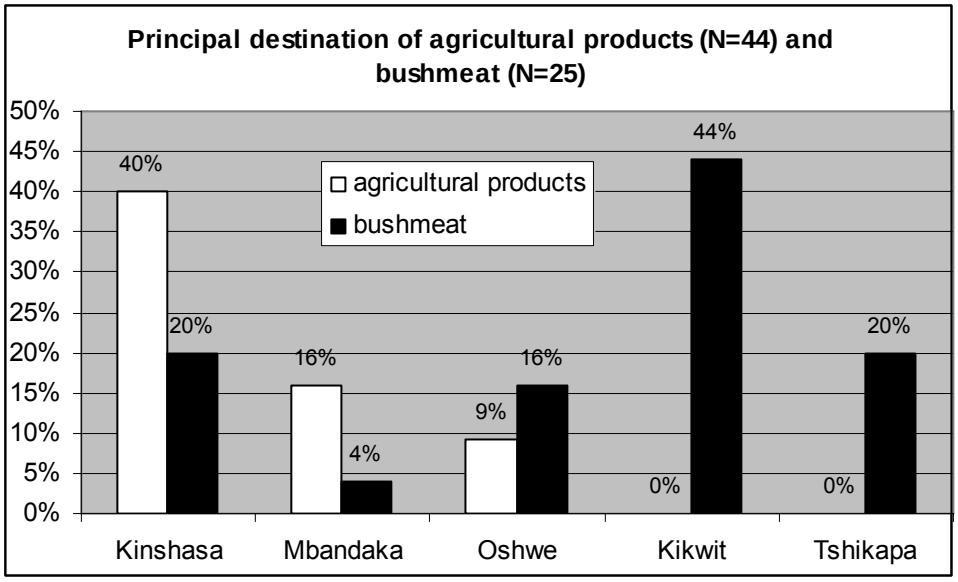
"I was a security agent for 'Gardiennage Securitor', that's how I first financed my business. » (Merchant 002 Ngendo)

"After [working in] the diamond fields I decided to become a merchant, [in order] to manage my own money» (Merchant 005 Lokolama sector)

Barriers to the practice of commerce

Geographic isolation and difficult communications in general appear to be the largest barrier to local development in the portion of the Territory of Oshwe encompassed by the landscape. Trade trends that started to change after independence continue to impact local commerce today. While Kinshasa continues to be the principal market for the sale of agricultural products (90.9% of products (N=44) documented during interviews with merchants were destined for Kinshasa), the volume of trade has decreased with the growing transportation difficulties. Participating merchants travel to Kinshasa once or twice a year, with their trips lasting between one and three months. Some agricultural products are also sold closer to the villages or sometimes transported by bicycle to markets like Oshwe (Bandundu), reported by 9.1% of participants. Principal destinations varied according to product and highlighted the demand for bushmeat originating from southern mining areas (figure 50)

Figure 50



Demand for fish and bushmeat comes significantly from Tshikapa, Idiofa, Kikwit, Mbandaka, and in some cases, Kinshasa. Diamond fields (e.g. Tshikapa) appear as the source of demand for some of these products. Travel to these destinations may last over a month.

"It is impossible for me to calculate how much I make in a week because when I buy bushmeat I travel far to sell it – Tshikapa, Kasai, Kinshasa-. Just the trip can take up more than a month. I cannot estimate [how much I make]. (118 Inyongo)

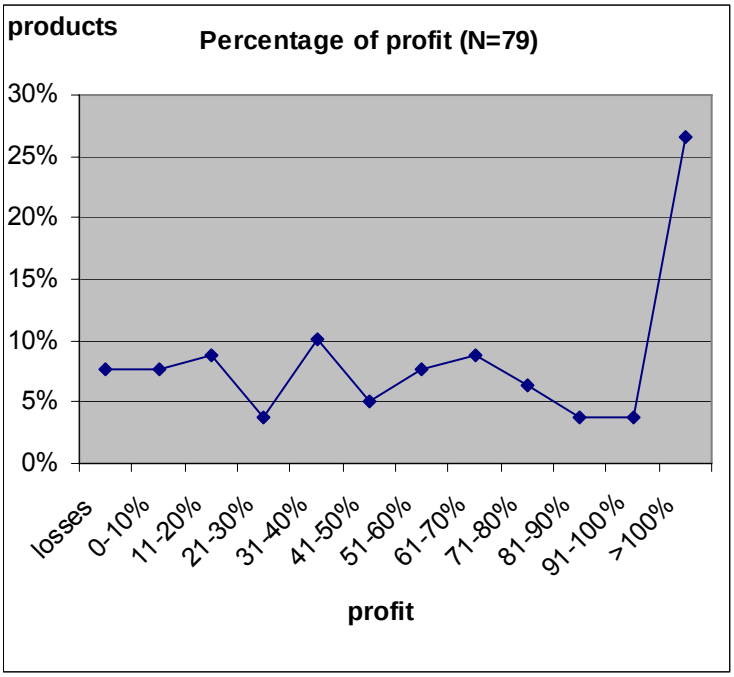
Lack of information concerning market prices in larger towns and cities, as well as unforeseen costs of travel and illegal taxing are among the causes of the wide variation in profit margins. As explained by a participant from Oshwe, sometimes merchants are taxed twice or more by authorities from different sectors, territories or provinces

«Sometimes [local authorities] refuse documents already approved by fellow agents from other sectors, territories or provinces. Such is the case of agents of the environmental service and the DGM[127]." (Merchant 005 Oshwe)

[127] Direction General de Migration.

Eight percent of transactions documented resulted in losses for the merchant because of miscalculation of costs or because of increased availability of the same product at the time of sale. Merchants normally did not calculate costs incurred per unit of purchase or sale, but rather talked about the total costs per trip, combining more than one type of product in their calculation. Higher costs did not necessarily mean lower revenue: the correlation between costs and revenue was of 0.58, confirming that some merchants do not charge based on actual incurred costs.

Figure 51



Low revenue from one product is sometimes compensated with gains from other product sold at the same time. Merchants may thus consider the overall result of their transactions as positive, despite limited or no gains in the sale of certain products. Five out of 21 merchants that trade in more than one product reported losses in one but gains in others, and only two reported gains of over 100% for two products or more. Miscalculation of costs may be leading some merchants to continue to trade in goods that report minimal or no profit margins. The high variability in margin of profits (figure 51) was true for all products and no particular product stood out as more profitable than the rest.

E. Access to land and resources

Local households have, for the most part, open access to natural resources located within their village's forest and waters. Traditional areas remain important not only for hunting and fishing but also because people return to the original location of villages to collect products from old groves. Locals can clear forest for agricultural activities everywhere except in sacred sites and other people's fallow fields.

Among sacred sites mentioned were cemeteries, areas destined for the division and preparation of totem animals captured by hunters, and certain areas around traditional authorities' residences. Twenty one villages in Lokolama and 14 in Nkaw mentioned prohibitions concerning cemeteries, while participants from 18 villages in Lokolama and 4 in Nkaw spoke of restriction of access to areas of the forest used for skinning totem animals such as giant pangolin, leopard and eagle, a task performed only by traditional leaders and notables. Respect for these prohibitions was reported in 100% of cases.

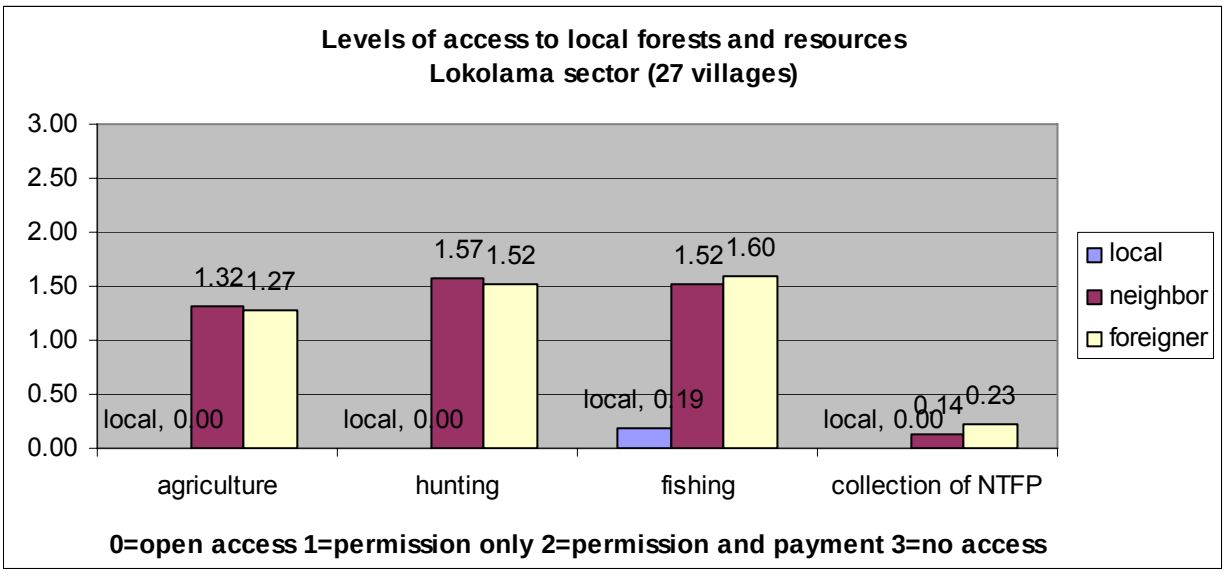
Another restriction mentioned in the Lokolama sector concerned the use of fish "ponds" by specific clans.

> *« For fishing, [locals] are free to practice it on the Lokoro 2, and certain waterways, but not in private fish ponds. »* (Men's focus group, Booko)

People from neighboring villages and foreigners to the area access local land and its resources through traditional authorities, who determine whether people have open access, need permission, or must pay access rights. Traditional authorities can also deny access to individuals. Participants in men and women's focus groups were asked about access mechanisms for farming, hunting, fishing or collecting NTFP[128]. Figures 52 and 53 depict the average levels of control for all categories. Individuals taking up residence or marrying into a village are given access to agricultural land.

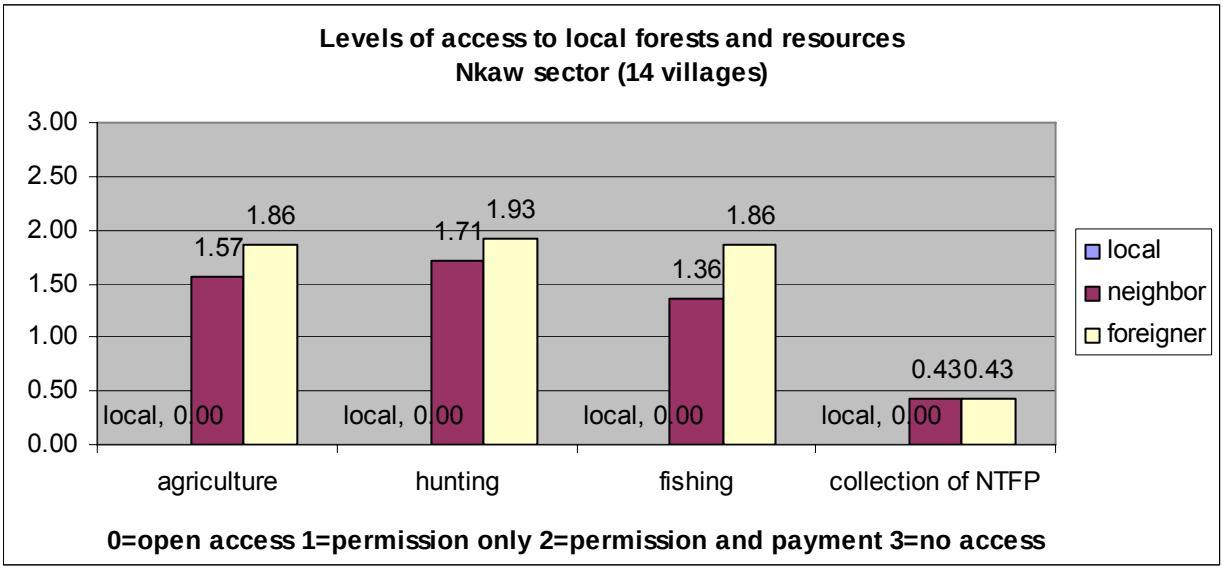
> *« [A foreigner] can't [farm here] unless through marriage to a member of the village, and by taking up residence and respecting our customs. »* (Women's focus group Basobe)

Figure 52



[128] A complete list of villages and the forms of access and restrictions for locals, neighbors and foreigners is included in appendix 2.

Figure 53



In some villages, access to farm land was granted to foreigners but not to neighboring villages. This practice was reported in the villages of Eyanza (Lokolama sector), and Ikomo Bombole (Nkaw sector) where people from neighboring villages are prohibited access to all village natural resources, including NTFP, while foreigners may be granted use by traditional authorities. Relatively stricter controls in Nkaw may be due to local populations' growing perception that some of their resources are limited.

Even though traditional rules restrict access to neighbors and outsiders, participants reported difficulties in controlling the use of local natural resources by certain individuals and groups. Four villages reported the presence of poachers and military groups in their forests. Table 39 includes information on every village reporting the presence of non-authorized users of their land and resources.

Table 39

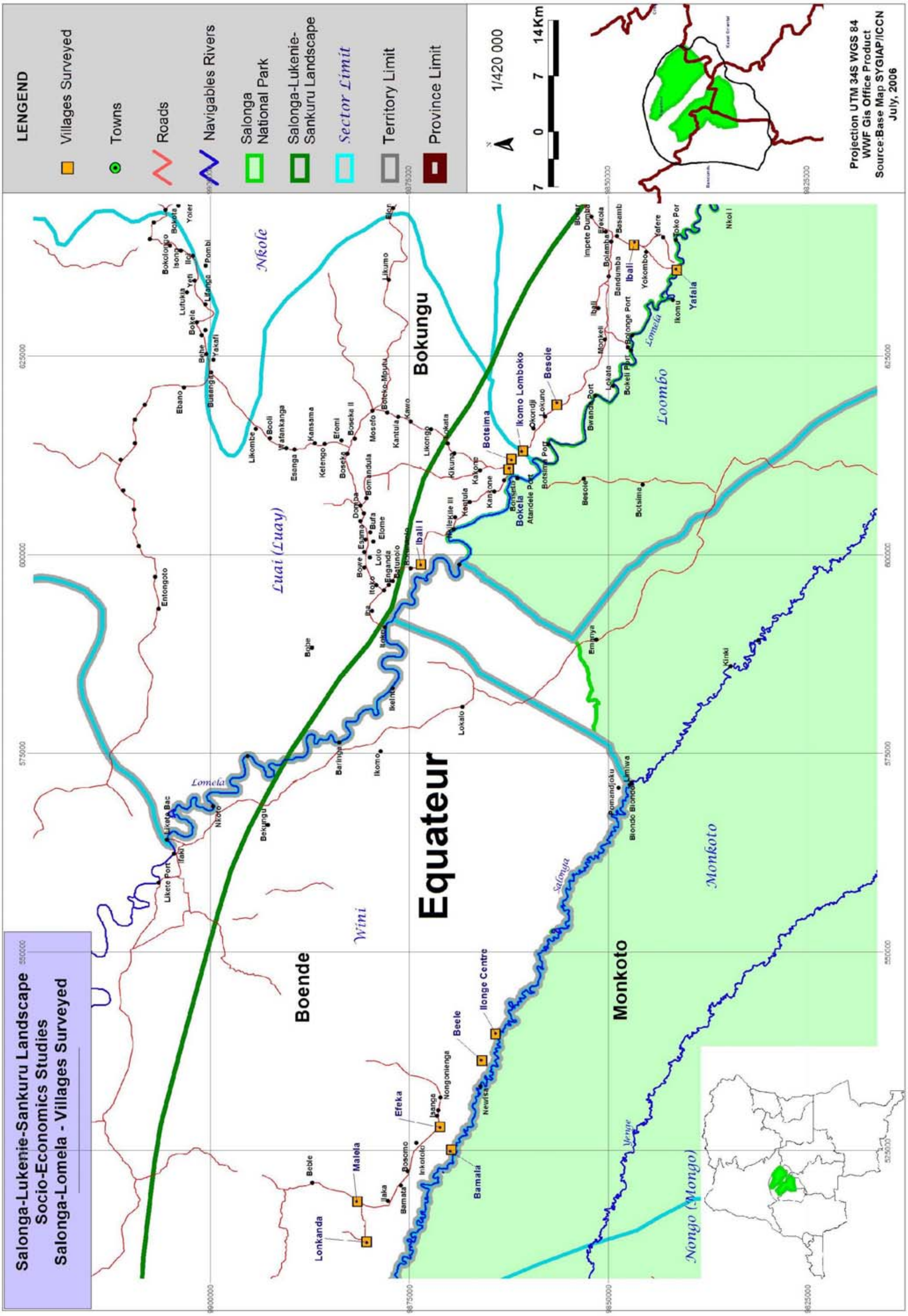
Village	Groups	Activities
(L) Inyongo	Outsiders from the town of Lokolama	Fishing
(N) Lokolama 2	Military coming from Bandundu, Oshwe, Kikwit and Equateur	Poaching
(N) Lokolama 2	Fishers from Kutu, Kasai and Mai Ndombe	Fishing
(N) Bosenge	Outsiders from Oshwe	Poaching
(N) Bokwankoso	Military and outsiders from Oshwe	Poaching
(N) Mange Nord	Military	Poaching
(N) Pengola	Military from Kikwit and Bandundu	Poaching

Boende and Bokungu Territories: Salonga and Lomela Rivers[129]

This section includes results from villages located along the Salonga and Lomela Rivers. All villages in this section, except for the village of Yafala, are located within ten kilometers of the northern border of the northern block of Salonga National Park (SNP).

Province	Equateur
District	Tshuapa
Territories	Boende (Salonga River), Bokungu (Lomela River)
Sectors	Wini, Luayi, Loombo
Groupements	Nongokwa, Nongongomo, Mom'elinga, Lotoko Ikongo, Makanda
Villages Salonga River	Bamata, Beele, Efeka, Ilonge Centre, Lonkanda, Malela Centre
Villages Lomela River	Besoyi, Bokela/Kankonde, Botsima, Ibali, Ibali 1, Ikomo-Lomoko, Yafala, Impete Kadumba[130]

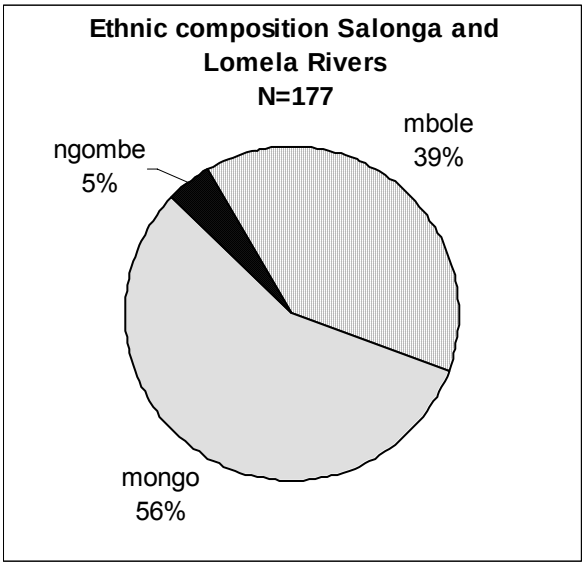
[129] General demographic information, including percentages of households that reported different economic and subsistence activities, was based on answers from 177 households. Specific information on agriculture, hunting, fishing and collection of NTFP was based on information from 123 households (the remaining 54 contained errors).
[130] A focus group was conducted in this village upon request of local leaders.


Salonga-Lukenie-Sankuru Landscape
Socio-Economics Studies
Salonga-Lomela - Villages Surveyed
LENGEND
Villages Surveyed
Towns
Roads
Navigables Rivers
Salonga National Park
Salonga-Lukenie-Sankuru Landscape
Sector Limit
Territory Limit
Province Limit
1/420 000
7 0 7 14Km
Projection UTM 34S WGS 84
WWF Gis Office Product
Source:Base Map SYGIAP/ICCN
July, 2006
Equateur
Boende
Bokungu
Monkoto
Wini
Luai (Luay)
Nkole
Loombo
Lomela
Salonga
Yenge
Nongo (Mongo)
Lonkanda
Malela
Efeka
Bamala
Beele
Ilonge Centre
Ibali I
Bokela
Botsima
Ikomo Lomboko
Besole
Ibali
Yafala

A. Cultural and Historical Context

The majority of participants from these villages belong to the Mongo ethnic group, represented by over half (56%) of the population. The second most important group in the territory is the Mpole (39% households). A Ngombe minority also lives in the area (5%) (figure 54). Seventy nine different clans were identified in both areas, some with membership from two different groups: The clans of Bofoko, Bompota, Ikomo, Isoko, Kankonde, Kanoku, Nangadeke, Nangansamba, and Lomoko have membership from both Mbole and Mongo groups, while the clan of Iyali has Mbole and Ngombe members and the Mpekwa has members from the Mongo and Ngombe ethnic groups. Other clans include lofanania (mongo), balinga (mongo), ilaka nkoyi (mbole), and nangopate (mbole).

Figure 54



Oral histories indicate that local Mbole, Ngombe, and probably the majority of Mongo groups[131] situated along, or in the proximity of the Salonga and Lomela Rivers migrated into the area in the late XIX or early XX centuries. Several of these groups came from Safala, located in the vicinity of Mbandaka, and various villages share the same ancestor, Nkengo, the founder of Watshikengo.

Box 2 The descendants of Nkengo

Because of the ethnic wars, our ancestors decided to leave their village and search for land somewhere else. One group went to Tshuapa, the other towards the Lomela River. On the way here the group stopped where Watshikengo is now. The name Watshikengo means "Nkengo's village," Nkengo was our ancestor. [These villages] descent from one of Nkengo's many sons. Nkengo's son (called Bofena in Efeka, Iloko in Lonkanda) had a daughter named Bonsona Mboyo, who was pregnant at the time, and who wished very much to see an elephant that hunters had killed in the forest. Because she was pregnant, she couldn't go to the forest, so her father, who was the chief, sent his sons (or clan members, in another version) to bring the elephant to the village. The sons refused to follow the chief's orders and dispersed from there [Watshikengo].

One group crossed the Salonga River and settled in Monkoto, they are the Nkengo Nkobeli. A second group settled by the Yenge River, they are the Boleng'a Ngele. The third group settled in Imoma. Others went towards Boende and Bokungu.

Our group (the founders of Efeka) continued up the Salonga River, we are the groupement Nongokua, descendants of Lokua (Lokua's brother, Iloko, is the founder of Lonkanda). The last group settled in Botsike, close to Bokonzi, they are the Bekomi, Bokutu, Isomelia, and Isoko.

Sources: Focus group and field notes from Efeka, Bamata, Lonkanda, Malela Centre

Other groups migrated in from other areas close to Mbandaka, such as the people from Kankonda and Ibali, while others migrated from the south (Monkoto), all fleeing ethnic wars. Some groups first

[131] Even though a large percentage of the population identifies itself as Mongo, the stories of migration were told by Mbole and Ngombe participants. Field notes from the research team did not indicate whether they migrated together or separately, however, some local clans have membership from two different ethnic groups, indicating long-standing relations.

settled in more accessible areas, but moved again to avoid conscription by colonialists in the collection of rubber.

> *"[After leaving Safala] we settled between the Lomela and Tshuapa rivers. Our village was called Ngombe Malala, which still exists today, and where we have brothers[132]. It was because of forced labor imposed by the whites - the search for wild rubber, that is – that we left that place to settle along the Lomela River." (*Men's focus group Yafala)

The first contact with Europeans (table 40) corresponded to the arrival of companies that harvested and purchased copal, rubber and palm nuts.

Table 40 First Europeans to arrive in villages

Name[133]	Place[134]	Year and Role or position
Extractive companies	(S) all villages	1914. Collection/purchasing copal, rubber and palm nuts
Catholic missionaries: Fathers Rido, Leon, Louis, Nicolas, Rene	(S) Efeka, Malela Centre, Lonkanda (L) Ibali	1918. Belgian priests
Protestant missionaries: Mr. Bofola, Mr. Isalongange, Mr. Elima	(S) Efeka, Malela Centre, Lonkanda (L) Ibali 1	1940s. Missionaries who built and managed a school in Malela.

The arrival of Europeans in the area also signified the beginning of agricultural production and collection of NTFP for commercial purposes. Table 41 summarizes the companies and individuals that traded with these villages.

Table 41 Companies and traders in the area 1910s-Independence

Villages[135]	Companies	Type of business
(S) Efeka, Bamata, Malela Centre, Lonkanda (L) Ibali, Botsima, Yafala	Equatorial, SAB, Nogera, SECLI, Bourges	Based in Isanga. Purchased copal (resin), palm nuts, and rubber. According to participants from Lonkanda, initial attempts to establish a palm plantation ended with independence.
(S) Lonkanda	Mulanga	Portuguese trader who purchased local products before independence.

While there were no large-scale plantations, a logging company did exploit the forests close to the villages of Efeka. Other companies' activities included the transport of people and goods, as well as operating stores where local populations could purchase manufactured goods and agricultural, hunting, and fishing tools and equipment.

Groups that settled along the southern banks of the Lomela River had to move again when the creation of Salonga National Park was first considered in the 1950s.

> *"[It was after World War II that] we decided to settle on the other side of the Lomela, where the SNP is now. It was under threats and pressure from soldiers and Mr. Matalatala that we quit that side and settled here in 1954. A few years later the villages of Ikomo Lomoko, Besoyi, Bekuma Nkake, and Boanda, joined us. At the time, the whites had companies here, such as SAB and Secli."* (focus group men Botsima)

[132] The villages of Impete and Kadumba, now a single village, also descend from the group that first established Ngombe Malala.
[133] Names and dates as provided by participants.
[134] (S)= Salonga River, (L)= Lomela River
[135] (S)= Salonga River, (L)= Lomela River

> *«Towards 1967, after the rising of Pierre Mulele, during Mobutu's time, the government decided to give land to all of us who were displaced because of the Park. That's why our [current] village's limits start on the Bungua River all the way to the Loombo River."* (men's focus group, Besoyi, Lomela River)

Some of the villages were relocated to areas already claimed by other groups, and tensions over their access to this land persist today. The village of Ikomo Lomoko, for example, continues to have problems with neighboring villages that demand payments for the right to use their forest for hunting and fishing. This village also lacks exclusive access to a portion of the Lomela River for fishing and they must obtain permission from traditional authorities to fish.

In the years between the displacement of these groups and the creation of the SNP, Kitawalist groups settled within the park limits, in areas south of the Lomela River that had been previously used by the displaced villages.

In 1973, Zaïrianization transformed economic dynamics indirectly by causing a decrease in transportation services. The disappearance of stores gave way to the growth of barter, but it appears that this occurred later than in other parts of the landscape, because the Office Nationale des Transports (ONATRA) boats continued to arrive, if more sporadically, until the onset of the war.

The war of 1996-2002 appears to have impacted these areas more than other parts of the landscape. Locally-based military seized crops, farm animals, and fishing and agricultural instruments. Current problems associated with the war include continuing poaching by former and active military, confiscation of farm animals and products, and the illegal taxation of merchants traveling in the area. Some participants in the Lomela area also mentioned the forced recruitment of local men to hunt for military personnel, a problem that was reported in other areas of the DRC during the war (Draulans and Van Krunkelsven, 2002).

B. Present day context: General demographics and social organization

Villages in these sectors remain located along colonial era roads that have been reduced to footpaths. Villages' size varies between 10 and 53 households. These roads run mostly parallel to the Salonga and Lomela Rivers, connecting the area to the Territory of Monkoto. During the colonial era, these roads connected the region to the two of Boende and the city of Kisangani in the east. Transport by land has become extremely difficult, leaving rivers as the only alternative for product evacuation and trade. The arrival of boats has become extremely rare, with some villages on the Lomela reporting that *baleiniers* (larger motorized boats) arrive only once a year.

As in other parts of the landscape, local authorities include: 1) the *Chef de localité*, the principal representative of the Congolese government; and 2) the *Chef de terre* and village elders (notables), recognized locally but not considered part of the state's administrative hierarchy. The *chef de terre* constitutes the strongest traditional authority and appears to exercise significant influence over the regulation of hunting and, to a lesser degree, fishing by local and neighboring populations, as well as monitoring internal conflict and immigration into the village.

The importance of traditional authorities is particularly evident in Lomela where access rights continue to plague the last villages (BoIkomo Lomoko, Besoyi, Bekuma Nkake, and Boanda) to be resettled on the northern banks of the Lomela River after the creation of SNP. *Chefs de terre*, however, have very little control over poachers that come from Boende and other towns, and who intimidate local traditional authorities and the population in general, sometimes forcing local men to act as their guides and hunt for them inside the park.

Beyond the village level, and apart from sporadic visits from sector and territory authorities (seat of the sector), the presence of the State in the villages is limited to the park guards and the ICCN posts on both rivers. (The relationship between ICCN and local populations is discussed in the section, "Access to Resources".)

Traditional power is transmitted through the paternal line, but not necessarily from father to eldest son, and habitation is patrifocal, with most women settling in their husband's village and using their land.

Table 42 General demographic information

	Salonga and Lomela Rivers
Average age of head of household	45.7 (men), 37.8 (women)
Female heads of household	8.5%
Average household size	8 (SD=3.88)
Nuclear families	59%
Polygamist families	14%
Average educational level of head of household	Elementary (men 51%, women 67%) D4[136] (men 28%)[137]
Group membership	Participation in groups and associations is low, at an average of 1.02 per household. Most membership corresponds to religious groups (74% of households), followed by farmers' groups (7.9%).Only 14.7% of households participate in two groups or more.

It is difficult to talk about the average size of households because this, as well as its composition, varied greatly. The number of members per household varied between 1 and 23 (table 43), with the largest percentage of households having between seven and ten members (44.1%). Non-nuclear households sometimes included elderly parents, younger siblings of the head of household or his/her spouse, married children with their families, grandchildren, nephews, nieces, cousins, as well as distant relatives under the head of household's charge.

Table 43 Household size

Members per household	**%**
1 – 3	6.8
4 – 6	24.9
7 – 10	44.1
11 – 15	18.1
16 – 20	5.6
21 – 25	0.6
> 25	0.0

Families usually settle in the husband's village. Exogamy is still practiced in the area, with 27% of participants reporting that their mothers moved out of their villages of origin because of marriage. Meanwhile, only one head of household reported his father moving to his mother's village.

Participants (9.6%) expressing a desire to emigrate from their villages cited opportunity and living in Kinshasa as reasons for their departure. Female participants cited marriage among their reasons for departure. A slight negative correlation (-0.15) was found between age and desire to move: participants planning to move were younger than the average head of household. Most participants who express no desire to leave said that they wanted to stay because it was their village of origin where they were already well-established, or because they had responsibilities in the village, including supporting their immediate family or as traditional authorities or church leaders.

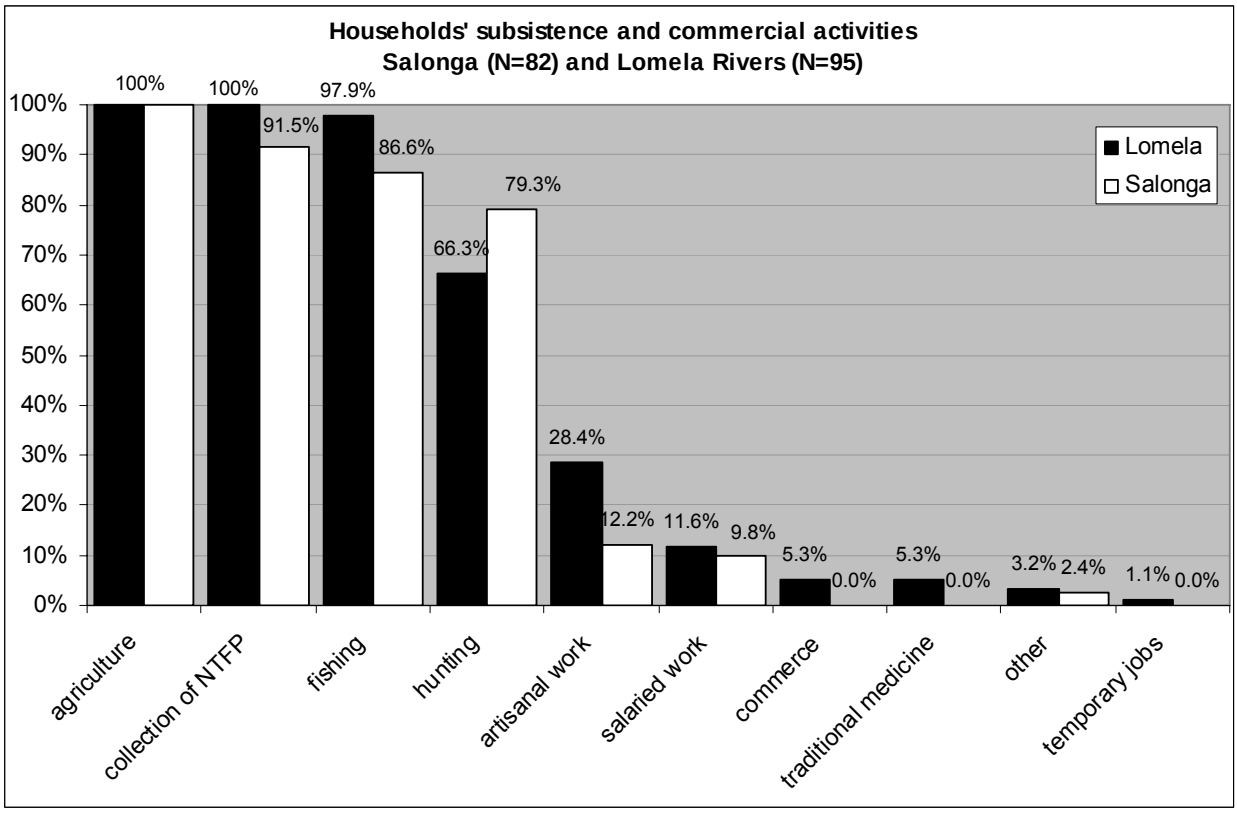
C. General information on household and village level subsistence and economic activities

[136] One female head of household completed the D4 level, or short cycle of secondary education. Eighteen male and one female head of household hold a university degree.

[137] Younger heads of household have higher education than older ones (age to education, r=-0.31)

Households on the Salonga River and Lomela Rivers report an average of four economic and/or subsistence activities (3.9 on the Salonga, 4.1 on the Lomela). In order of importance, they are agriculture, collection of NTFPs, fishing and lastly, hunting. Salonga households report/reported hunting more frequently; while the inverse was true for artisan activities, commerce and salaried employment with greater participation described by Lomela households. Figure 55 shows the percentage of households involved in each activity.

Figure 55



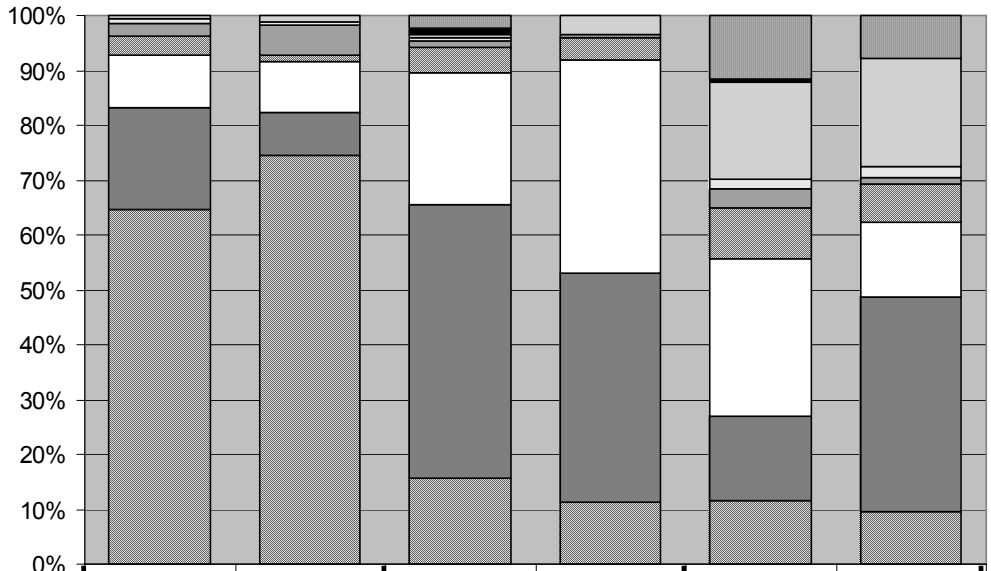
1. Income generation and time allocation

Most income generation activities in the area involve the exploitation of local natural resources: 96% of households reported agriculture among their three principal sources of income, followed by fishing (84.2%) and hunting (62.1%). The collection of NTFP is widely practiced for subsistence purposes, but its importance in terms of principal sources of revenue for household ranks below agriculture, fishing, and hunting. Collection of NTFP constitutes a tertiary source for 17.5% of households. Figure 56 shows the principal sources of income and time consuming activities of households in the area[138].

Some households reported no second or third source of income (2.3% and 11.3% respectively). These households rely solely on agriculture, hunting, or fishing, with the exception of two cases, where income came from salaried employment. Households depending solely on agriculture, fishing, or hunting exemplify the area's strong reliance on a limited number of extractive activities for revenue generation.

[138] Totals exceed 100% because 30 households ranked equally two or three activities.

Figure 56



	first income	first time	second income	second time	third income	third time
no second or third activity	0.0%	0.0%	2.3%	0.0%	11.3%	6.8%
traditional medicine	0.0%	0.0%	1.1%	0.0%	0.6%	0.0%
collection of NTFP	0.6%	1.1%	0.6%	3.4%	17.5%	17.5%
commerce	1.1%	0.6%	0.6%	0.0%	1.7%	1.7%
salaried work	2.3%	5.6%	1.1%	0.6%	3.4%	1.1%
artisanal work	4.0%	1.1%	4.5%	4.0%	9.0%	6.2%
hunting	10.2%	9.6%	23.7%	37.3%	28.2%	11.9%
fishing	19.8%	7.9%	49.2%	40.1%	15.3%	34.5%
agriculture	69.5%	76.3%	15.3%	10.7%	11.3%	8.5%

> *« We are isolated and find it difficult to transport our [agricultural] products. We produce a lot but we cannot get our products out, so they rot in storage."* (SL 140 Ibali 1)

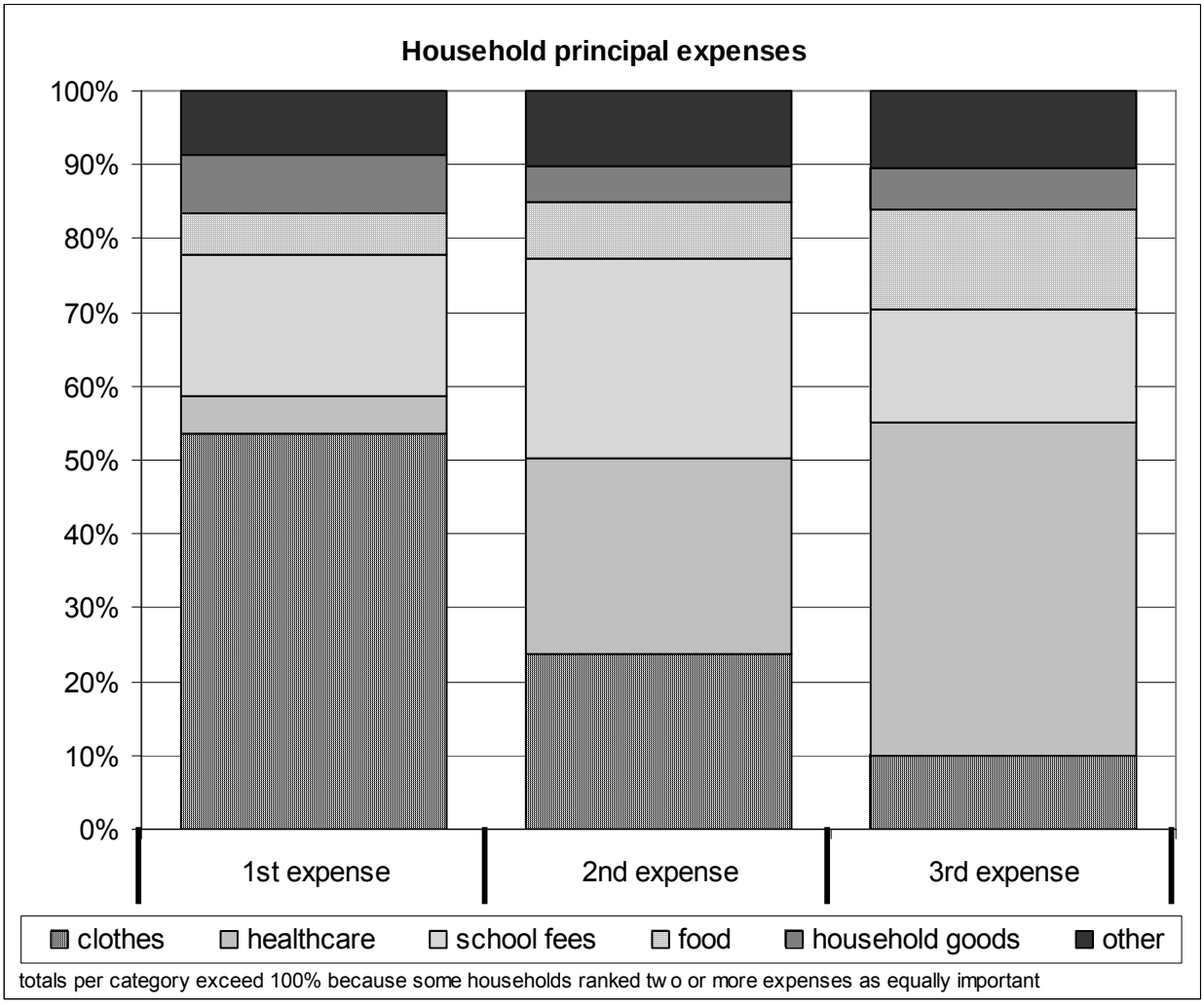
More households reported agriculture as their most time consuming activity than as their principal source of income, probably because actual revenue is low due to the absence of local markets and the relative isolation of the area, rendering the evacuation of products unprofitable and economically risky. Fishing and hunting are important second sources of income as well as time consuming activities. Correlation between income and time was strongest for principal activities (r=0.98), followed by the second (r=0.92) and the third (r=0.58)[139].

2. Household expenses

Household earnings are used to buy clothes, pay for health care and school fees, buy food, and purchase household goods (Figure 57). Clothing was mentioned among their three principal expenses by 94.4% of households, followed by health care (82.5%), and education (65.5%).

[139] Analysis for the complete area, comparison between individual households is still pending.

Figure 57



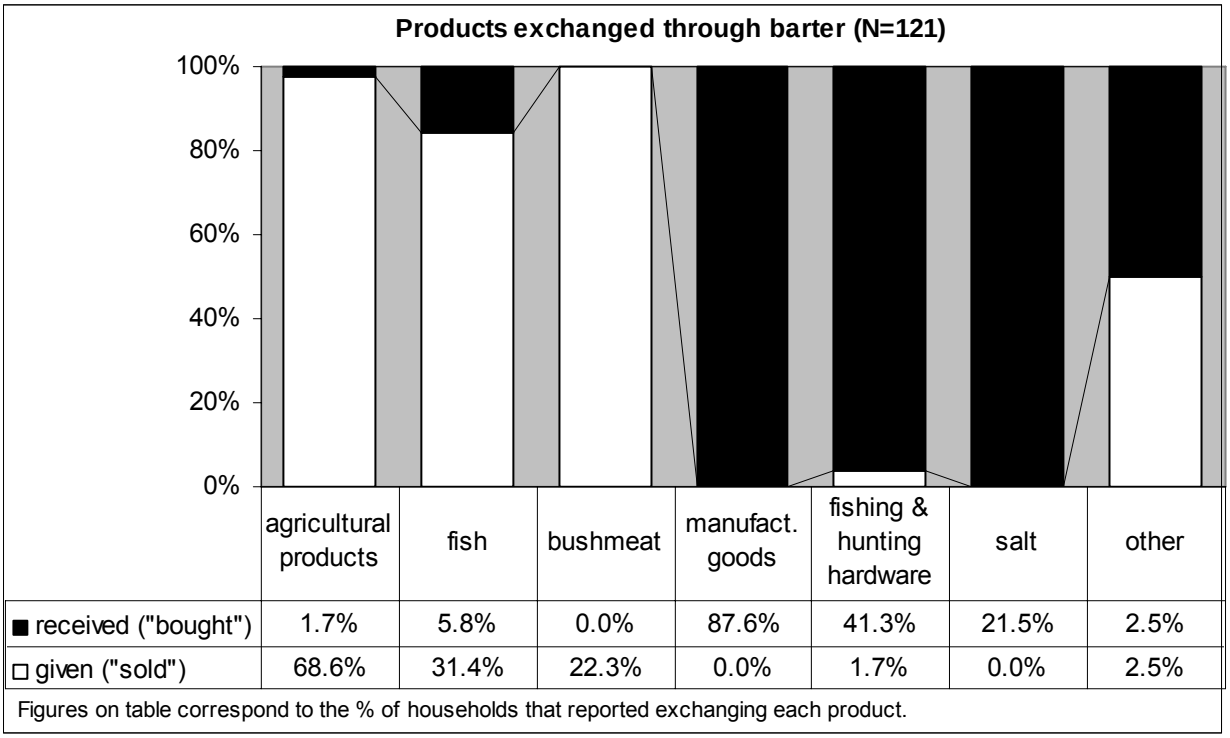
Other expenses include: home improvement, salt and soap, fishing and hunting equipment/hardware, assisting family, church donations, entertainment, paying back loans, savings, contributions to saving cooperatives, and agricultural tools. Given the isolation of villages in this area, many commercial transactions rely on barter. 68% of households reported practicing barter to obtain manufactured products and services[140].

> *« The few traders that arrive here impose prices on our products in order to barter. Fifteen sacs of corn or twenty sacs of manioc represent one bicycle."* (SL 141, Ibali 1)

Figure 58 illustrates the principal products traded by local populations (agricultural products, fish and bushmeat) in exchange for manufactured goods, and fishing and hunting hardware sold by traders[141].

[140] Similar figures were found in Oshwe: 69% in Nkaw and 66% in Lokolama.
[141] Less frequently mentioned products were farm animals (given), and services like health and education (received).

Figure 58



	agricultural products	fish	bushmeat	manufact. goods	fishing & hunting hardware	salt	other
■ received ("bought")	1.7%	5.8%	0.0%	87.6%	41.3%	21.5%	2.5%
□ given ("sold")	68.6%	31.4%	22.3%	0.0%	1.7%	0.0%	2.5%

Figures on table correspond to the % of households that reported exchanging each product.

Some examples of barter transactions include two sacks of cassava in exchange for six yards of cloth or empty plastic jugs; two sacks of corn for a radio; a sack of corn for a pair of pants, two sacks of cassava or one of corn for one machete; fish for fishnets and hooks; a chicken for four jars of salt; and corn for notebooks or medicines. Exchange of agricultural products, fish, bushmeat or NTFPs between neighbors is also practiced. For example, a basket of cassava may be exchanged for a basket of fish or a jug of palm oil. While barter with traders is considered disadvantageous to the seller, the terms of trade between neighbors is considered fair.

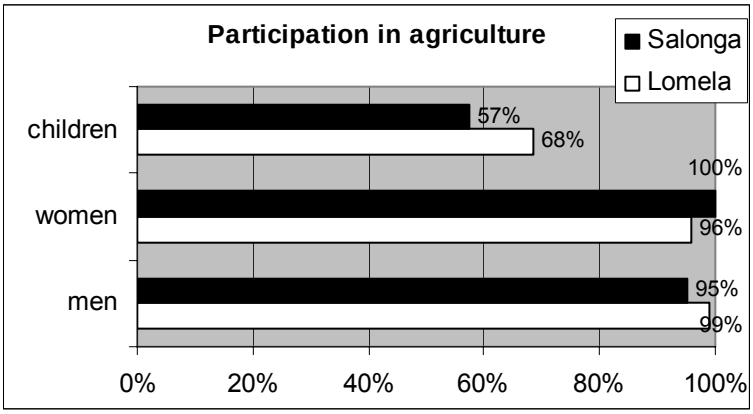
Participants desire the return of commercial agricultural enterprises because they are associated with the re-opening of stores (manufactured goods) and improved transportation networks. The perception that companies are beneficial to communities contrasts with the negative view of independent traders that monopolize trade and pricing to the disadvantage of the seller.

D. Principal subsistence and economic activities

1. Agriculture

Agriculture was mentioned as a subsistence or economic activity by all participating households in villages along or close to the Salonga and Lomela rivers. Men, women, and children from each household contribute to the family's agricultural production. Women's participation was slightly higher in the Salonga area, while the involvement of men and children was higher in Lomela (figure 59). As in the rest of the landscape, agricultural tasks are differentiated by gender, with men engaged in clearing and preparing agricultural fields and women involved in planting and harvesting. Men also set traps and guard fields from crop-raiding wild animals, such as red river hog and monkeys.

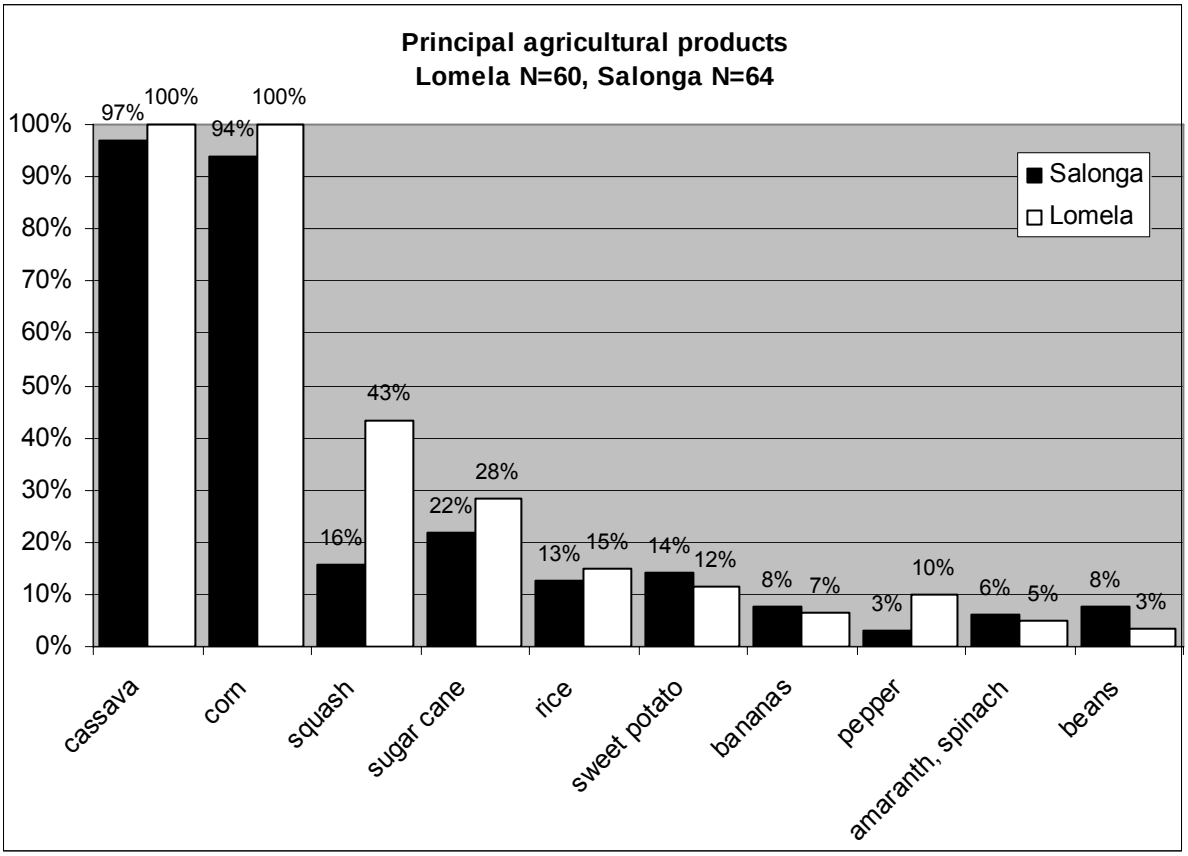
Figure 59



Cassava (*Manihot esculenta)* and corn (*Zea mays)* are the most prevalent agricultural crops in both areas, while squash is grown by more households along the Lomela than on the Salonga. Sugar cane and rice (*Oryza sativa)* are grown in both areas. Figure 60 includes the principal crops[142] produced by households engaged in agriculture. Contrary to households in the territory of Oshwe, participants in the areas of the Salonga and Lomela rivers did not report producing palm nuts (*Elaeis guineensis)*, formerly an important cash crop.

[142] Other products mentioned greens (5.0% on the Lomela and 6.3% on the Salonga), groundnuts (8.3% and 1.6%), pineapple (3.3% and 4.7%), tobacco (5.0% and 1.6%), yams (1.7% and 3.1%), tomato (3.3% and 1.6%), soya (3.3% on the Lomela only), and chives (1.7% on the Lomela only).

Figure 60[143]



[143] Results based on valid answers in the activities section of the questionnaire.

Households in the Salonga River area reported growing between one and nine crops, with an average of 3.06 per household[144]. In the Lomela River area, households reported between two and seven cultures, with an average of 3.51 per household[145]. The average field size was larger in the Lomela area, 0.95 ha[146], than in the Salonga, 0.35 ha[147]. All fields in the Salonga River area were one hectare or less, while households in the Lomela reported up to 2.5 ha (table 44). Most fields are located within villages' traditional land use zones, accessible by forest footpaths[148], and often within 1 km of the household (table 45).

Table 44 Field Size

Size of fields in ha	% households	
	Lomela	Salonga
0 - 0.05	4.3	9.7
0.051-0.1	6.6	20.4
0.101-.5	27.0	45.9
0.51 - 1	30.8	21.9
1.01 - 1.5	5.7	0.0
1.51 - 2	19.0	0.0
2.01 - 2.5	0.9	0.0

In terms of land ownership, 98% of households in Lomela and 91% in Salonga said they own their fields. One household in each area reported renting a field, while five households in the Salonga River area (all in the village of Beele) reported use without authorization from traditional authorities.

Table 45 Distance to Fields

distance in km	% of households	
	Lomela	Salonga
0 - 0.05	3.3	0.0
0.051-0.1	0.0	2.6
0.101-.5	20.9	23.5
0.51 – 1	25.1	28.1
1.01 - 1.5	19.9	16.3
1.51 – 2	9.5	11.2
2.01 - 2.5	14.2	4.6
2.51 – 3	3.3	4.6
3.01 - 3.5	2.4	6.6

Methodologies for preserving soil fertility are fallow (98% in the Lomela and 100% in the Salonga river area), followed by crop rotation and mixed cropping systems (46% in both rivers' areas). Fallow periods range from two to ten years.

Changes and adaptation in agriculture

Agriculture was perceived to have changed the most of all activities by all participating villages in both areas (table 746

In Lomela the most frequently cited change was the decrease in agricultural product commerce. The cause was linked principally to the deterioration of roads and the collapse of transportation systems in general associated with Zairianization (1973), after which there were fewer companies buying from local producers. Lastly, one village cited the recent civil war and associated increased isolation of the area among perceived changes in agriculture.

The lack or loss of equipment was the second most often reported change. Reasons for this change include the absence of stores and suppliers in the region and the confiscation or destruction of agricultural implements/tools by the military. A third change was a decline in production due to difficulties in preventing crop-raiding wildlife in distant fields. This change was associated with the absence of instruments and materials necessary to avoid the need to open new fields in primary forest.

Table 46 Changes in agriculture and their perceived causes, Lomela River[149]

	Changes

[144] Standard deviation 1.41
[145] Standard deviation 1.56
[146] Standard deviation 0.68
[147] Standard deviation 0.33
[148] 100% of cases in both rivers' areas.
[149] Information from the 8 participating villages.

		Decrease in commercialization (all villages Lomela)	Lack or loss of equipment (6 villages)	Decreased production (3 villages)	Destruction of crops by wild animals (3 villages)
Cause	Fields are farther away	0	0	0	1
	War	1	4	2	0
	Deterioration of rural roads, disappearance of buyers	8	4	1	0
	Loss or lack of equipment and capacity	0	0	0	1
	Unknown	0	0	0	1
	Political events, e.g. Zaïrianization	4	1	0	0

Salonga area villages spoke of a decrease in production associated with an inability to sell products as well as with the lack of agricultural equipment and technical support to improve yields. Participants from this area did not mention political events (e.g. war) among the causes of change. Another problem mentioned concerned the destruction of fields by insects and plant diseases (table 47).

Table 47 Changes in agriculture and their perceived causes, Salonga River[150]

		Changes		
		Lack of agricultural equipment and knowledge (4 villages)	Decrease in commercialization (4 villages)	Insects and plant diseases (3 villages)
Causes	Insects, disease and wildlife	0	0	2
	Deterioration of rural roads, disappearance of buyers	4	4	0
	Lack of capacity and technical support	1	0	0
	Unknown	0	0	2

While not identified among the principal changes, participants from the Salonga area also reported destruction of fields by animals. Crop-raiding by red river hog was mentioned in every village, which people attempt to control using traps and shotguns, as well as by constantly monitoring their fields. Other animals mentioned were monkeys and rodents (table 48). Villages state that they do not have the capacity to find solutions for cassava disease, and their only recourse is to move to new fields.

Table 48 Crop-raiding Wildlife (N=13)[151]

Animals	# Villages
River red hog *(Potamocherus porcus)*	13
Monkeys	7
Red-tailed Monkey *(Cercopithecus ascanius)*	4
Birds	3

[150] Information available from 4 villages.
[151] Complete scientific names.

Animals	# Villages
Wolf's monkey (*C. wolfi*)	2
Misi (?) (monkey)	1
Rodents	1
Forest buffalo *(Syncerus cafer caffer)*	1

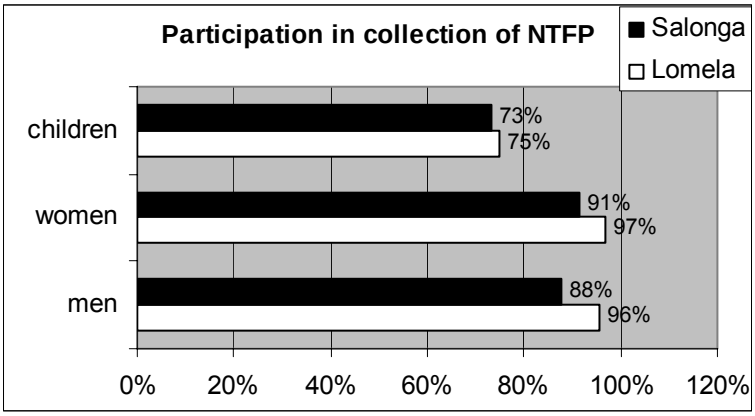
The only positive change mentioned by both men and women focus groups was the introduction of new crops, such as coffee, during the colonial period and immediately after independence. Sales of these crops assisted with payment of paying school fees and meeting other family needs. As in other parts of the landscape, the memory of the time/era when agriculture represented a reliable source of income continues to drive people's aspirations of local development

2. Collection of NTFPs

Every household in Lomela and 91.5% in the Salonga area collect NTFPs for subsistence and/or commercial purposes. While a common subsistence activity, NTFP collection was reported as the primary income source by only one household (N=177) and by a single household as the second most important revenue source. Collection of NTFPs acquires some importance as a tertiary source of income, with 17.5% of households ranking it as their principal tertiary source of revenue. Reliance on NTFPs as a source of income may be increasing in the Lomela area, where three villages reported increasing sales of caterpillars and mushrooms. Also, an additional 39% percent of households in the Lomela area that collect NTFPs reported periodic sales.

Women from the Lomela villages of Bokela/Kankonde, Yafala, and Botsima reported using revenue from the sale of NTFPs to cover part of the cost of education and other services for their families. Participants from Botsima also spoke of a change in the origin of demand, mentioning the recent arrival of merchants from Mbandaka in search of NTFPs.

Figure 61



Similar to other areas in the landscape, collection of NTFP is practiced by men, women and children (figure 61). It registered the highest participation of children among all household subsistence and economic activities.

Households in the Salonga area collect between two and seven different products, while households in the Lomela area reported between two and eight (table 49).

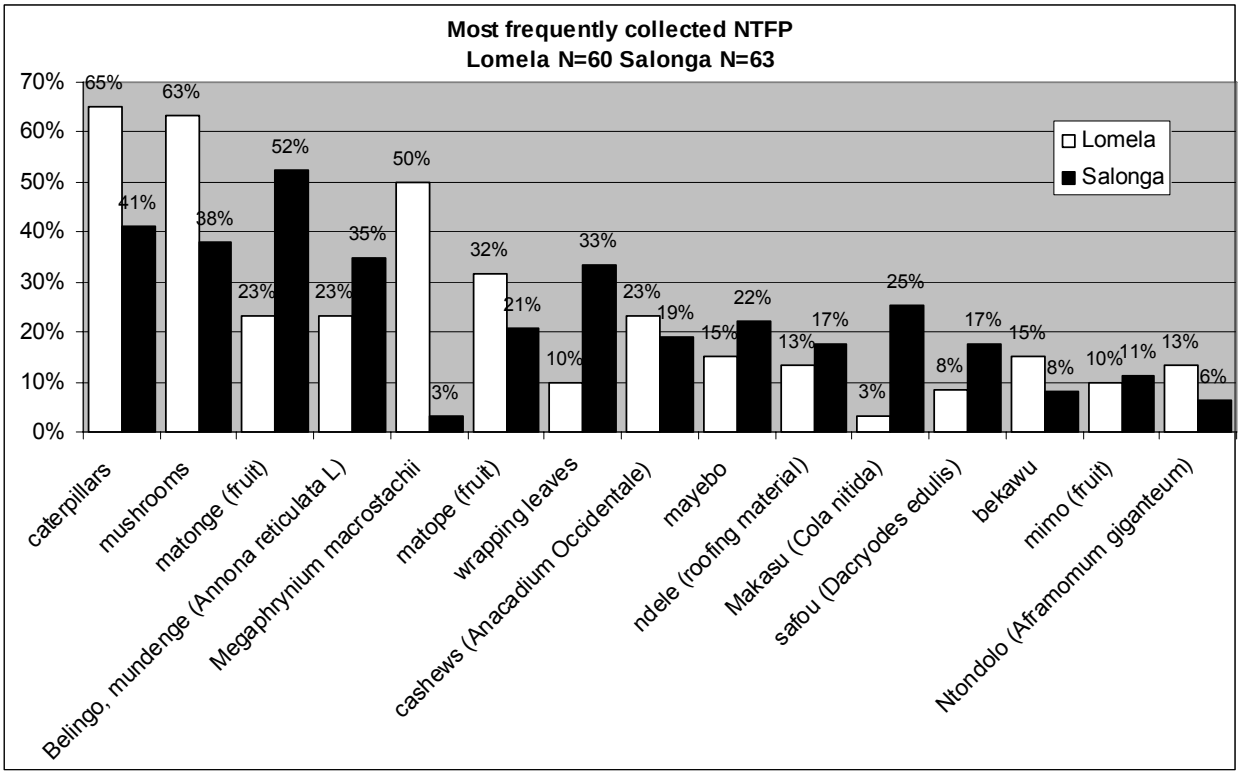
Principal NTFPs collected in villages along or close to the Lomela River included caterpillars (65%), mushrooms (55%), and *beeya (Megaphrynium macrostachii)* (50%). Villages along or close to the Salonga River collect *matonge* (fruit) (52%), caterpillars (42%), and mushrooms (38%).

Table 49[152]	**Lomela N=60**	**Salonga N=63**
Average number of NTFP collected by household	4.67[153]	4.20[154]
Average number of commercialized NTFP	2.08[155] (N=34)	1.56[156] (N=9)

As shown in figure 62, different NTFPs are collected more frequently in different areas. For example, wild macaroons are an important product in Lomela, while they were hardly reported by households in the Salonga area (3%); cola nuts are collected by a fourth of households in the Salonga area, but only by 3% in the Lomela area.

[152] Based on total valid answers (N=123)
[153] Standard deviation 1.16
[154] Standard deviation 1.18
[155] Standard deviation 1.16
[156] Standard deviation 1.01

Figure 62



Products mentioned in the Lomela area but not in the Salonga included *befili*, or wild garlic (*Scorodophloeus zenkeri)* (16.7% households) nkolo kumu (10.0%) beefe (8.3%), mbete (6.7%), bansenda (5.0%). bateke (5.0%), bento (3.3%), beyengo (3.3%), lintonda (3.3%), and nsemu (fruit) (3.3%). Products mentioned in the Salonga but not in the Lomela area included bafomi (7.9% households), mbele (fruit) (7.9%), ndonga (4.8%), ngadiadia (fruit) (4.8%), palm nuts (4.8%), and ketsu (peppers) (3.2%).

More households in Lomela River area (58%) report finding NTFPs within 1 km of their homes than in the Salonga area (45%) (table 50).

The percentage of households in the Lomela area who sell a portion of their NTFP harvest (57%) is 4 times greater than comparable households in the Salonga area (14%). A greater number of NTFPs collected equated slightly to greater distances traveled (r=0.13). However, the decision to commercialize did not relate to the distant traveled to harvest the actual products.[157]

Table 50 Distance from households to NTFP

distance in km	% of households	
	Lomela	Salonga
0 - 0.05	0.0	2.6
0.051-0.1	1.1	0.0
0.101-.5	38.9	13.6
0.51 - 1	17.9	29.1
1.01 - 1.5	14.6	15.5
1.51 - 2	5.7	7.9
2.01 - 2.5	11.8	18.1
2.51 - 3	3.9	0.4
3.01 - 3.5	0.0	0.0
3.51 - 4	0.7	1.5
4.01 - 4.5	0.0	0.0
4.51 - 5	2.1	2.3
>5	2.5	7.5

[157] The oorrelation between distance traveled and whether products are sold or not was of -0.1.

Table 51 Principal commercialized NTFPs - Lomela area[158]

Product	% of households (N=39)	Prices	Weekly sales
Beeya (*M. macrostachii)*	47.1	$0.02 pile (10FC)	$0.07 to $3.33
Caterpillars	35.3	$0.02 pile (10FC); $0.11 cup (50FC)	$0.09 to $3.33
Mushrooms	35.3	$0.02 pile (10FC); $0.11 cup (50FC)	$0.07 to $3.33
Matope (fruit)	29.4	$0.02 pile (10FC)	$0.44 to $4.44

Very few households that report income from the sale of NTFPs make more than $15 (6750 FC) per season. Income from this activity was difficult to estimate because collection is seldom systematic, sometimes practiced everyday, once a week, or sporadically according to seasonality. The nine households in the Salonga River area that commercialize NTFPs reported selling mushrooms (4 households), matonge fruit, roofing material, mbaka (2 households each), resin, caterpillars, bekaw and kungo (1 household each). Principal products sold in the Lomela area included *beeya* (wild macaroons), caterpillars, mushrooms, and matope. Table 51 includes the principal commercialized products in the Lomela River area and their respective prices.

Locally perceived changes in the collection of NTFPs

Among economic activities, the fewest changes were recorded for the collection of NTFP. Households from four Salonga and seven Lomela villages reported changes. Of collecting households, 12.7% in Salonga and 20% in the Lomela area perceive changes in the availability of NTFP, particularly of caterpillars, mushrooms, and fruits.

Four out of ten households in the Salonga area believed the change in availability was caused by the supernatural. One household related the disappearance of caterpillars to forest conversion to agricultural lands and two households said they did not know the cause of the decrease.

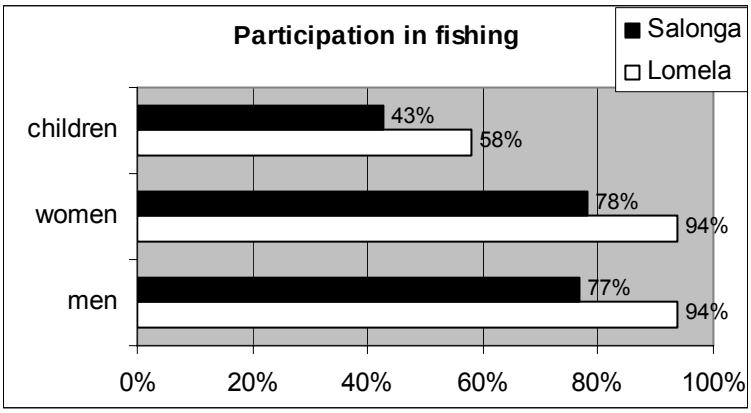
On the Lomela River, reasons for the negative trend included changes in land use (58.3%), the supernatural (16.7%), changing weather (16.7%), and demographic pressure (8.3%). Twenty-five percent of households were unable to provide an explanation. In women's focus groups in the Lomela, participants also spoke of an increase in the commercialization of NTFPs, discussed previously in this section. Women's focus groups in the villages of Bamata, Efeka and Ilonge Centre, all in the Salonga area, reported a decrease in the availability of caterpillars associated with forest conversion, the supernatural, and the death of President Mobutu.

[158] The season during which the data from this area was collected (September and October) may have impacted the percentage of households reporting each product.

3. Fishing

Along the Salonga and Lomela Rivers 84.2% of households report fishing among their three most important income generating activities. Every household[159] in both areas reported consuming fish. Women and men participate equally in fishing activities (94% of men and women in the Lomela area, 77% of men and 78% of women in the Salonga area) (figure 63), but techniques are gender differentiated.

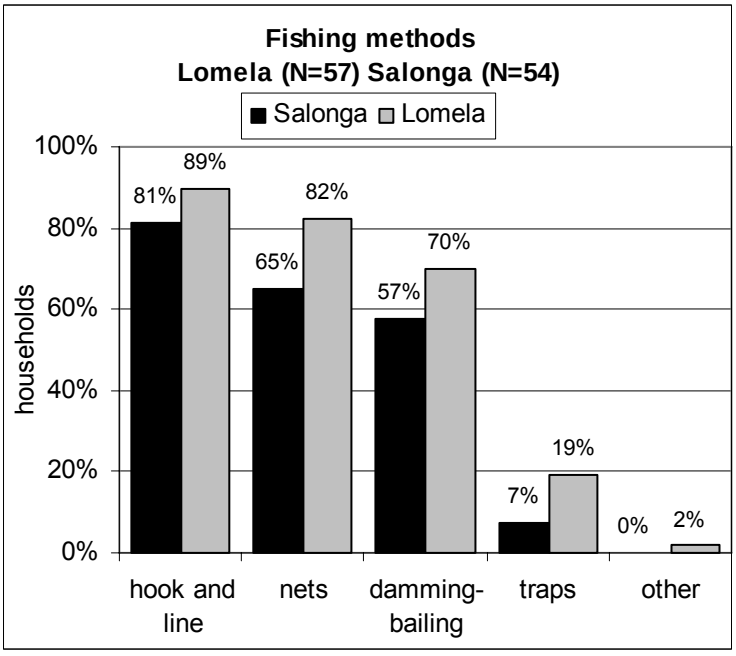
Figure 63



Households from villages close to the Lomela River reported between 1-5 fishing techniques, with an average of 2.6 methods per household[160]. Villages in proximity to the Salonga River reported fewer techniques[161], ranging from 1-3 with an average of 2.1 per household[162].

The most popular fishing methods are hook-and-line, nets, and damming-bailing. Figure 64 includes the types of instruments used by households in both areas.

Figure 64[163]



[159] Based on 123 valid answers.
Standard deviation: 0.84
[161] While 49% of households in the Lomela reported three methods of fishing, only 33% in the Salonga reported the same.
[162] Standard deviation 0.10
[163] "Other"= mosiki.

Participation by household members varies according to method. Men fish mostly with nets, hooks and line, and to a lesser degree, traps. Women also use traps, but less frequently than men[164]. The damming-bailing system is practiced almost exclusively by women, sometimes helped by their children. As illustrated in figures 65 and 66, activities are gender differentiated among adults.

Figure 65

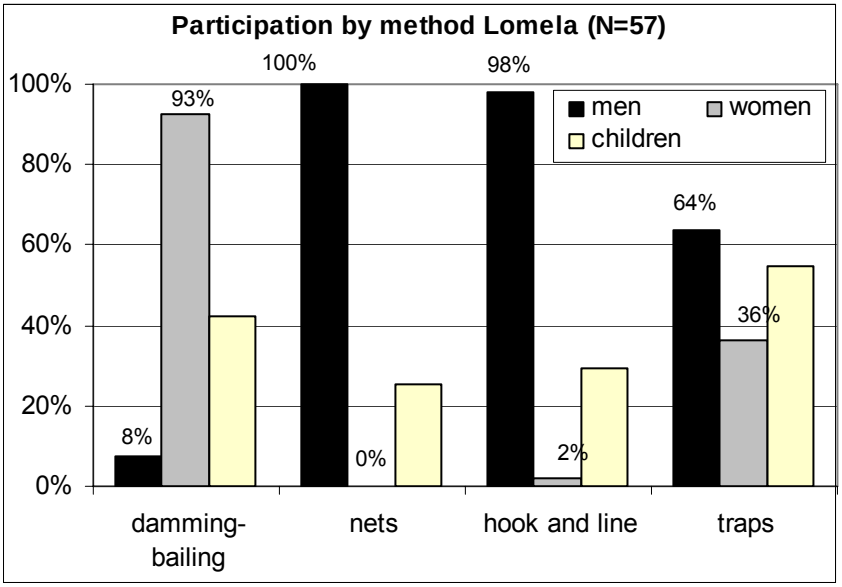
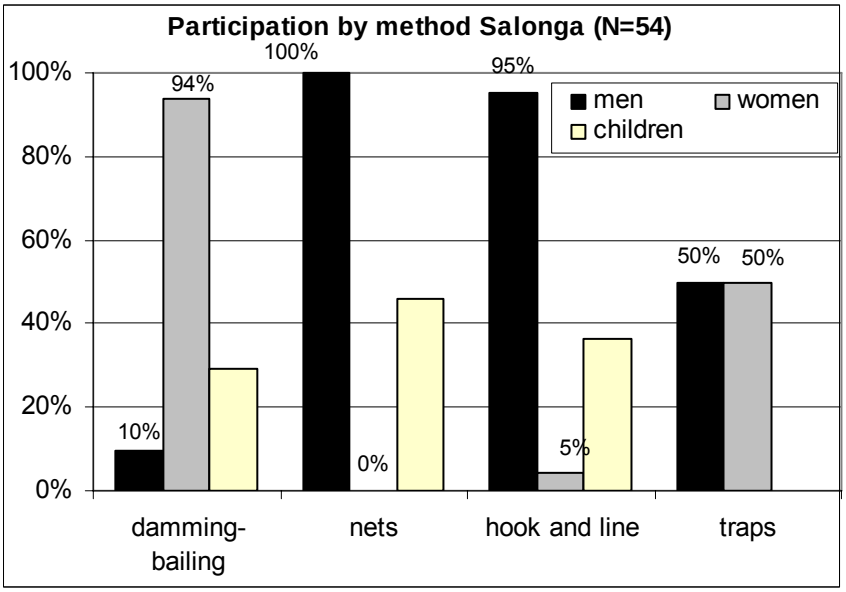


Figure 66



Women fishing in the Salonga and Lomela areas use between 1-6 baskets for the damming-bailing technique. Trap numbers varied between 1-60[165]. Table 52 and figure 53 include the number of nets, and hooks and line reported by households in both areas.

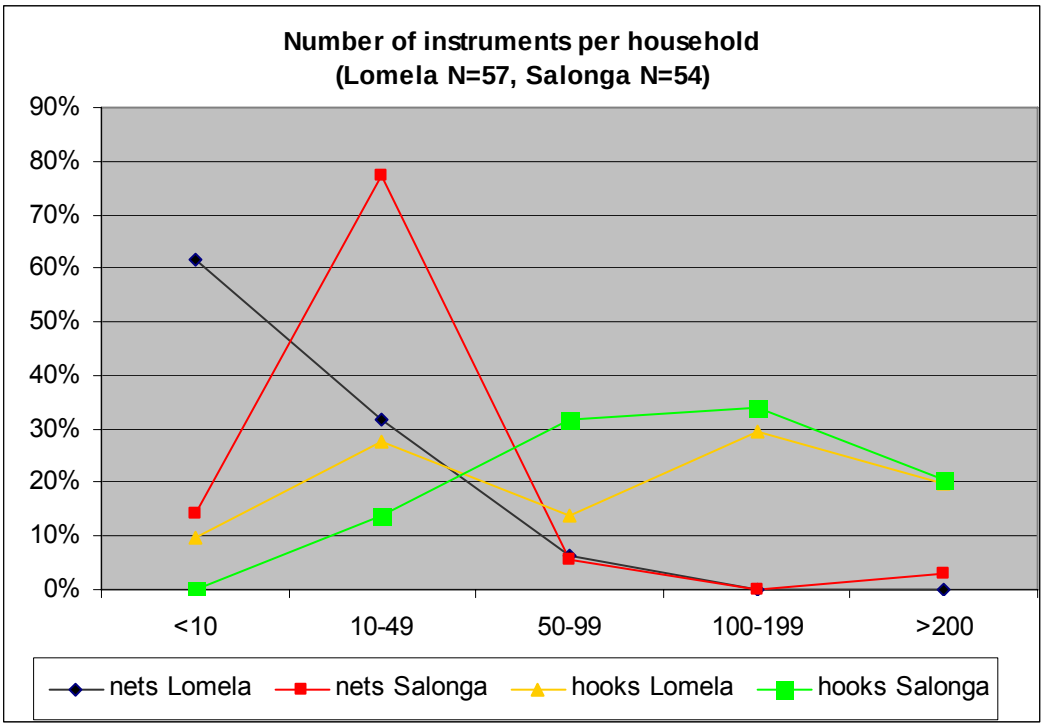
Table 52 Number of instruments per household

	Hook and line		Nets	
	Lomela (N=57)	Salonga (N=54)	Lomela (N=57)	Salonga (N=54)

[164] Compare with a higher participation of women in the use of traps in the Territory of Oshwe.
[165] Only a total of fifteen households reported fishing with traps. No distinction was made between numbers used by men and women.

	Hook and line		Nets	
	Lomela (N=57)	Salonga (N=54)	Lomela (N=57)	Salonga (N=54)
<10	9.8	0.0	61.7	14.3
10 – 49	27.5	13.6	31.9	77.1
50 - 99	13.7	31.8	6.4	5.7
100 - 199	29.4	34.1	0.0	0.0
>200	19.6	20.5	0.0	2.9

Figure 67



The principal fishing areas are the Lomela (43.3%) and Salonga (57.9%) Rivers. Three villages in the Salonga area and four in Lomela reported fishing in Salonga National Park. Fishing in the park represents 4.1% of all fishing activities. Table 53 includes the most often mentioned fishing zones in both areas[166].

Table 53 Principal fishing zones Lomela and Salonga Rivers

fishing zones	Villages Lomela N=8	% activities (N=240)
Lomela River	8	43.3
Bungwa	4	10.0
Ngili	2	4.2
Nkake	2	2.9
Beloke	2	2.1

fishing zones	Villages Salonga (N=5)	% activities (N=152)
Salonga River	5	57.9
Bolango River	3	13.8
Bosomo River	2	5.9
Bofunga	2	4.6
Bofaka River	1	3.3

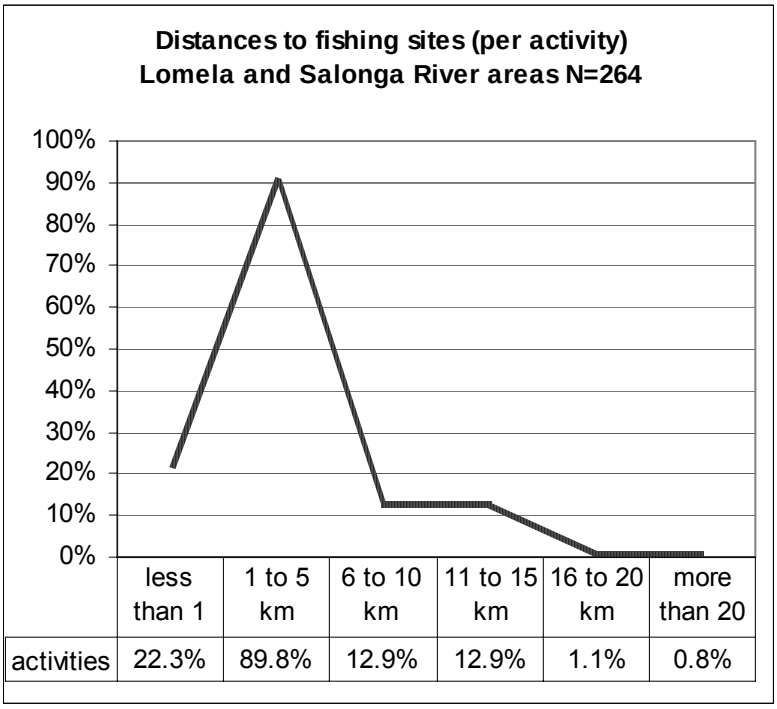
Distances between villages and fishing sites ranged from under 1-20 kilometers (figure 68). Households from the same village sometimes gave varying distances to the same river or waterway. This was possibly due to rough estimates and also because people from the same village may fish in

[166] A complete list of rivers and streams used by all participating villages is included in appendix 2. Participants did not mention whether any of these zones were located within the park's boundaries. The only reference to fishing activities in the park was for the Salonga and Lomela Rivers.

different spots along the same waterway and also because people have no means of measuring exact distances both in kilometers and hours traveled.

Access to fishing areas is by both forest footpaths and pirogue. However access by pirogue is more common in Lomela (55%) than in Salonga (18%).

Figure 68

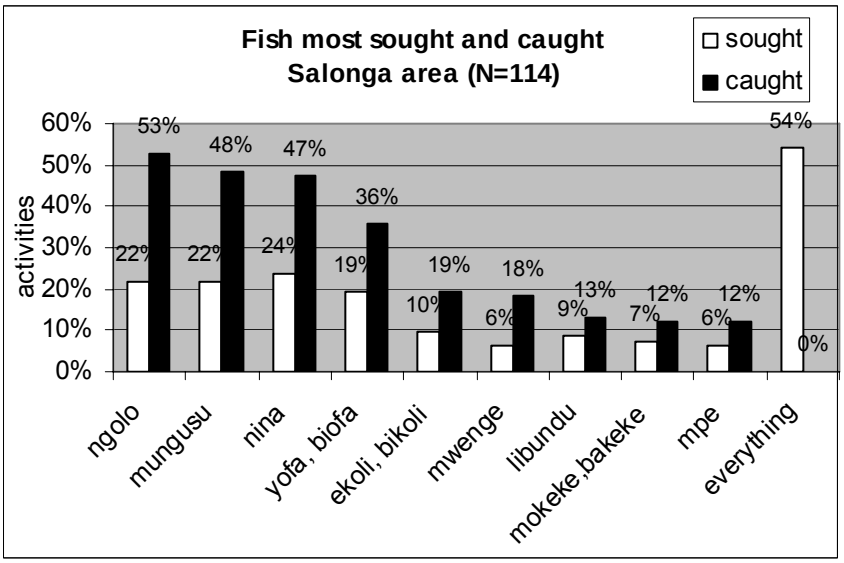


	less than 1	1 to 5 km	6 to 10 km	11 to 15 km	16 to 20 km	more than 20
activities	22.3%	89.8%	12.9%	12.9%	1.1%	0.8%

Fish preferences

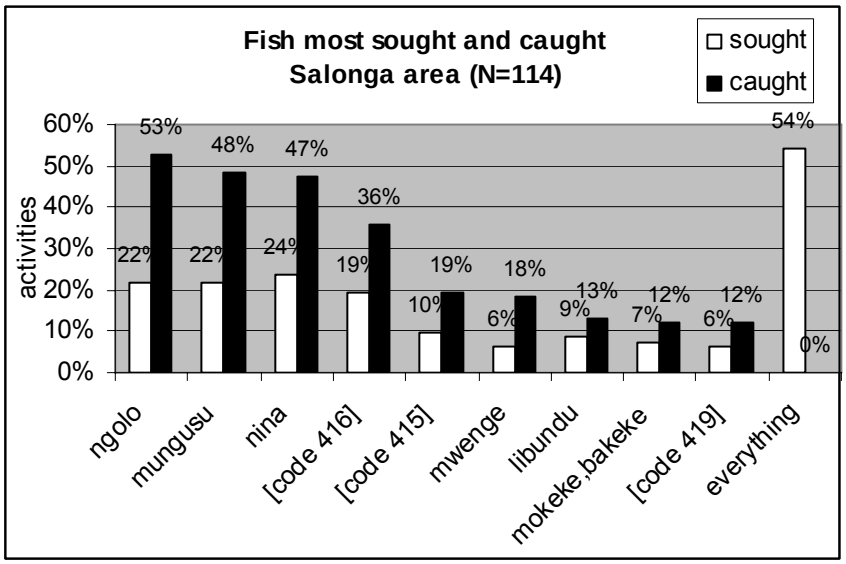
Forty-four percent (45%) of participants in the Lomela area reported fishing for all species. For the rest of fishers target species were listed as ngolo *(Claria bothopogon)* mungusu (*channa obscurus)*, nina *(Malapterururs electricus),* yofa or biofa, and ekoli or bikoli *(Chrysichtys spp).* Other desired fish included libundu *(Chilochromis duponti),* mwenge *(Hepsetus odoe)*, prawns, and mpe *(Bagrus spp.)* (figure 69), which were also the most often captured species.

Figure 69



Participants from the Salonga area cited the same species with the exception of mokeke or bakeke (*Channallabes apus?*[167]), which was not mentioned as often in the Lomela area. The principal fish sought and captured in the Salonga area appear in figure 70.

Figure 70



Revenue from fishing

In the Salonga area, 79.6% of households that fish commercialize a portion of their catch, while in the Lomela area, 84.2% of fishing households practice some commerce.. The number of fish species sold by Salonga households range from 2-6, with an average of 3.7 types[168]. In the Lomela area the range was between 2-7, with an average of 3.9[169] varieties per household.

The majority of fish sold by households is smoked (95.1%) and packed in baskets of different sizes for transport, or sold individually or in pieces for local consumption. The principal species commercialized in the Salonga River area are mungusu (83.7%), ngolo (72.1%), nina (37.2%), and nkonga *(Polypterus spp.?)* (32.6%). More than 10% of households also mentioned mwenge (18.6%), biofa or yofa (16.3%), and mpe (11.6%). Ngolo, mungusu, nina, nkonga and biofa or yofa were also among the five most sold species in the Lomela area, with ngolo being commercialized by 68.8% of households, followed by mungusu (56.3%), nina (41.7%) nkonga (35.4%), and yofa or biofa (16.7%). Over 10% of households in the Lomela River area also reported selling ekoli (12.5%), mabundu *(Serranochromis angusticeps),* ndangwa (12.5%) and mwenge (10.4%). Table 54 includes the fish species most often commercialized in both river areas and the range of prices for the principal units of sale in each area. More households in the Salonga River area than in the Lomela reported selling *"valises"* ("suitcase" refers to the packaging done for long-distance travel). Households in the Lomela River area sell fish in smaller quantities, either individually, in piles, and in pieces, more than in baskets.

Table 54 Commercial fish species in the Lomela and Salonga River areas

Fish spp	% households Lomela (N=48)	% households Salonga (N=43)	Price range (unit) Lomela	Price range (unit) Salonga	Price range ("suitcase") Lomela	Price range ("suitcase") Salonga
Mungusu	56.3	83.7	$0.07- $1.11	$0.11-$1.11	$1.56- $6.67	$1.11-$5.56

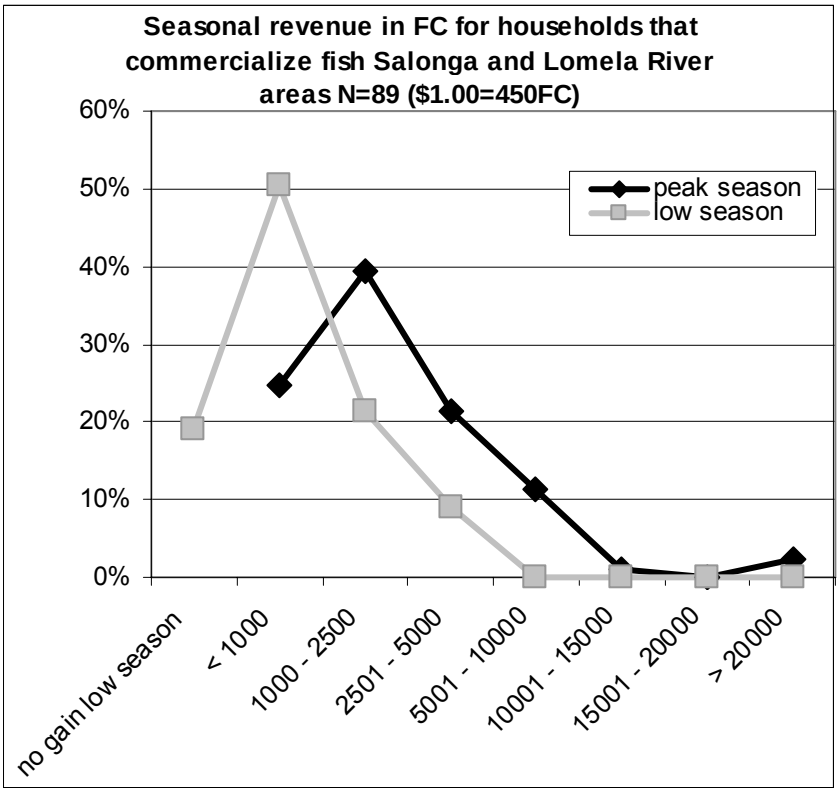
[167] Verify if mokeke is the same as mokoko *(Chanallabes apus)*
[168] Standard deviation 1.24
[169] Standard deviation 1.5

Fish spp	% households Lomela (N=48)	% households Salonga (N=43)	Price range (unit) Lomela	Price range (unit) Salonga	Price range ("suitcase") Lomela	Price range ("suitcase") Salonga
			(30FC-500FC)	(50FC-500FC)	(700FC-3000FC)	(500FC-2500FC)
Ngolo	68.8	72.1	$0.11-$0.60 (50FC-$250FC) **Pile:** $.07-$0.44 (30FC-200FC)	$0.11-$0.22 (50FC-100FC)	$1.56 (700FC)[170]	$1.11-$5.56 (500FC-2500FC)
Nina	41.7	37.2	$0.22-$1.80 (100FC-800FC) **Piece:** $0.07- $0.11 (30FC-50FC)	$0.22-$0.66 (100FC-300FC)	Unit not reported by households	$1.56-$5.56 (700FC-2500FC)

Households that trade fish do not travel to markets outside their area but sell to traveling merchants often in exchange for manufactured goods.

In terms of seasonal revenue, 97% of households reported earning under $10 during the peak season. During the low/rainy season, the majority of households (89%) reported gains under $5, and 19% of households that reported gains during the peak season reported no gains during the low one. Figure 71 shows the trend in gains, during both seasons, by households in both areas.

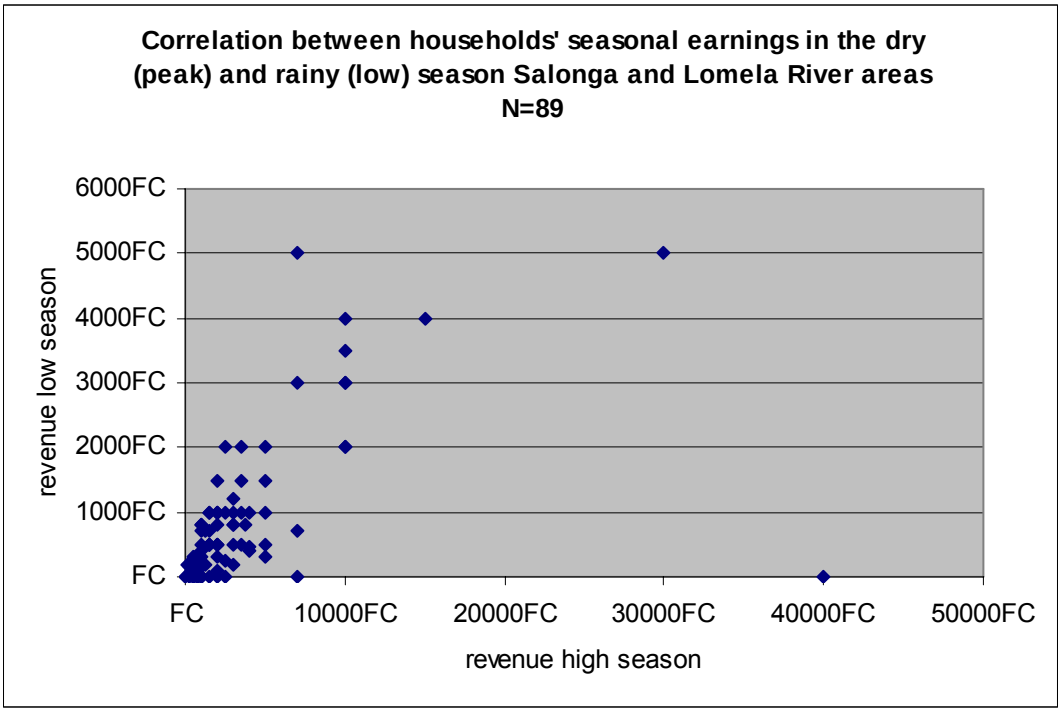
Figure 71



[170] This unit was reported by one household only.

Greater earnings in the peak (dry) season often, but not always, equated to comparatively higher revenue in the low (rainy season). A correlation of 0.55 was found between earnings reported by households for the peak season and what they reported for the low/rainy season (figure 72).

Figure 72



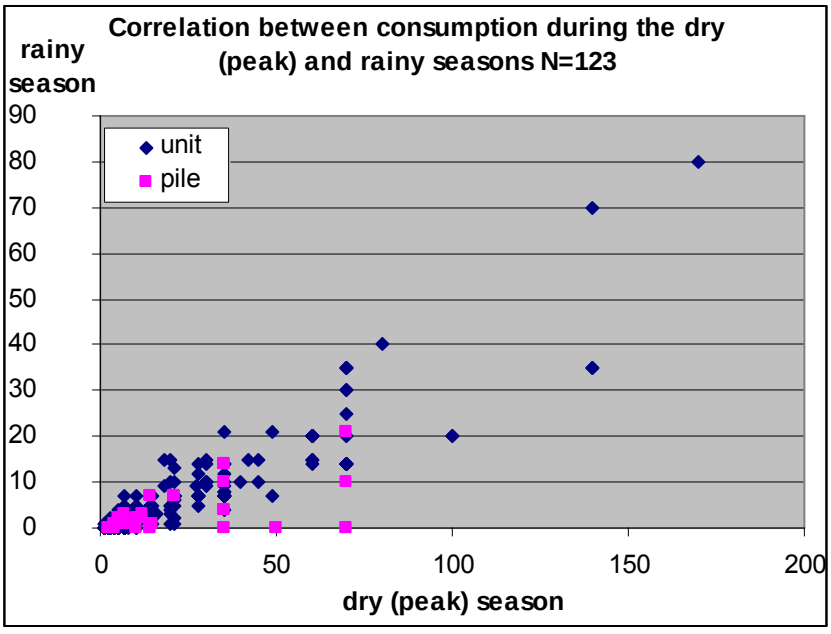
Consumption of fish

In terms of consumption, households eat between 1-5 species of fish, with an average of 3.17 varieties per household[171]. Consumption of fish, as with commerce, decreases during the rainy season. Species most often consumed are ngolo *(Claria bothopogon)*, nina *(Malapterus electricus)*, mungusu (*channa obscurus),* and nkonga *(Polypterus spp.?)* (table 55). A correlation of 0.90 was found between quantities consumed by households during the peak and low seasons (figure 73).

Table 55 Most often consumed fish species Salonga and Lomela River Areas

Species	% households (N=123[172])
Ngolo	65.9
Nina	46.3
Mungusu	39.8
Nkonga	35.0

Figure 73



[171] Standard deviation 1.04

[172] Includes households that do not fish but reported consumption.

The correlation between consumption and season was greater in Lomela than Salonga. Forty-four percent (44%) of Lomela households do not eat fish during the rainy season in comparison to 23.8% of Salonga participants.

Regarding food prohibitions, 22 households (17.9%) reported not eating certain food species because of tradition. The most frequently mentioned species was nina *(Malapterus electricus)*, reported by 14 households as not eaten by men. Other fish mentioned included enkondi (3 households), nyawo and mbenga *(Hydrocynus spp)* (2 households each), nzombo, kakateni, elene, and bomiminse (1 household each).

Locally perceived changes in fishing activities

Historical events reported as influencing fishing included the introduction of new practices, such as the use of hooks and nets in the 1960s, and an increase in commerce in the 1980s.

Changes in fishing activities and fish availability were reported by 76.7% of households in the Lomela River area and 81.0% in the Salonga River area. The principal change affecting households are declining fish stocks, reported by 97.1% of respondents. The other changes mentioned were "general difficulties" (1.44%), appearance of a new species (1%), disappearance of fish species (0.5%), and positive changes (0.5%). Household-level participants associated a decline in fish stocks to increased fishing, with an emphasis on the growing number of fishers. Negative changes were also associated with changes in weather, the presence of Salonga National Park, the increasing numbers of fishing implements per household, and the use of poison.

Table 56 Causes associated with decrease of fish stocks Salonga and Lomela areas (N=97)

Causes	% cases[173]
More locals exploiting resources	41.9%
Changes in the weather	29.6%
SNP	28.1%
Number of instruments has increased	21.9%
Use of poison	14.3%
Unknown	7.1%
Changes in use	6.2%
Supernatural	6.2%
Lack of other economic alternatives	5.2%
Demographic pressure	3.8%
Lack of respect of fishing calendar	1.0%

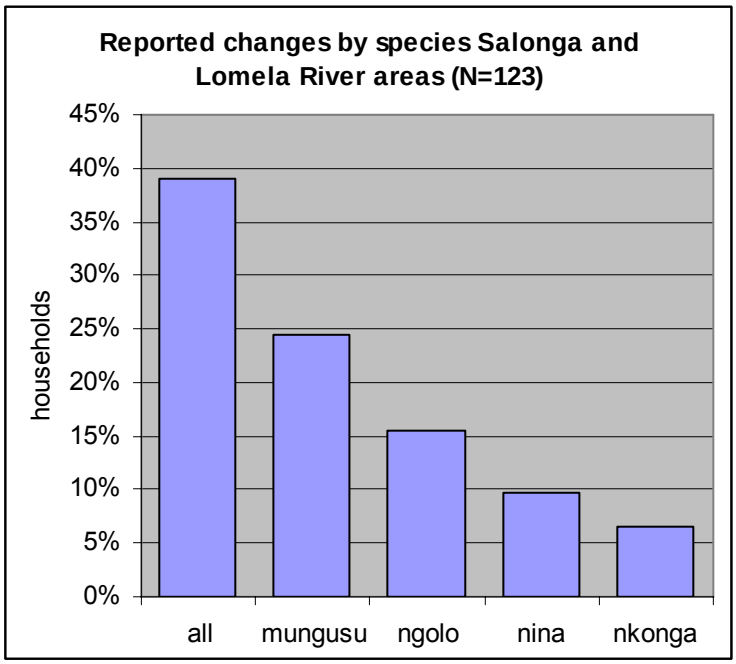
The villages of Efeka (Salonga River area) and Ibali (Lomela River area) had the highest number of households reporting changes in fishing activities and availability of fish (90% and 89% of all participating households from these villages reported changes in fishing activities).

During focus groups, changes in fishing were also reported in every village in the Salonga River area (table 56). The most frequently mentioned change during group discussions was also the decrease in fish stocks, associated with the growth of the activity. Focus group participants from two villages in the Salonga River area said that the negative trend was also due to the creation of Salonga National Park, which reduced village fishing areas. The SNP was mentioned as a cause of change in 28.1% of household interviews in both areas. Participants believe that the creation of the SNP reduced village fishing areas, putting more pressure on freshwater habitats outside of the park.

The majority of changes mentioned concerned perceived decreases in all fish species (45% of households), followed by specific species: mungusu (24.4%), ngolo (15.4%), nina (9.8%), nkonga (6.5%) and ndangwa (6.5%) (figure 74).

[173] Total exceeds 100% because some changes were associated with more than one cause.

Figure 74



Four villages in the Salonga River area identified the creation of the SNP as a change in itself, with no related causes. Finally, two villages talked about the use of poison as a change, associating it both with the need to generate income and the constraints imposed by the creation SNP (table 57).

Table 57 Changes reported by villages in the Salonga River area (N=5) and their associated causes

		Changes	
		Decrease in fish stocks (5 villages)	**Use of poison (2 villages)**
Associated causes	Number of instruments has increased	5	0
	Creation of SNP	2	1
	Weather	2	0
	Use of poison	1	0
	Outsiders fishing in local waterways	1	0
	More locals fishing	1	0
	Need to generate income	0	1

Focus group discussions in the Lomela River area revealed that the principal change identified by participants is also a decrease in fish stocks, followed by the loss or lack of fishing equipment, and decreased or difficult access to fishing areas which often refers to restrictions for fishing in the park (table 58).

Table 58 Changes reported by villages in the Lomela River area (N=7) and their associated causes

		Changes		
		Decrease in fish stocks (7 villages)	**Lack or loss of equipment (7 villages)**	**Difficult access to resources (5 villages)**
Associated causes	Creation of SNP	3	0	5
	Deterioration of roads, disappearance of buyers	0	6	0
	Changes in the weather	4	0	0
	War	0	2	0
	More locals exploiting resources	2	0	0
	Number of fishing instruments has increased	1	0	0

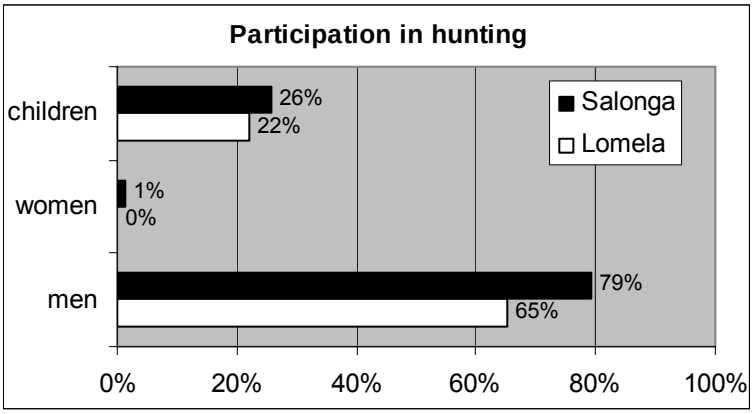
Other changes mentioned were shifts in weather patterns (3 villages), the introduction of new fishing practices in the 1960s (2 villages), the start of commercial fishing, increased use of poison (1 village), and the creation of SNP (1 village). Causes for the decline in fish stocks included changes in the weather (4 villages), the creation of SNP (3 villages), an increase in the number of people fishing (2 villages) and in the number of instruments used by fishermen (1 village). Lack of fishing equipment was mentioned as change, consequence, and cause of other changes. It is seen as consequence of the absence of commerce (6 villages), important enough to stand out as a change in itself. In the case of lost equipment, the identified cause was the recent war (2 villages). Finally, the creation of the SNP was seen as the cause of increased difficulty in accessing resources.

4. Hunting

An almost exclusively male activity (figure 75), hunting is practiced as a subsistence and/or commercial activity by 66.3% of Lomela and 79.3% of Salonga households. However, in both areas all households[174] reported consuming bushmeat. Similarities between the two areas exist in terms of methods and species hunted, while differences were recorded in the patterns of commercialization of bushmeat, including pricing, units of measure, and the degree of trade outside of their villages.

Local men engage in both individual and, to a lesser degree, collective hunting, in which they sometimes include men from neighboring villages with whom they have clan ties. Male children start participating in hunting activities when they're about twelve years old.

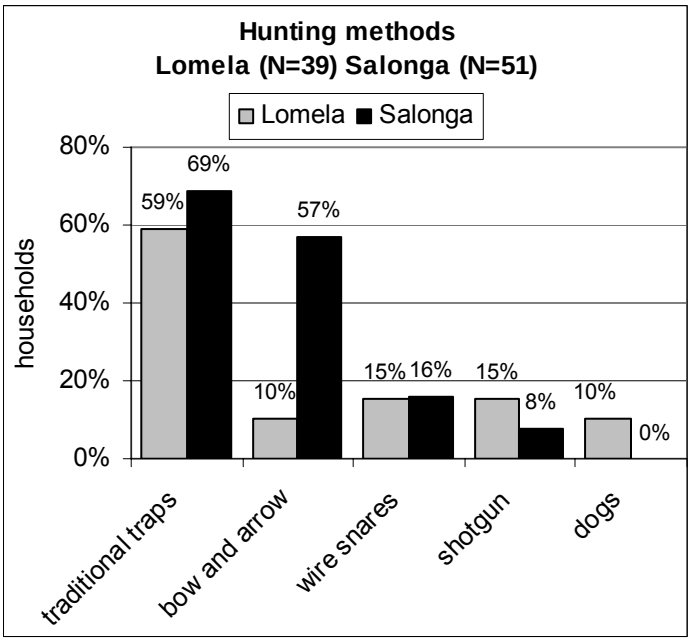
Figure 75



Apart from households that hunt for consumption and commerce, an additional 11.2% of households in Lomela and 7.3% in Salonga reported purchasing bushmeat for household consumption. Participants reported buying from hunters of their own villages (81.8%), from neighboring villages (24.2%), and in one case, from a larger market (Boende).

Households in the Lomela River area hunt and trap using one to two methods (84.6% and 15.4% of households, respectively), while households in the Salonga River area hunt with one to three (51.0%, 45.1%, and 3.9%). The most popular method is traditional traps used by over half of households that hunt (figure 76). Participants differentiated traditional traps from snares made with metal wire, which are used by 15% of Lomela and 16% of Salonga households. Over half of the households in the Salonga area also use bows and arrows, a method reported by only 10% of households in the Lomela area. Ten percent of participants in the Lomela area hunt with dogs.

Figure 76



Most hunting is year-round (73.3% in the Lomela area and 66.7% in the Salonga area). The rest of activities take place during the rainy season (20.0% in the Lomela area and 30.8% in the Salonga area). Only three activities in both areas were exclusively practiced in the dry season.

Men access hunting and trapping areas by forest paths. The majority of participants reported walking from 1 to 5 kilometers to get to their hunting sites, including camps (figure 77). The maximum reported distance in the Lomela area was 20 km, while participants in the Salonga reported up to 25 km. Only one Salonga household reported hunting in SNP.

[174] Based on 123 valid answers.

Figure 77

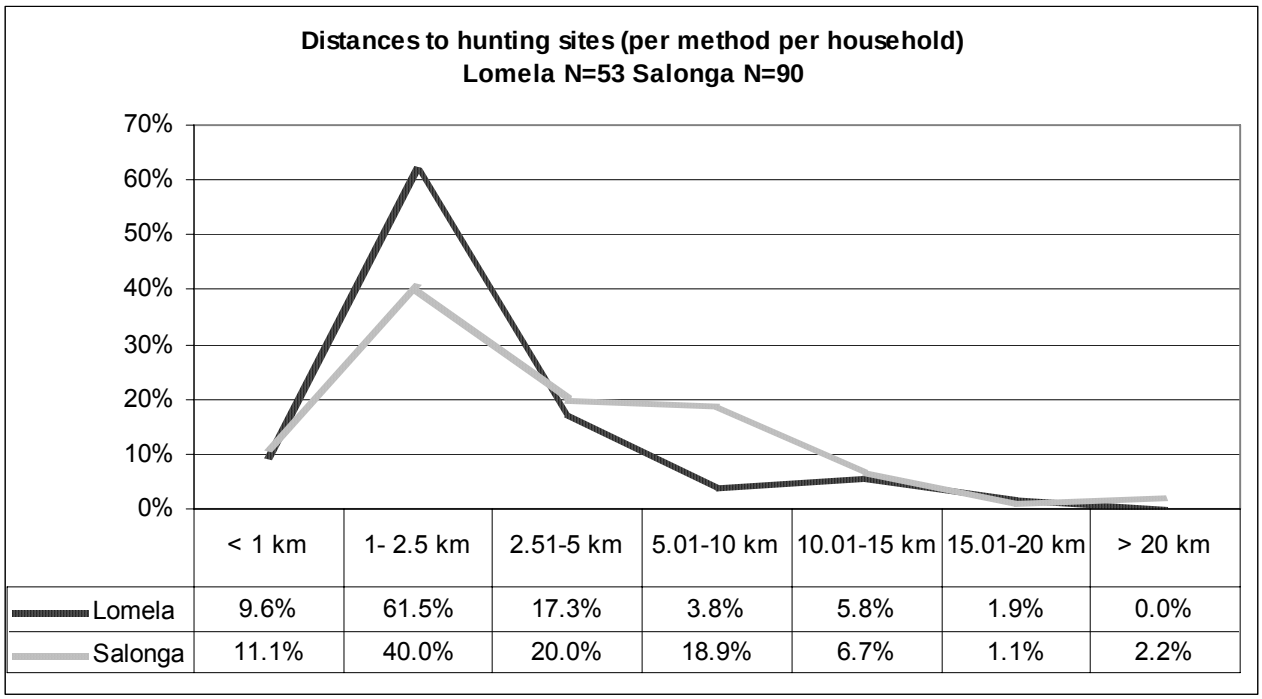


Table 59 distances (km) traveled per hunting method

instrument	Lomela	Salonga
Wire snares	0.2 -12.0	0.6- 7.5
Shotgun	0.5- 2.5	0.05- 12.5
Traditional traps	0.2- 20.0	0.8- 15.0
bow and arrow	1.0- 12.0	0.6- 25.0
Dogs	0.42- 7.5	n/a

Distances between village homes and hunting sites varied according to method. Variation in distances reported for each method was high, particularly for trapping in the Lomela River area and bow and arrow hunting in the Salonga area (table 59). Households in the Lomela River area reported traveling shorter distances (on average, 2.05 km less) than households in the Salonga area when hunting with shotguns and bow and arrow as well as for trapping.

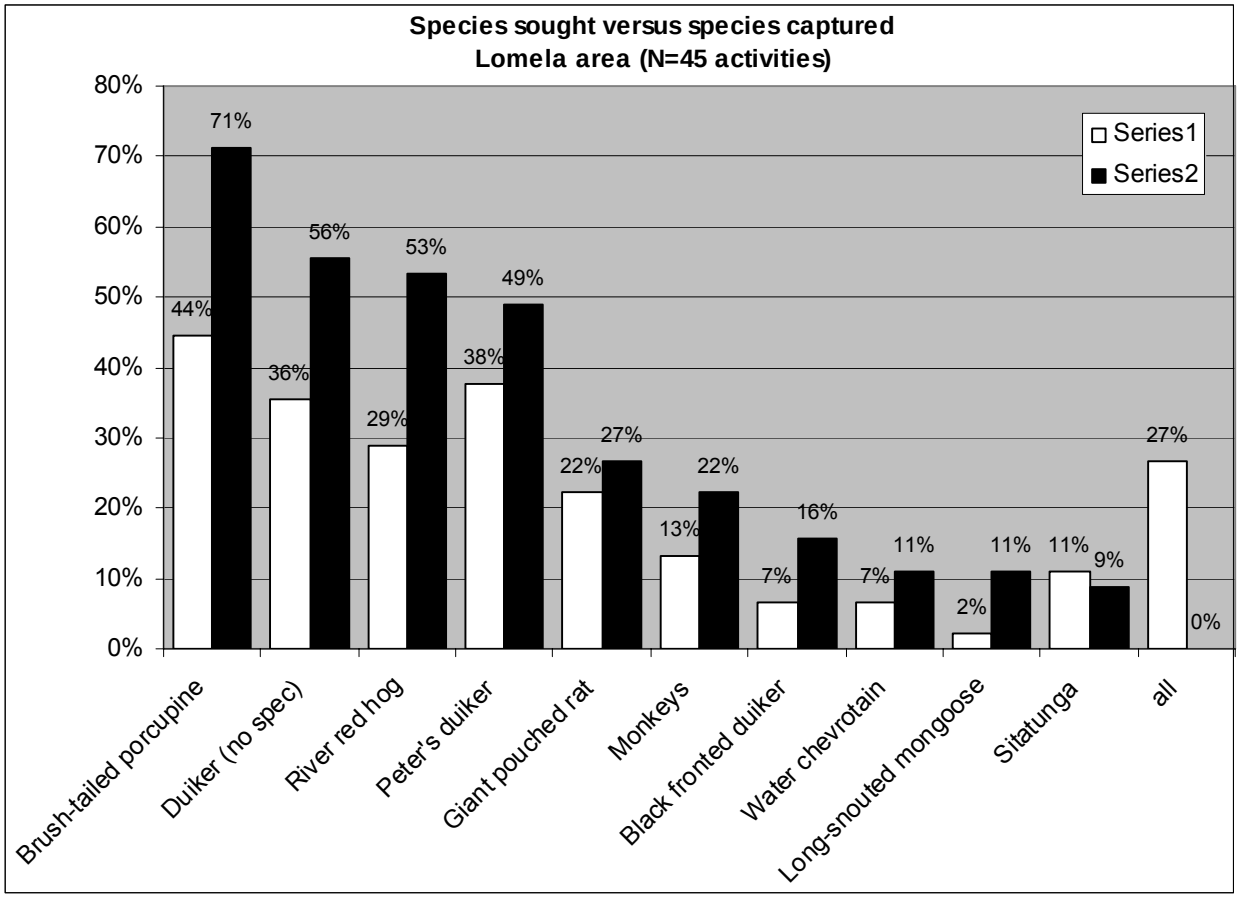
Households that reported hunting with firearms, reported owning, on average, one shotgun, with 5 to 50 cartridges available as ammunition. Between 1-6 dogs were used by the four Lomela households that hunt with dogs. The number of wire snares, arrows, and traps reported by households is included in table 60.

Table 60 Instruments per household Salonga and Lomela areas

	Households Salonga (N=51)			Households Lomela (N=39)		
	cables (N=8)	arrows (N=29)	traps (N=35)	cables (N=8)	arrows (N=4)	traps (N=23)
10 and under	2	27	2	4	4	5
11-20	4	0	8	0	0	4
21-30	0	0	6	1	0	2
31-40	1	1	2	1	0	0
41-50	1	0	3	1	0	5
51-60	0	0	0	1	0	1
61-70	0	0	2	0	0	3
71-80	0	0	2	0	0	0
81-90	0	0	2	0	0	1
91-100	0	0	2	0	0	1
over 100	0	1	8	0	0	1

Species sought by Lomela River hunters and trappers include brush-tailed porcupine (eiko, *Atherurus africanus*), Peter's duiker (mbengele, *Cephalophus callipygus)*, unspecified duikers (*Cephalopus* spp.), river red hog *(Potamocherus porcus)*, and giant pouched rat or Gambian rat (motomba, *Cricertomys gambianus)*. Twenty-seven percent of households reported no preference, stating that they hunt and trap all species. In terms of species captured, brush-tail porcupine also ranks first (73%), followed by unspecified duikers (56%), river red hog (53%), Peter's duiker (49%), and giant pouched rat (27%). Figure 78 compares species sought and species actually captured in the Lomela area.

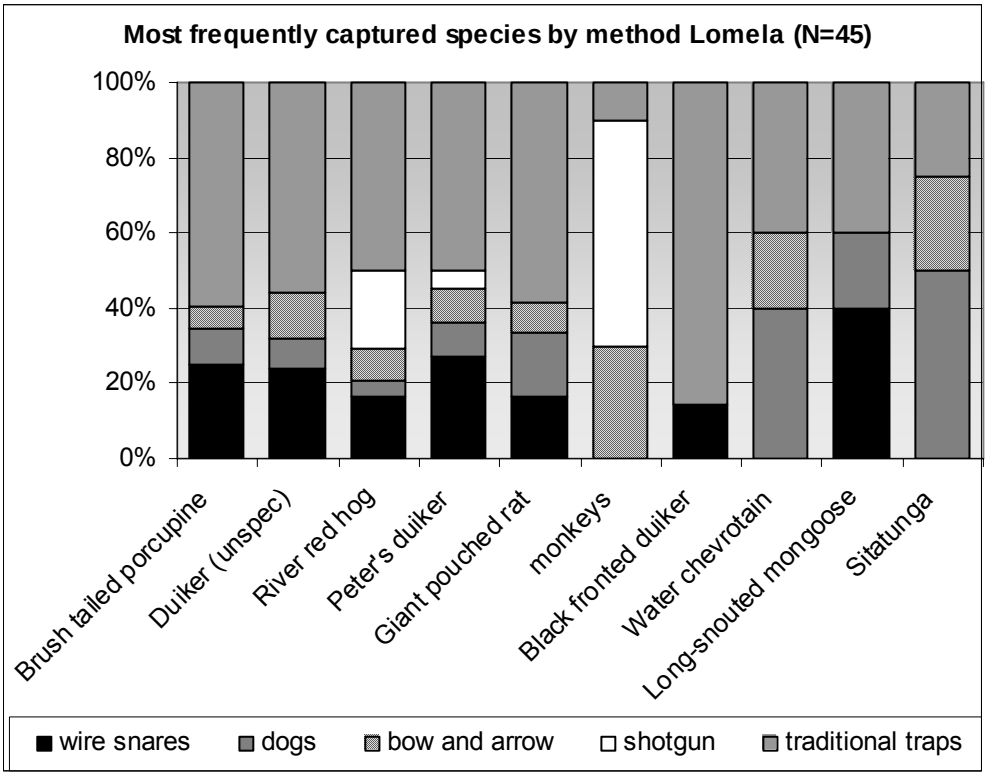
Figure 78[175]



Species captured varied according to methodology. Firearms are for the most part used for monkeys and sometimes river red hogs, while traps are used for terrestrial species like duikers. Sitatunga *(Tragelaphus spekei)* and water chevrotain *(Hyemoschus aquaticus)* were more often associated with the use of dogs. Methods used to capture the ten principal species mentioned by hunters in the Lomela River are summarized in figure 79.

[175] Other species captured in the Lomela River area included yellow backed duiker (mbende, *C. silvicultor*), snakes, bay duiker *(*nkulupa, *Cephalophus dorsalis)*, (6.7%), turtles (6.7%) red duikers *(Cephalophus spp*), pangolin *(*kalabonyo, *Smutsia triscuspis*) (both 4.4%), leopard *(Panthera pardus)* and African civet (djo or liobo, *Civetta vivrera)* (both reported by 2.2% of households).

Figure 79



Hunters in both river areas seek and catch similar species. Differences were found in terms of households that reported no preference in what they seek, saying their activities target all species (27% in the Lomela versus 38% in the Salonga area). Some differences also were found in terms of species caught, like in the case monkeys, mongoose, and red duikers. Monkeys are sought almost as much in the Salonga area as in the Lomela (6.4% versus 6.7% of households), but not caught as often (9.0% versus 22.2%). The long-snouted mongoose (bolia, *Herpestes naso)* while not among the principal species sought in Salonga, ranked eighth among species most often caught in the Lomela area (11.1% households). Red duikers *(Cephalophus spp)* also were not among the principal species sought, but ranked tenth among the most often caught by households in the Salonga area (11.5% of households). Figure 80 compares species most often sought and captured in the Salonga River area. Figure 81 summarizes methods used to capture the ten principal species in this area.

Figure 80

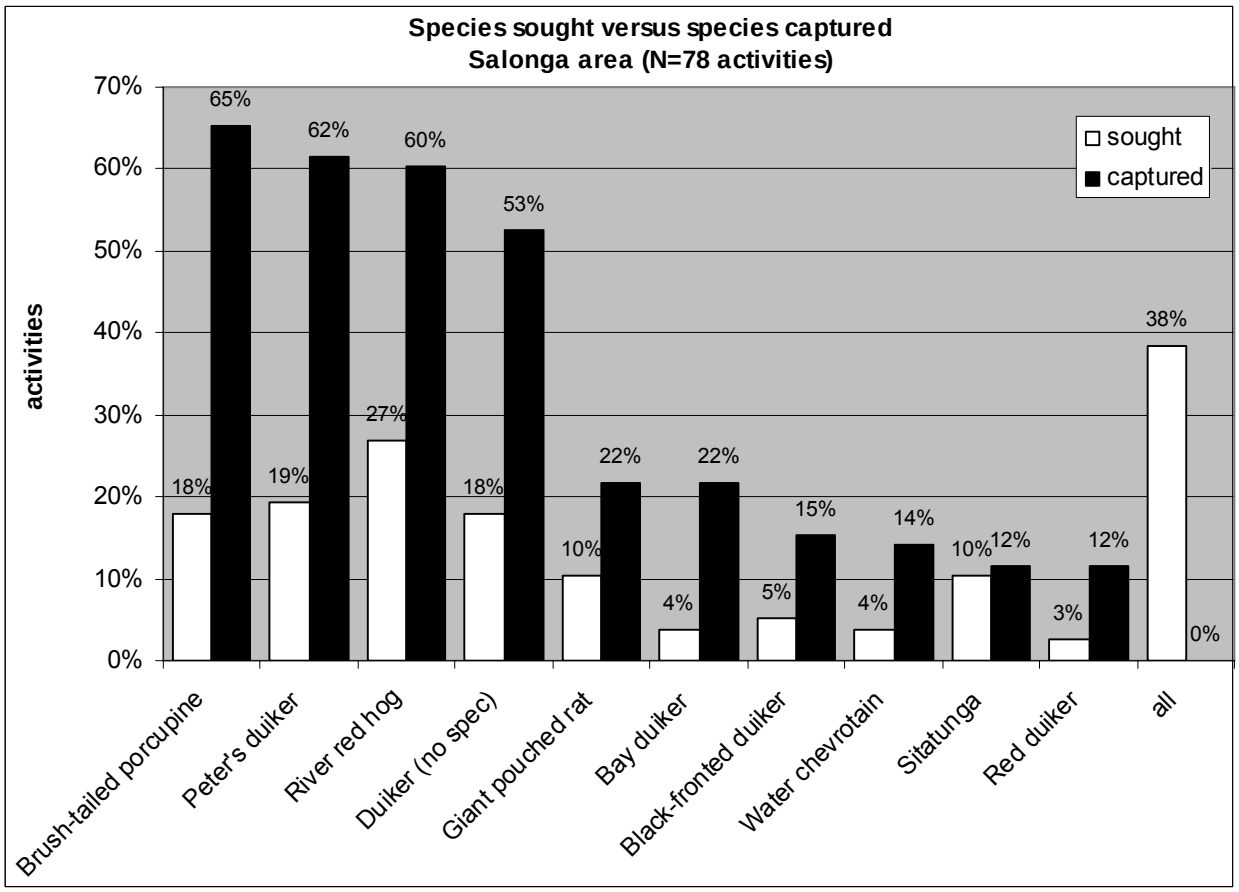


Figure 81

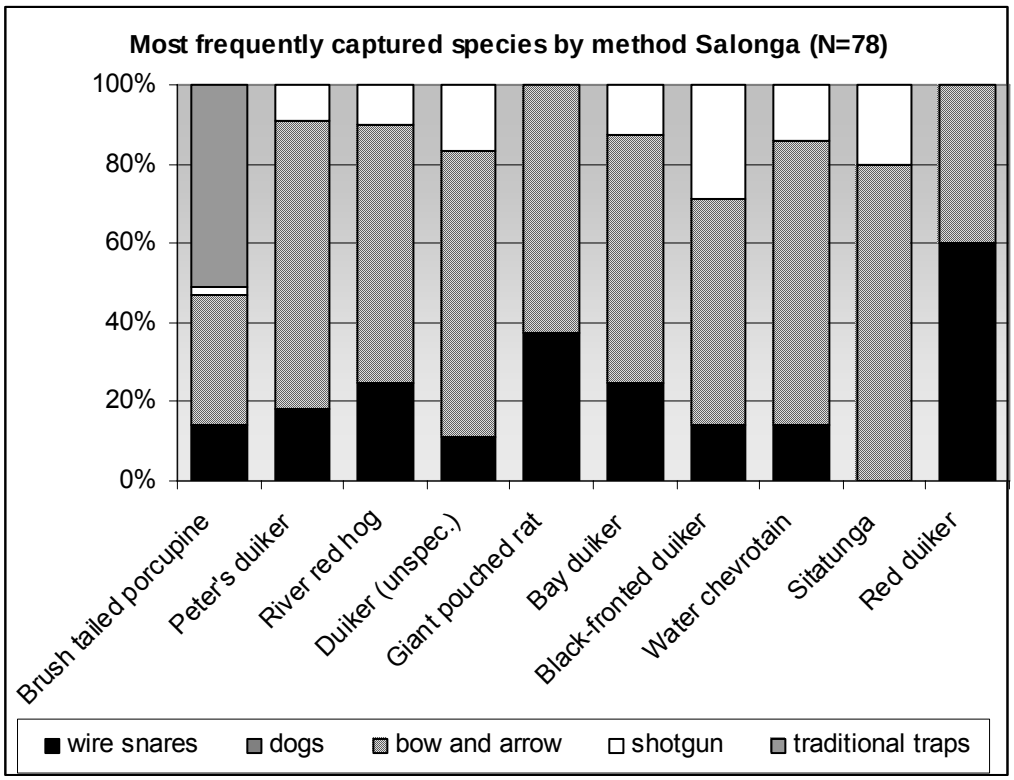
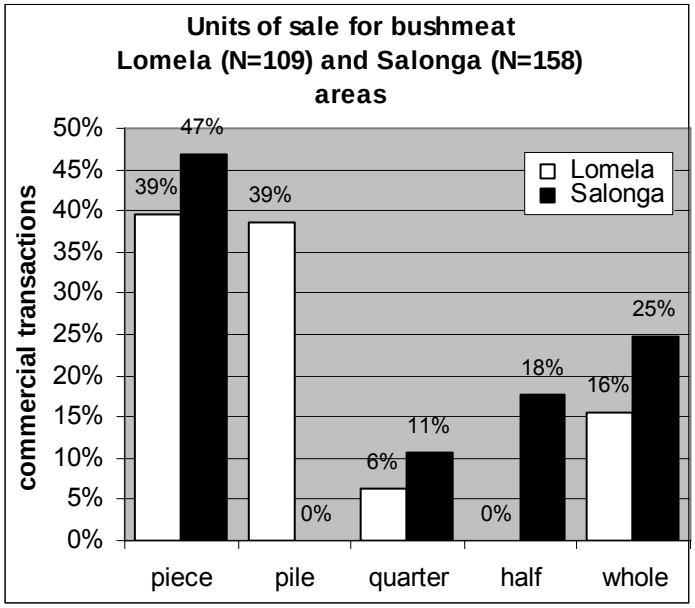


Figure 82



Revenue from hunting

Ninety-five percent of hunting households in Lomela and 88% in Salonga commercialize a portion of their capture. These percentages are higher than those reported by households that commercialize a portion of their fish catch (84% in Lomela and 80% in the Salonga)[176], a trend observed in the territory of Oshwe as well.

Participants in the Lomela area reported selling between one and five species, while in the Salonga area the numbers reported were between one and six. The average number of commercialized species was higher in the Salonga area (3.2, SD=1.1) than Lomela (2.8, SD=1.1), and more often involved larger units of sale. Over 50% of transactions in the Salonga area involved the sale of entire animals or halves or quarters, while in Lomela 78% of trade involved smaller units such as piles or stacks of small pieces of bushmeat. This difference may be partially related to where bushmeat is sold. In the Lomela area, 91.3% of transactions take place in the same village and only 2.9% in larger markets, while 13.9% of sales in Salonga take place in larger markets. The higher number of traded species and larger units of sale in the Salonga river area (locally called "epese" or "halves" system) may indicate higher overall volumes of bushmeat commerce to the reported detriment of household consumption of meat. Figure 82 includes the proportion of transactions per unit of sale for both areas.

Tables 61 and 62 present the species most frequently sold by households in the Lomela and Salonga river areas, as well as their unit prices. In the Lomela area, prices for piles or stacks and pieces at the village started at 30 FC (about $0.07) and went up to 50 FC ($0.11), while prices in larger markets ranged from 500-1000 FC ($1.11 to $2.22).

Table 61 Most frequently sold species and unit prices for Lomela River area

Species	% households (N=37)	Piles and pieces[177]	Quarter of carcass	Whole
River red hog	64.9	30-50FC	n/a	n/a
Peter's duiker	56.8	30- 50FC	400- 800FC	1500-3000FC
Bay duiker	45.9	30- 50FC	n/a	n/a

Prices in the Salonga area were higher, and fell within a wider range than in the Lomela area. For example, prices of piles and pieces of bushmeat in the Lomela area ranged between 30-50 FC for all reported species, with an average price of 39.25 FC (N=80, SD=10.0). Prices for pieces in the Salonga area ranged from 10-1500 FC, with an average price of 304 FC (N=66, SD=381.9).

Table 62 Most frequently sold species and unit prices for Salonga River area

Species	%	Piece	Quarter of	Half of	Whole

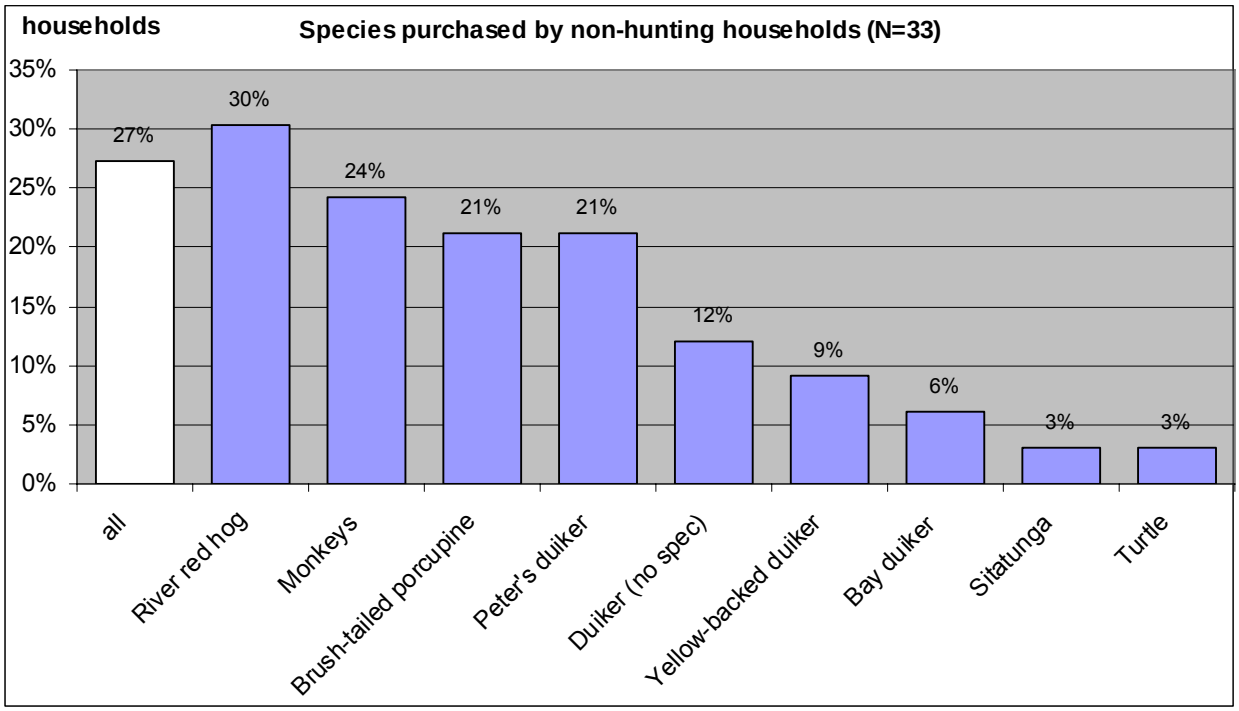
[176] Compare also with collection of NTFP, where only 28% of households that reported this activity mentioned trading them.

[177] Same range of prices for both measures.

	households (N=45)			carcass	carcass	
		Village	Market			
Peter's duiker	73.3	50- 700FC	50-1000FC	500-600FC	500-1000FC	700-1000FC
River red hog	68.9	50-1500FC	500-1000FC	500-1500FC	1000 FC[178]	1000-2000FC
Bay duiker	64.4	50- 800FC	500-1500FC	600FC[179]	500-1200FC	700FC[180]

Non-hunting households purchase bushmeat from local hunters and in some cases from hunters in neighboring villages. Thirty percent of purchasing households reported buying river red hog, monkeys (24%), brush-tailed porcupine (21%) and Peter's duiker (21%), while 27% expressed no preference (figure 83).

Figure 83



Revenue from hunting and trapping was higher in Salonga than in Lomela, during all seasons. In Lomela, 39% of households reported selling bushmeat only during the rainy (high) season, while only 21% of households in the Salonga area reported the same (figures 84 and 85).

[178] Only one household reported selling in halves.
[179] Only one household reported selling in quarters.
[180] Only one household reported selling whole.

Figure 84

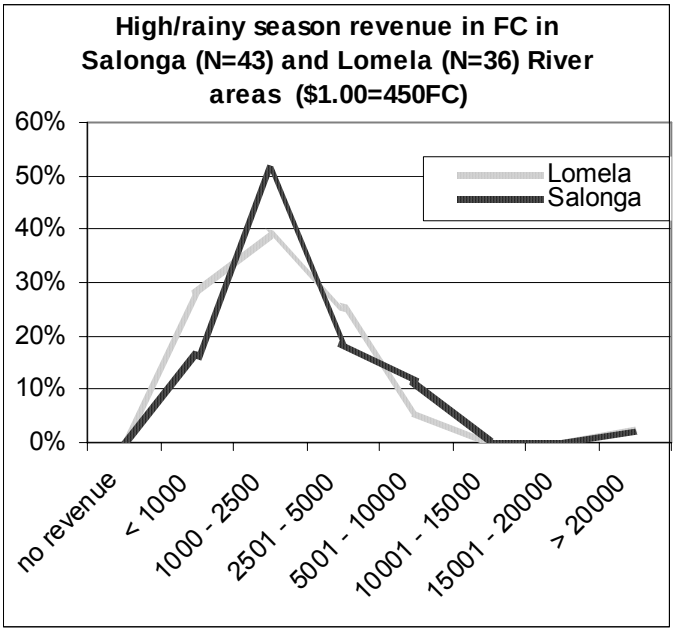
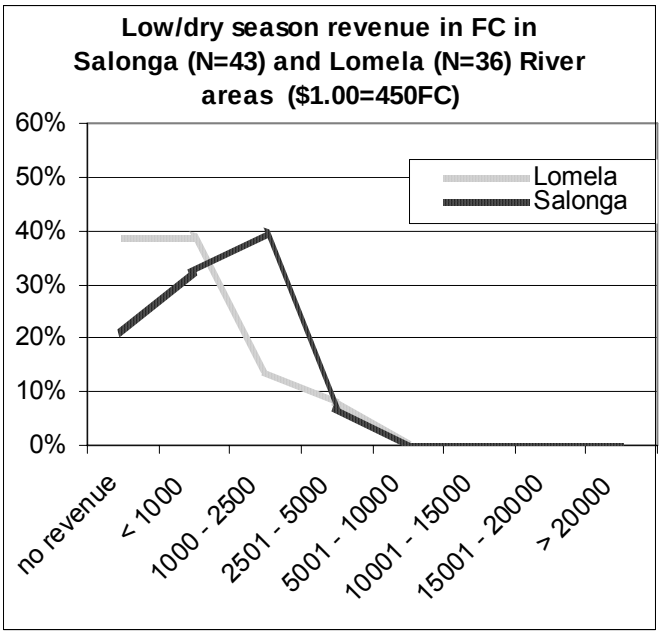
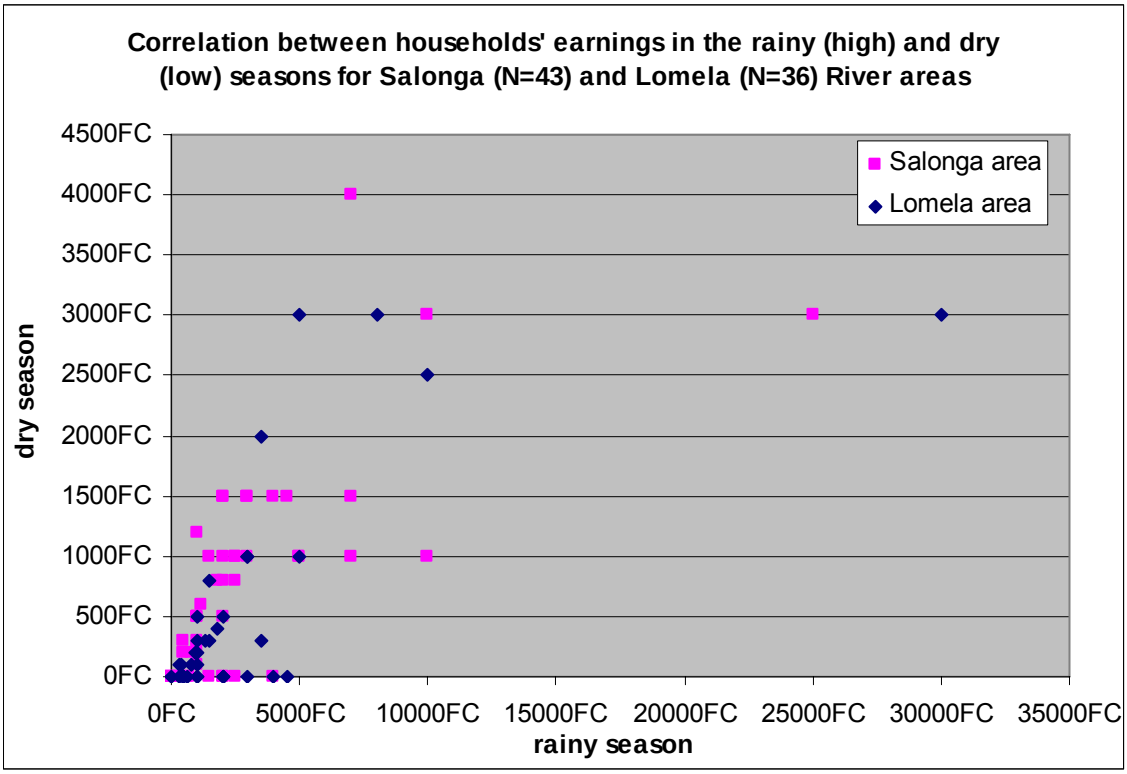


Figure 85



Higher gains in the high (rainy) season often, but not always, translated to higher profits in the low (dry season). A correlation of 0.70 was found between profits reported by Lomela area households during the high season and low/dry season. In the Salonga area the correlation was of 0.67 (figure 86)

Figure 86



Consumption of bushmeat

In terms of consumption, households in the Lomela area reported eating between 1-7 different species, while households in the Salonga area reported between 1-6, with both areas consuming an average of 3.2 species by household (Lomela SD=1.53, Salonga SD=1.19). Species most frequently consumed include brush-tailed porcupine, river red hog, and Peter's, bay, and blue duikers (table 63).

Table 63 Most often consumed animal species in Salonga and Lomela River Areas[181]

species	% households Lomela (N=60[182])	% households Salonga (N=63[183])	Weekly consumption high season[184]	Weekly consumption low season
Brush-tailed porcupine	70.0	69.8	Whole (L) 1-10 (S) 2-40	Whole (L) 0-3 (S) 0-20
river red hog	56.7	52.4	Pieces (L) 2-24 (S) 1-70	Pieces (L) 0-10 (S) 0-7
Peter's duiker	38.3	36.5	Pieces (L) 2-90 (S) 1-70	Pieces (L) 0-20 (S) 0-21
Bay duiker	30.0	38.1	Pieces (L) 2-21 (S) 1-70	Pieces (L) 0-9 (S) 0-21

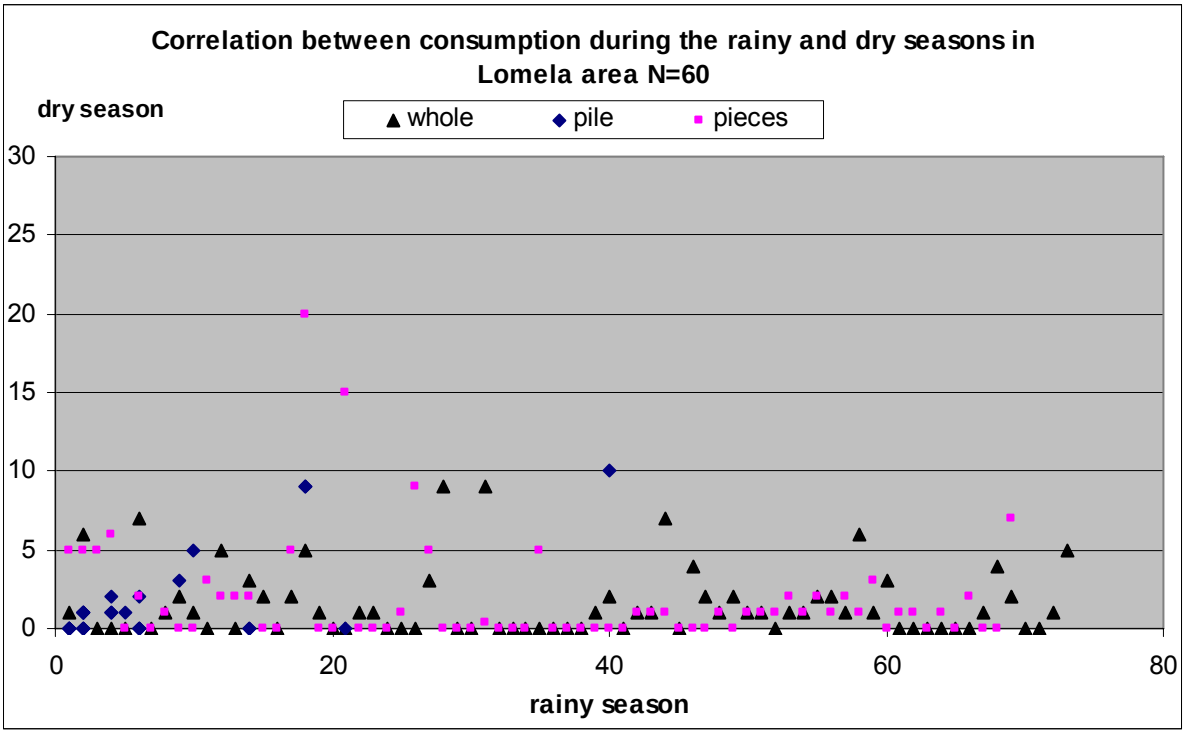
[181] Other species reported included unspecified duikers (6.7%% Lomela, 17.5% Salonga), giant pouched rat (16.7% Lomela, 19.0% Salonga), black fronted duiker (6.6% Lomela, 11.1% Salonga), monkeys (23.3% Lomela, 11.1% Salonga), "makako" (participants differentiated between other monkeys and "makako") (10.0% Lomela, 6.3% Salonga), yellow backed duiker (5.0% Lomela, 3.2% Salonga), sitatunga (8.3% Lomela, 3.2% Salonga), pangolin, (3.2% only Salonga), lonkonga, mengeya, black mangabey, nsoli (*Cercopithecus ascanius),* and snakes (1.6% each, only Salonga).
[182] Includes households that do not hunt but reported consumption.
[183] Includes households that do not hunt but reported consumption.
[184] Most frequently units of measures were used in each case. Pieces included units identified as "portions" and "piles."

Table 63 Most often consumed animal species in Salonga and Lomela River Areas[181]

species	% households Lomela (N=60[182])	% households Salonga (N=63[183])	Weekly consumption high season[184]	Weekly consumption low season
Blue duiker	25.0	30.2	Whole (L) 1-5 (S) 1-70	Whole (L) 0-2 (S) 0-10

In the Lomela area, the most frequently used measurements of household consumption were piles and pieces (49.2% of cases), while in the Salonga area households referred to consumption of whole animals (49.3% of cases). Weekly consumption decreases during the low (dry) season, but households with greater consumption of bushmeat in the rainy season also consume relatively more during the dry season (r=0.88 in the Lomela area and 0.94 in the Salonga area). As figure 87 shows, consumption during the low season decreases by a third or more in every household in the Lomela area.

Figure 87

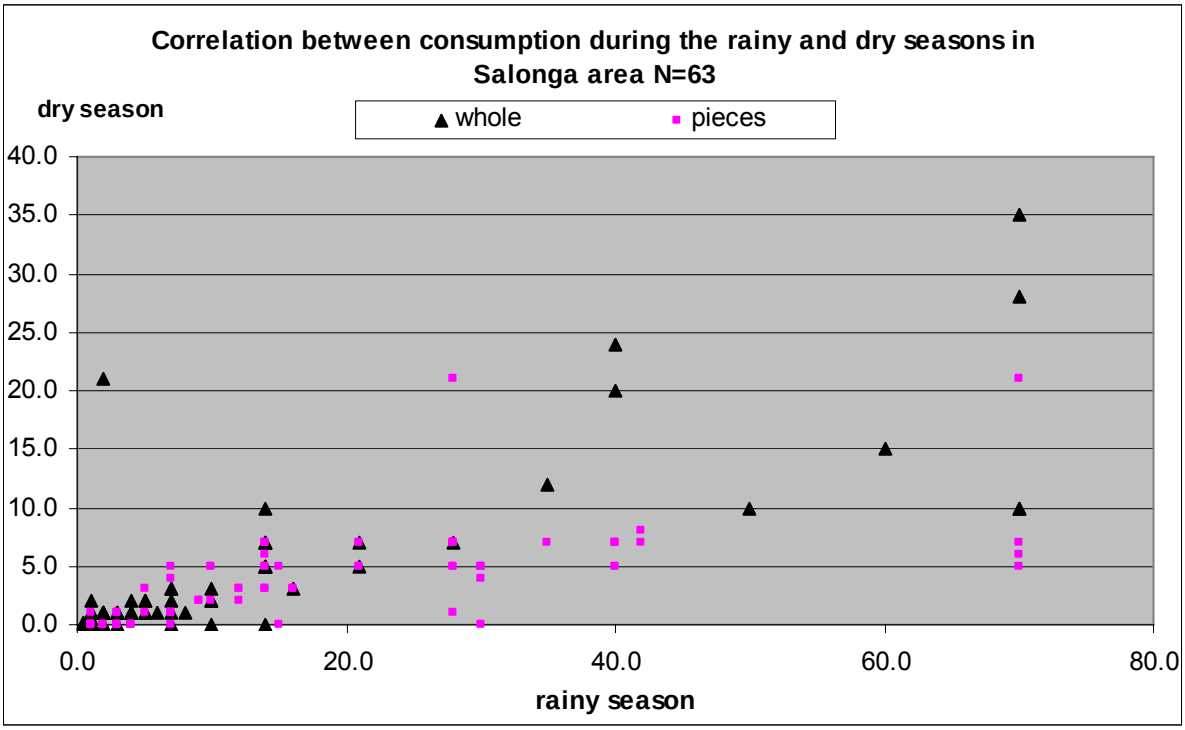


Consumption during the dry season decreases by 71.7% in the Lomela area. In this area, a correlation of
-0.95[185] was found between seasonal consumption of fish and bushmeat, indicating a marked shift in activities according to season.

While consumption also decreases in the Salonga area, more households eat some bushmeat year round, with 44.4% reporting no consumption during the dry season (figure 88). The correlation between seasonal consumption of fish and bushmeat in the Salonga is of -0.98[186].

[185] Based on percentage of reduction in consumption at the household level.
[186] Based on percentage of reduction in consumption at the household level.

Figure 88



Food prohibitions were reported by 42.3% of households, 90.8% of which relate to custom, 6.9% to health beliefs, and 2.3% to personal choice. Over half of prohibitions (58.6%) apply only to women. The most often mentioned animals were leopard, long-snouted mongoose, and snakes (table 64).

Table 64: Principal taboo species of Lomela and Salonga River areas

Species[187]	% of households (N=86)
Leopard *(Panthera pardus)*	29.1
Long-snouted mongoose *(Herpestes naso)*	22.1
Snakes	9.3

Locally perceived changes in hunting activities

In total, 61.7% of Lomela households and 76.2% Salonga households mentioned changes in hunting. Of these households, the principal change cited is decreasing wildlife numbers articulated in terms of animals becoming rare, decreased yields per hunting trip, and the need to increase trap numbers in order to capture enough game (100% of households in both rivers). The dates provided for the onset of changes varied greatly between households, but corresponded in the majority to the decades of the 1990s and 2000s (56.3%). During group discussions participants also linked changes to three historical events: the creation of Salonga National Park, an increase in poaching in the late 1970s and early 1980s that led to the disappearance of elephants, and the recent civil war (1996-2002), referred to as the *"war of the AFDL[188]"*, by respondents.

[187] Other species mentioned as taboo included eleka (5.8%), golden cat *(Felis laurata)* (4.7%), bonobo (4.7%), nkoba (3.5%), and African civet (2.3%).

[188] Alliance de Force Démocratique pour la Libération

Sixty one point seven percent (61.7%) of households in the Lomela River area and 76.2% in the Salonga River area perceive changes in hunting activities. The majority of these changes concern increased difficulty finding wildlife, a problem participants articulate in terms of animals becoming rare, decreased yields per hunting trip, and the need to increase the number of traps in order to catch enough game. 93.1% of changes mentioned in the Lomela area and 96.6% in the Salonga area were of this nature.

Regarding the decreased availability of game, the most often mentioned causes by local households concerned changes in hunting practices, comprising 56.3% of cases in the Lomela and 55.2% in the Salonga areas (table 65). These changes include the increased use of firearms, the prolongation of the hunting season, and the replacement of collective hunting, a subsistence activity, by individual hunting for commercial bushmeat trade.

Table 65 Causes associated with the decrease of wildlife (N=85)

	% Lomela	% Salonga
Changes in hunting practices	56.3	55.2
Salonga National Park	16.7	10.3
Military	11.5	10.9
Poaching	11.5	17.6
Demographic pressure	1.7	0.0
Supernatural	0.6	1.2
Lack or loss of instruments	0.6	0.0
Lack of laws and regulations	0.0	2.4
Unknown	0.0	1.8

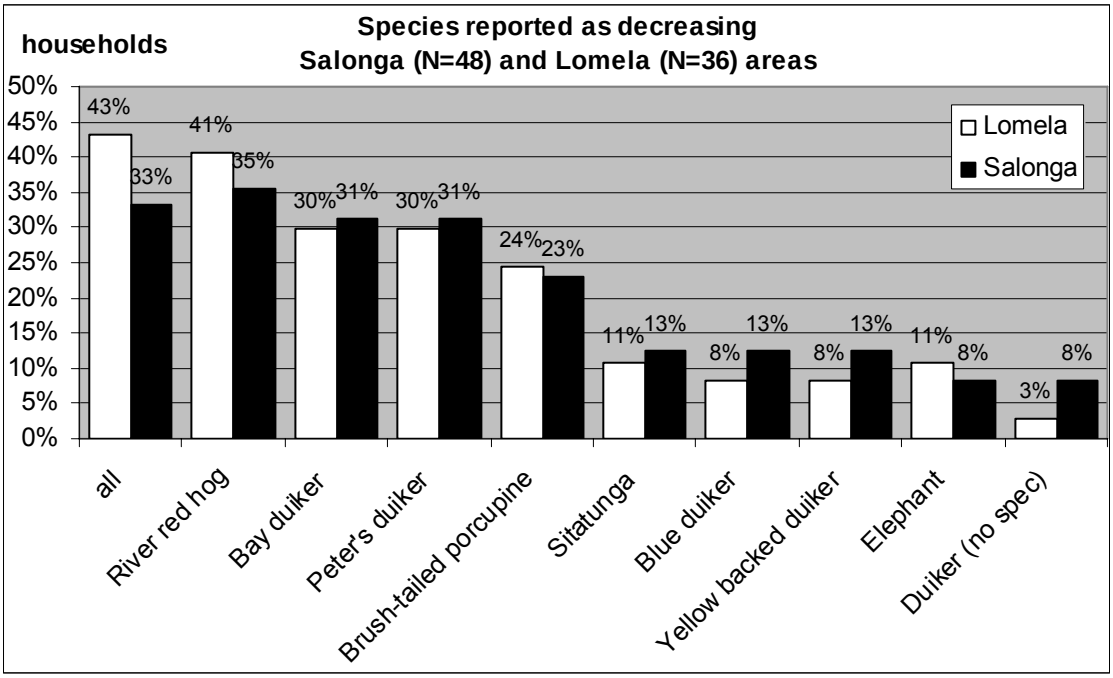
The presence of SNP, which limits hunting and trapping areas, was the second most mentioned cause of the decrease of game. Other important causes of the change are poaching and hunting by military personnel. Poachers were often associated with the disappearance of large game like elephants and buffalos.

“In 1980 poachers massacred elephants” (015 Malela)

A limited percentage of households also referred to a lack of laws and regulations governing hunting practices, demographic pressure, and the impact of the supernatural.

Forty-three percent (43%) of households in the Lomela area and 33% in Salonga said all species were decreasing in numbers. Of households citing changes to specific species the most frequently mentioned included river red hog, bay, Peter’s, blue *(C. monticola)* and yellow backed duikers, brush-tailed porcupine, sitatunga, and elephant (figure 89).

Figure 89[189]



Three households in each area spoke of the disappearance of buffalo, leopard, and forest elephant provoked by poaching activities of the late 1970s and early 1980s. One household in each area stated that river red hogs are abundant and increasing in numbers because they are not hunted enough.

The villages of Efeka (Salonga) and Ibali (Lomela) where the highest number of households reported changes in hunting activities (90% and 89% respectively), were also the communities reporting the most changes in the activity of fishing.

Changes mentioned during focus groups mirrored answers provided by households. The principal change mentioned by men and women was the decrease in game, with associated causes similar to those provided by individual households. However, in the Lomela area individual responses focused more on changes in hunting and trapping methods, while group discussion centered more on the perceived problem of hunting by outsiders, usually referred to as poaching. Table 66 presents the principal changes and their causes as identified by Lomela participants.

Table 66 Changes reported by villages in the Lomela River area (N=7) and their associated causes

		Changes			
		Decreasing wildlife (5 villages)	**Lack or loss of equipment (4 villages)**	**Abandonment of collective hunting (3 villages)**	**Outsiders hunting & trapping (3 villages)**
Associated causes	Increased numbers of equipment (e.g. firearms, wire snares)	1	0	0	0

[189] Other species mentioned were bomena (Lomela 2.7% and Salonga 6.3%), "makako", giant pouched rat (both 2.7% and 2.1%). Species only mentioned in the Salonga area included libobi, mengeya, and water chevrotain (all 4.3%), mangala, pangolin, and wolf's monkey *(Cercopithecus mona wolfi)* (all 2.1%). Species only mentioned in the Lomela area included bongunzu, koba and moongo (all 2.7%).

		Changes			
	Poaching	4	0	0	0
	Introduction of new technology (e.g. firearms)	1	0	0	0
	War	1	1	0	2
	SNP	3[190]	0	1	0
	Increased numbers of local hunters.	1	0	0	0
	Absence of merchants of hunting equipment and materials	0	4	0	0
	Need to generate income	0	0	0	1
	Decrease of wildlife	0	0	1	0

While many individual and some focus group participants in the Lomela area associate an increase in equipment used for hunting as a cause of declining wildlife availability, paradoxically groups in four villages brought up the lack of adequate hunting hardware due to the absence of traders in their area as a separate change. Reduced trade in hunting and trapping implements is associated with the deterioration of roads and the cessation of boat services linking the area with larger towns and markets. Lack of hunting materials was mentioned only one village in the Salonga area.

In the Salonga area, focus group discussion concerning decreased game availability focused on changes in practices by local hunters, both in terms of increased number of instruments and the introduction of new techniques. Poaching was also cited as a cause of the change. One village in each the Salonga and Lomela areas linked the decline to the abandonment of collective hunting, while participants from the village of Botsima (Lomela) said that collective hunting ended in the mid-1980s with the death of the last traditional leader versed in the practice. Table 67 includes the principal changes and their causes identified by participants in the Salonga area.

Table 67 Changes reported by villages in the Salonga River area (N=5) and their associated causes

		Changes		
		Decrease of game (5 villages)	**Abandonment of collective hunting (2 villages)**	**Bushmeat commerce (2 villages)**
Associated causes	Increased numbers of equipment (e.g. firearms, wire snares)	4	0	0
	Poaching	3	0	0
	Introduction of new technology	1	0	0

[190] Villages of Ibali, Yafala and Bokela Kankonde.

		Changes		
		Decrease of game (5 villages)	**Abandonment of collective hunting (2 villages)**	**Bushmeat commerce (2 villages)**
	(e.g. firearms)			
	War	1	0	0
	SNP[191]	1	0	0
	Decrease of wildlife	0	1	0
	Need to generate income	0	1	2

The presence of the Salonga National Park appears to impact villages in the Lomela more than in the Salonga area. The SNP was mentioned both as a change by itself and as a cause of other negative changes both in individual and group responses.

[191] Village of Lonkanda

E. *Access to land and resources*

Local households have open access to almost all natural resources located within their village's forest and waters. Exceptions include cemeteries, where no activities are permitted, certain family or clan-governed fishing zones, and agricultural fields (active and in fallow).

> *« [Locals] are free to fish in smaller rivers, but for larger ones, each family has its own site. For example, the part of the [Salonga] river where the port of Ika is, belongs to the Boonga clan, while the site called 'Ebekey'okonda' belongs to the Bompota clan."* (Men's focus group Lonkanda)

Female participants from the villages of Bamata (Salonga), Efeka (Salonga), Ilonge Centre (Salonga), and Yafala (Lomela), also specified areas within their village's forest exclusive for farming, hunting, and the collection of NTFPs (table 30).

Table 68 Village use zones

Village	Activity	Forests' names
(S) Bamata	Agriculture	Etono nyenge
(S) Bamata	Hunting	Efeka Moyo, Lokombo ya Lokua
(S) Bamata	Collection of NTFP	Elolongo
(S) Efeka	Agriculture, hunting, collection of NTFP	Impuka, Kena, Maluku, Bonono, Ikali
(S) Ilonge Centre	Agriculture and collection of NTFP	Ilonge, Bakumo, Befomi, Esembe, Bekake, Ikumu, Betshangombe, Eteno, Ntonanka, Befio
(S) Ilonge Centre	Hunting	Efakela, Tamilela, Bokioyango, Mpushulonga, Longoyi, Mbuitape, Ikoonga, Elonga Onafe
(L)Yafala	Agriculture, hunting, collection of NTFP	Bototola, Bokakala, Isambo, Mpoke

On several occasions divergences were recorded between men and women's interpretation of access to land and natural resources in their villages. During five focus group discussions in each of the two river areas, women mentioned greater restrictions than men. Men reported higher restrictions than women in only one case in the Salonga River area, and in two in the Lomela area. Women from the Salonga villages of Bamata and Efeka said that foreigners needed to pay traditional authorities for permission to farm and hunt, while men from the same villages said permission was required but no payment was necessary. In the village of Malela, the situation was the inverse, with men stating that outsiders need to obtain and pay for authorization to farm, while women stated that only verbal, non-paid permission was required.

In the Lomela River area, discrepancies between men and women's responses were found in three villages. In the villages of Ibali and Yafala, women said outsiders needed to have permission and pay rights for agriculture, hunting, and fishing (Ibali), or hunting only (Yafala). Men said that only authorization, but no payment was necessary.

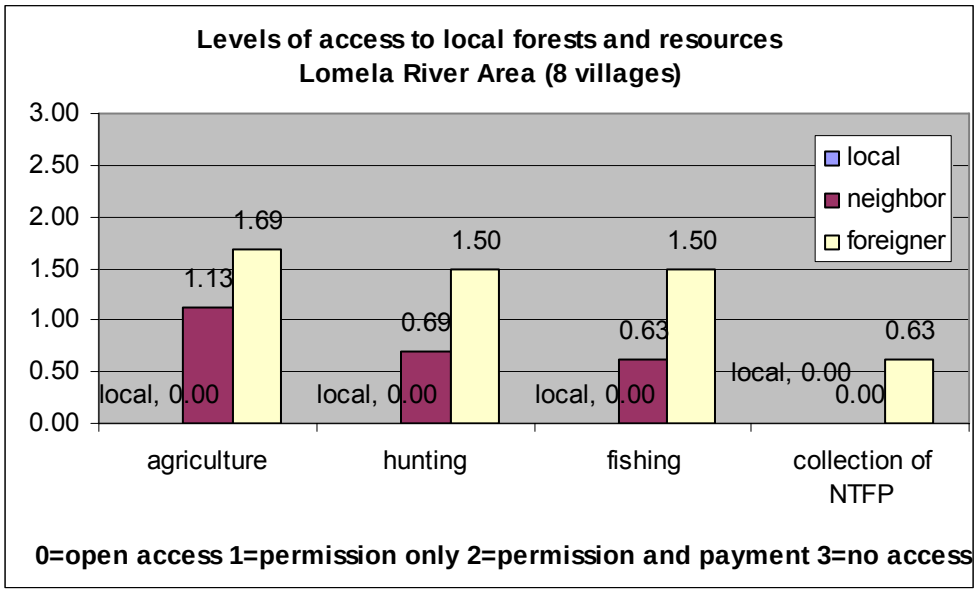
In the fishing zones of Ikomo Lomoko village, women said that neighbors were not allowed to fish, while men said that it was possible if they paid and obtained permission from local authorities. In the same village, women said that foreigners only required verbal permission to hunt and fish, while men said payment was also necessary. Lastly, the field team reported that Ikomo Lomoko residents themselves are paying for the use of "their" lands and waters. The village was displaced from its ancestral lands when SNP was created and the traditional owners of their present land continue to extract payments from Ikomo Lomoko villagers.

Participants from the villages of Efeka and Botsima, in the Salonga and Lomela areas, respectively, also mentioned that local populations were forbidden to access Salonga National Park, adding that this restriction was not honored by ICCN, speaking of: *"park guards hunt*

inside the park"(Efeka), and *"poachers that make arrangements with the ICCN chief of post"*(Botsima).

For neighbors who want to farm, hunt and/or fish in village land, only permission may be required or in some cases payment as well. Payment was more frequently required of people coming from outside the area. The strongest controls in the Lomela area concern agriculture, followed by hunting and fishing. Figure 90 shows the average level of access to land and natural resources in the Lomela River area.

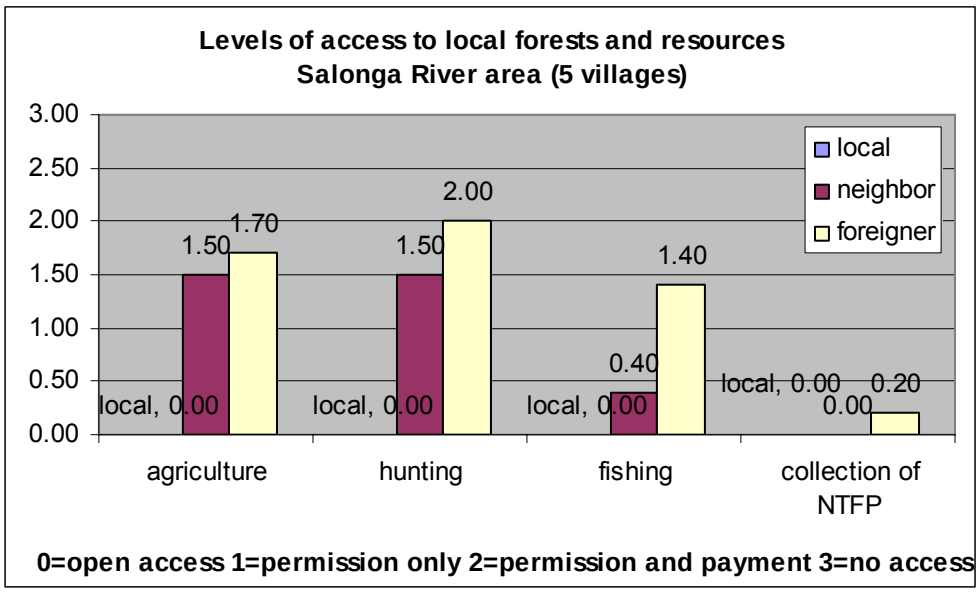
Figure 90



Differences between river areas included higher restrictions in the Salonga River area for agriculture and hunting, applying both to neighboring villages and foreigners. In the village of Efeka, for example, more restrictions exist for neighbors wanting to farm, than for foreigners. Participants in the women's focus group said that foreigners could farm if they pay rights to local authorities, but that neighbors «*Should be content to farm in their villages*».

However, access to fishing sites as well as for the collection of NTFPs was slightly more open in the Salonga than in the Lomela areas. Figure 91 shows levels of access for the Salonga River area (Appendix 6 includes individual villages' levels of access for locals, neighbors, and foreigners).

Figure 91



Even though traditional rules restrict access to neighbors and outsiders, participants reported difficulties in controlling the use of local natural resources by certain individuals and groups. Every village reported the presence of poachers, often mentioning military groups. Ten villages also reported the presence of fishermen coming from outside the area, most often mentioning people from Mbandaka, and sometimes people from neighboring villages. Table 69 includes information on every village reporting the presence of non-authorized users of their land and resources.

Table 69 Groups and individuals exploiting natural resources without permission from local traditional authorities

Village	Groups	Activities
(S) Bamata	Individuals from Kinshasa, Lodja, Ekofola	Poaching
(S) Bamata	Individuals from Bonema, Itshike, and Lodja	Fishing
(S) Efeka	military Iyanga and Bonema, and Boende	Poaching
(S) Efeka	Neighbors from Bamata and Malela Fishermen from Mbandaka	Fishing
(S) Ilonge Centre	Military from Boende	Poaching
(S) Ilonge Centre	Fishermen from Mbandaka and Lotoko	fishing
(S) Malela Centre	Military from Boende Individuals from Mbandaka	Poaching
(S) Malela Centre	Neighboring villages, fishers from Mbandaka	fishing
(L) Ikomo Lomoko	Military from Boende	Poaching
(L) Ikomo Lomoko	Libinza and Lokele fishermen from Mbandaka	Fishing
(L) Ikomo Lomoko	Merchants from Mbandaka and Bokungu	Collection of NTFP
(L) Bokela/Kankonde	Military from Boende	Poaching
(L) Bokela/Kankonde	Libinza and Lokele fishermen from Mbandaka	Fishing
(L) Besoyi	Military and poachers (no origin given)	Poaching
(L) Besoyi	Libinza and Lokele(no origin given)	Fishing
(L) Botsima	Military and poachers (no origin given)	Poaching

(L) Botsima	Individuals, Libinza from Boende	Fishing
(L) Ibali 1	Military from Bufa and Bomandela	Poaching
(L) Ibali 1	Libinza and Lokele(no origin given)	Fishing
(L) Yafala	Military from Boende, park guards	Poaching
(L) Yafala	Fishermen from Kinshasa and Mbandaka Libinza and Lokele (no origin given)	Fishing
(L) Ibali	Military from Bokungu and Boende	Poaching
(L) Ibali	Neighbors from Bosengo and Basama	Collection of NTFP
(L) Impete Kadumba	Military from Boende and Ikela	Poaching

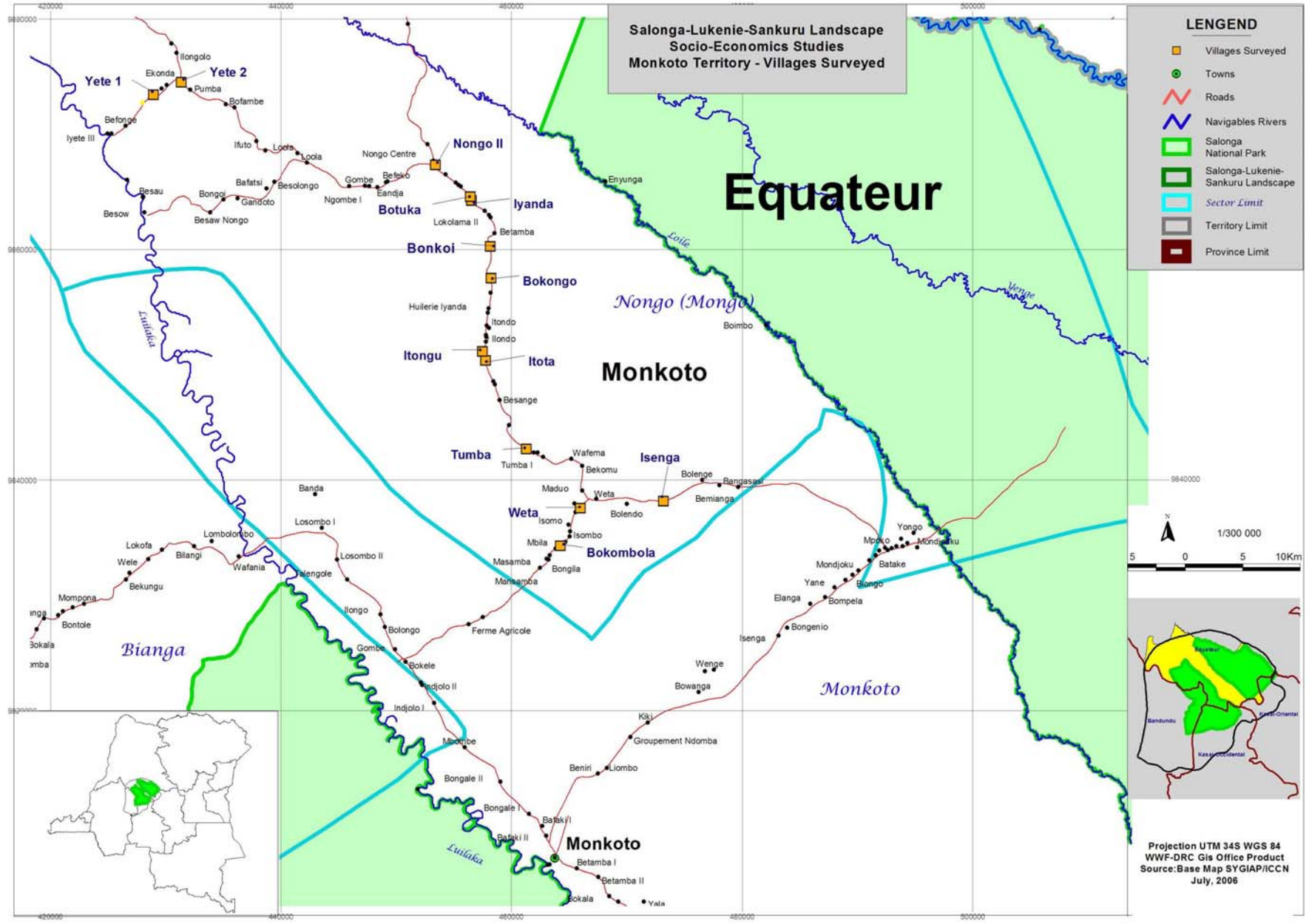
Seasonal versus year-round access: Households in the Salonga area appear to access and exploit local resources more intensively than households in the Lomela area, where activities and consumption of both game and fish seem to follow more seasonal patterns. In the Salonga area, more households reported consuming the yield of their activities (bushmeat, fish, etc.) all year-round and in greater volumes and numbers than their Lomela area counterparts. The apparent intensity of exploitation may relate to the perception of greater negative changes in resource availability reported in the Salonga area, particularly in proximity to the river, in comparison to Lomela. The awareness of resource limitations in the Salonga area may be reinforcing local controls in terms of access to local resources by hunters from outside the village.

Conversely, a higher percentage of households in the Lomela area reported the commercialization of both fish and game.

Monkoto Territory

This section includes results from 13 villages located northwest of the town of Monkoto, between the two blocks of Salonga National Park.

Province	Equateur
District	Tshuapa
Territory	Monkoto
Sector	Nongo
Groupements	Mpenge, Iyonganongo, Iyongo Bololongo, Etete
Villages	Bokombola, Bokongo, Bonkoy, Botuka, Isenga, Itongu, Itota, Iyanda, Iyete I (Bankanya), Iyete II (Mpuma), Nongo II (Boloki), Tumba, Weta


Salonga-Lukenie-Sankuru Landscape
Socio-Economics Studies
Monkoto Territory - Villages Surveyed
LENGEND
Villages Surveyed
Towns
Roads
Navigables Rivers
Salonga National Park
Salonga-Lukenie-Sankuru Landscape
Sector Limit
Territory Limit
Province Limit
Equateur
Monkoto
Nongo (Mongo)
Bianga
Monkoto
Luilaka
Lotile
Venge
Yete 1
Yete 2
Ilongolo
Ekonda
Pumba
Bofambe
Befonge
Iyete III
Ifuto
Loola
Nongo Centre
Nongo II
Befeko
Gombe
Eandja
Ngombe I
Botuka
Iyanda
Lokolama II
Betamba
Bonkoi
Bokongo
Huilerie Iyanda
Itondo
Ilondo
Itongu
Itota
Besange
Tumba
Tumba I
Wafema
Bekomu
Isenga
Bolenge
Bangasasa
Bemianga
Maduo
Weta
Bolendo
Isomo
Isombo
Mbila
Bokombola
Masamba
Bongila
Mansamba
Banda
Losombo I
Losombo II
Lombolombo
Lokofa
Bilangi
Wele
Wafania
Bekungu
Mompona
Bontole
Bokala
Ilongo
Bolongo
Ferme Agricole
Gombe
Bokele
Indjolo II
Indjolo I
Mbombe
Bongale II
Bongale I
Batiki I
Batiki II
Monkoto
Betamba I
Betamba II
Bokala
Yala
Enyunga
Boimbo
Yongo
Mpoko
Mondjoku
Batake
Mondjoku
Yane
Blongo
Elanga
Bompela
Bongenio
Isenga
Wenge
Bowanga
Kiki
Groupement Ndomba
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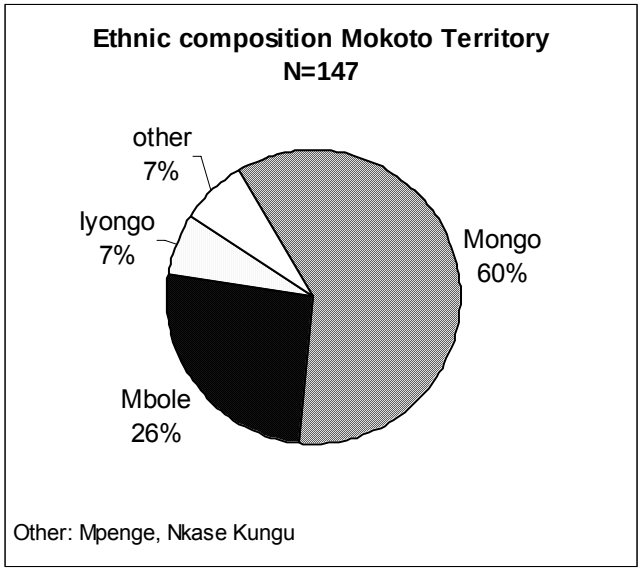
1/300 000
5 0 5 10Km
Projection UTM 34S WGS 84
WWF-DRC Gis Office Product
Source:Base Map SYGIAP/ICCN
July, 2006

A. Cultural and Historical Context

The majority of participants from the Territory of Monkoto belong to the Mongo (59.9%) and Mbole (25.9%) ethnic groups (figure 92). Sixty-one (61) different clans were identified in the area including Mpak'efomi (six families), and Bakako Bamoko and Bokoto (five families each).

Figure 92



Oral histories indicate that local Mongo and Mbole groups located between the Loile and Luilaka Rivers migrated into the area in the late XIX or early XX centuries. The groups now living in the area came originally from Safala[192], located in the vicinity of Mbandaka, the same area of origin for several of the groups living along or close to the Salonga and Lomela Rivers. The founders of the village of Bonkoy, for example, descended from the same seven brothers that separated in Watsikengo and founded the groupement of Nong'okwa in the Salonga River area.

"They were a group of seven brothers that dispersed in different directions…the Nong'okwa crossed the Salonga [River]" (men's focus group Bonkoy, Territory of Monkoto)

"Each brother refused to follow their father's order and each left in a different direction…one group crossed the Salonga [River] to go to Monkoto." (men's focus group Efeka, Salonga River area, in the Territory of Boende]

According to participants, Batetela and Lokele groups also left the area of Safala around the same time to establish themselves along the Congo and Ruki rivers.

Of the four Mongo groups that first arrived in the area between the Luilaka and Loile rivers, two left because of internal disputes and moved north to the territory of Boende. The remaining two became the present-day groupements of Etete and Mpenge. Groups that arrived later were allowed to settle in the area because of their shared roots with the first groups.

"Forced to move again because of [ethnic] war, the chief of Mpenge allowed us to settle in his groupement, after acknowledging our common origins." (men's focus group Bokombola)

The area occupied by these migrants from Safala was sometimes obtained through war with earlier established groups, as in the case of the village of Weta:

"After realizing that their forest wasn't [large] enough, our ancestors fought the clan of Mpongo to get the forest we now occupy." (men's focus group Weta).

The Luilaka River was first explored by Von François, who arrived in Iyete (Port) in 1885[193].The first contact with Europeans reported by participants corresponded to the arrival of colonial administrators that forced the villages of the groupements of Etete and Mpenge to relocate to

[192] Participants from Bokombola and Tumba mentioned that their ancestors migrated to Safala escaping the slave trade in the north.
[193] Boelaert E., et.al (1996:11)

assist with the construction of roads in the 1930s and 1940s (table 70). While participants referred to them as "whites," some of these administrators may have been "white blacks," *("blancs noirs")* as Congolese working for the colonial administration were known (Boelaert, et.al. 1996:110)

> *"It was around 1935 when the white man, Bolabola[194], relocated us where the village is now."* (Men's focus group, Itota).
>
> *"The place where the village is now belongs to Bofototo, who was here before the whites made us leave the forest in 1933."* (Men's focus group, Iyanda).

Protestant missionaries arrived in 1910, while the Catholic mission of Wafanya was not established until 1917.

Table 70 First Europeans to arrive in villages

Name	Place	Year and Role or Position
Anderson, "Isamunga"	Bonkoy	1910. Protestant missionary. His son Njoli was born in Bonkoy in 1923.
Mafutamingi (II[195])	Bokombola	1920s. Colonial administrator who began the resettlement of villages for road construction[196]
[E]bolabola	Itota	1935. Colonial administrator based in Watsikengo.
Louis Dollander	Bokombola	Colonial administrator
Koloke	Bokombola	Colonial administrator
Iyementole	Bokombola	Colonial administrator
Bolanga (Simons[197])	Bokombola	1950. Colonial administrator
Flandrien Makasi	Iyanda	1960. Merchant
Dongolamiso	Itongu	Colonial administrator who married a local woman
Ngonga na Butu	Itongu	Colonial administrator, successor of Dongolamiso

Rubber and coffee plantations were created during the colonial period. The town of Monkoto served as the base for the company *Congo Rubber Estates* (Infor Congo, 1958:707).

Commercial production of coffee, cocoa, and palm nuts decreased with the disappearance of buyers and the deterioration of routes in the 1980s. Export-oriented products were replaced with products for local and regional markets. Cassava production increased, while new cultures such as beans, rice, and groundnuts were introduced in the 1980s. Around the same time, hunting started replacing fishing as the second most important revenue source for local households. Among the causes associated with this change was the loss of knowledge of certain fishing techniques. The villages of Iyete Mpuma, Bonkoi, and Iyete Bankanya reported that the last *"specialized fishers disappeared (died)"* in the late 1980s and early 1990s, resulting in a reduced number of fishing techniques and consequently difficulties in catching certain species (*mokobe, mboto, ekoli, nsuni, lofongo*).

> *« In the past, most people fished, it was a profitable activity. It was not until the late 1970s when [people] turned to hunting and poaching. In the 1980s animals started to disappear."* (Women's focus group Iyete (I) Bankanya)

Groups from outside the landscape now fish with intensive techniques unknown to local fishers while hunting constitutes a more important source of income for local populations.

[194] The name of this European was also mentioned in the village of Impete Kadumba, in the Lomela River area. He was the first colonial administrator after the departure of the SAB (Boelaert, et.al. 1996:145).
[195] Boelaert et al1996:236
[196] Ibid.
[197] Boelaert et al 1996 :237.

B. Present day context: General demographics and social organization

Villages in these sectors remain located along colonial period roads that connect the seat of the Territory of Monkoto with Boende, seat of the District of Tshuapa (218 km away). Like elsewhere in the landscape, transport by land has become difficult and rivers are the only viable alternative for product evacuation and trade. However, this area appears to be less isolated than other parts of the landscape. The high number of households engaged in commerce as well as higher household membership in community groups, relative to the rest of the landscape, may be linked to the greater movement of information and external actors in and out of the sector.

Local authorities include: 1) the *Chef de groupement*, a traditional authority recognized locally and responsible for various villages connected by clan ties; 2) the *Chef de localité,* the Congolese government representative at the village level; and 3) the *Chef de terre* and village elders (notables), recognized locally but not considered part of the state's administrative hierarchy. Traditional authorities like the *Chef de groupement* and *chef de terre* exercise significant influence over the use of local forests by local and neighboring populations. Traditional authorities, however, have little control over outsiders' use of local resources.

The relative closeness of these villages to the territory's seat of Monkoto and their location along the principal waterways linking the territory to Mbandaka and other parts of the province result in relatively more contact and communication between local populations and territory-level authorities than in other parts of the landscape. The presence of ICCN stations in Monkoto and Mondjoku also contribute to these villages' increased awareness of State agencies in their area.

Like elsewhere in the landscape, traditional power is transmitted through the paternal line, but not necessarily from father to eldest son, and habitation is patrifocal, with most women settling in their husband's village and using their land.

The Territory of Monkoto reported the highest number of members per household (9.1) as well as the highest percentage of non-nuclear family households of all the study areas. Table 71 summarizes the general demographic information of Monkoto households.

Table 71 General demographic information

Average age of head of household	45.8 (men), 51.0 (women)
Female heads of household	6.1%
Average household size	9.1[198]
Nuclear families	43.5%
Polygamist families	12%
Average educational level of head of household	No schooling (women), D4 (44.2% men)
Group membership	Participation in groups and associations is higher in this territory than elsewhere in the landscape, at an average of 2.27 per household. Most membership corresponds to religious groups (86.4%), followed by farmers' groups (47.6%), and cooperative self-help groups (42.9%). 41.5% of households participate in three groups or more.

The number of members per household varied between 2 and 33, with the largest percent of households having between seven and ten members (table 72). As in the rest of the landscape, the composition of households varied and included elderly parents, siblings of the head of household and their families, uncles, nephews, nieces, grandchildren, etc.

[198] SD=4.49

Fewer cases of exogamy were found in this area than in the territory of Oshwe and the Salonga and Lomela Rivers areas: 83% of participants' parents were from the same village.

Participants (10.1%) expressing the intention to emigrate from their villages cited work opportunities and job transfers (civil servants) as principals reasons for their departure. All participants expressing plans to leave were male. Most participants who express no desire to leave said they felt an attachment to their village and their families.

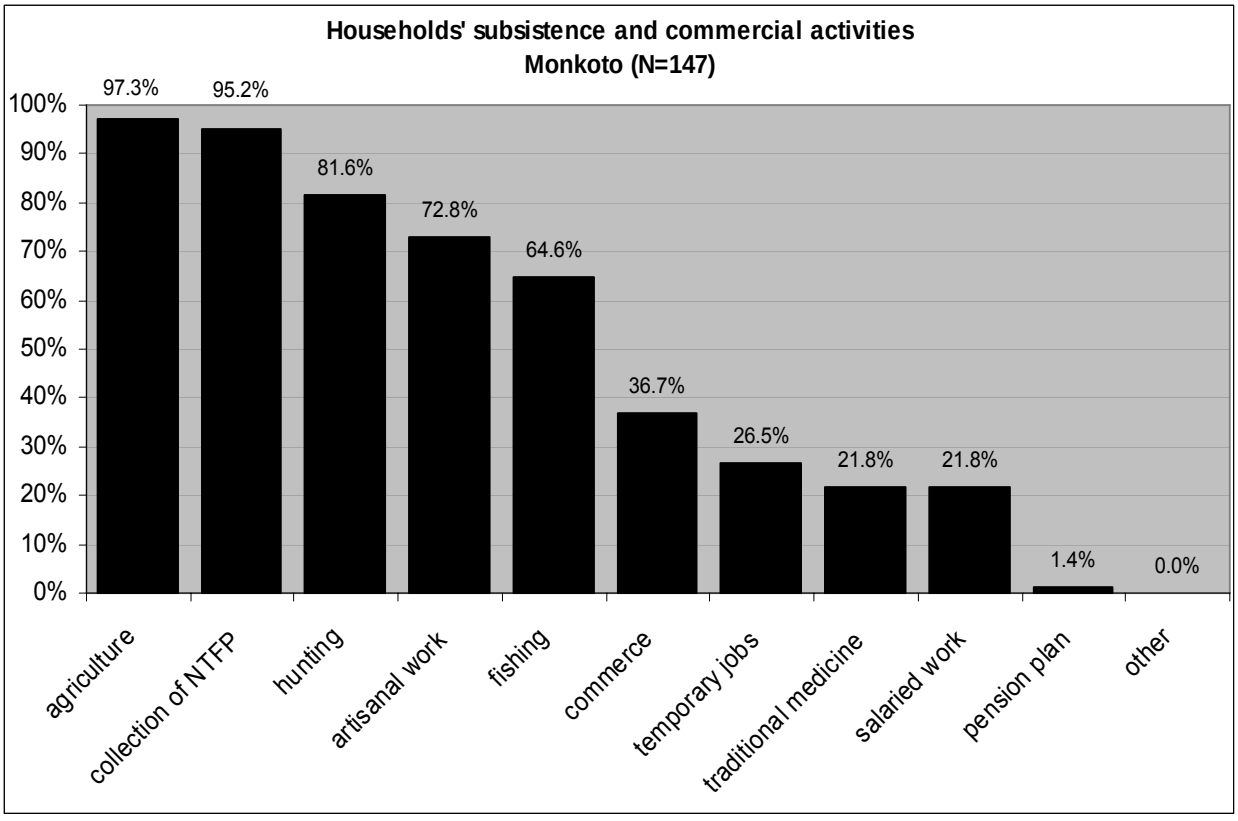
Table 72

Household size	%
1-3	6.1
4-6	23.1
7-10	41.5
11-15	24.5
16-20	2.0
21-25	1.4
Over 25	1.4

C. General information on household and village level subsistence and economic activities

Households in the territory of Monkoto report an average of five economic and/or subsistence activities, one activity more than households elsewhere in the landscape. In order of importance they are agriculture, collection of NTFPs, hunting, artisanal work, and lastly fishing. The territory of Monkoto is the only part of the landscape where artisanal work is practiced by more households than fishing. The percentage of households practicing commerce was also higher in Monkoto than elsewhere in the landscape. Figure 93 shows the percentage of households involved in each activity.

Figure 93



As with elsewhere in the landscape, the number of activities per household was slightly higher where one or more members were also engaged in salaried work or temporary jobs (5.6 for wage earners versus 5.1 for others). Table 73 includes the activities reported by households with at least one wage earner. Participation in commerce by households with one wage earner was higher than the average.

Table 73

Households with at least one wage earner also engaged in	% (N=22)
Agriculture	95.5
Hunting	50.0
Artisanal work	36.4
Fishing	18.2
Commerce	13.6

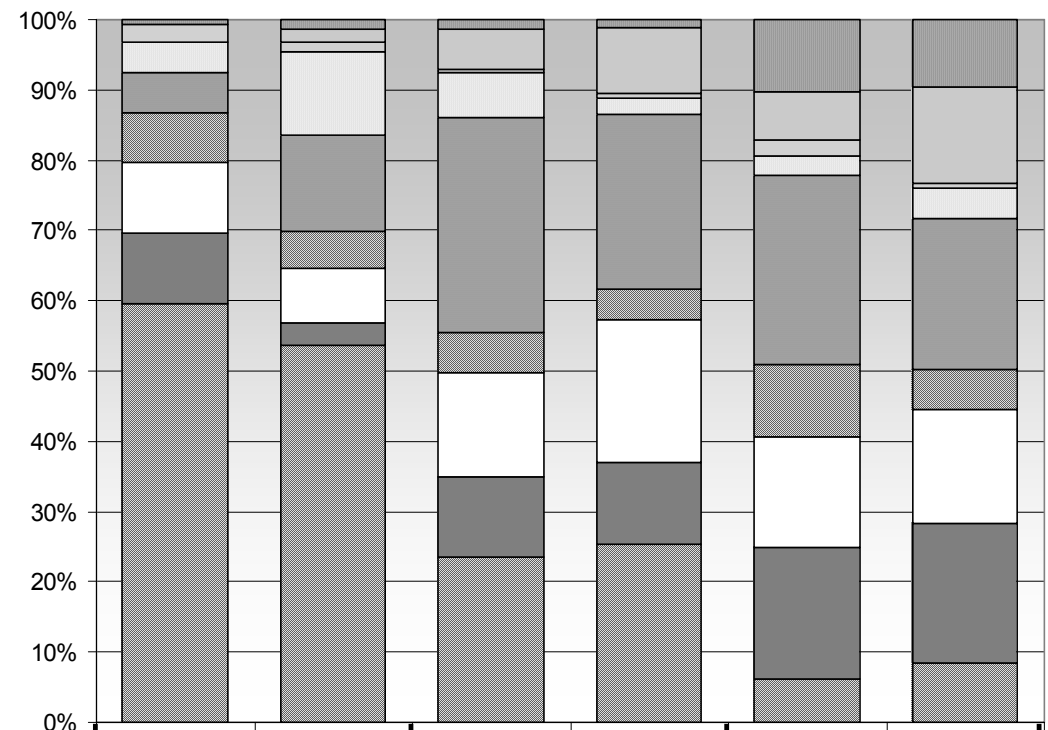
1. Income generation and time allocation

Local populations in this part of the territory appear to have more economic alternatives than populations elsewhere in the landscape, reporting a wider range of uses for local resources. While agriculture remains the principal source of income for local families, artisanal work was identified as principal source by 10.1% of participants and commerce by 7.0%. These figures represent the highest in the landscape for income-generation from artisanal work and commerce. In total, 62.6% of men, 32.7% of women, and 11.6% of children are involved in artisanal production, which participants defined as the fabrication of furniture and household utensils, pirogues, fishing instruments (e.g. baskets for damming and trapping), and material for the construction of houses.

The importance of agriculture as an income source and time consuming activity was less than elsewhere in the landscape. Fishing and hunting were ranked as important second and third sources of household income but not at the same scale as in the territory of Oshwe, and along the Salonga and Lomela Rivers. Finally, more households in Monkoto reported earnings from paid employment than in other areas of the study.

Some households reported no second or third sources of income (1.3% and 10.3% respectively). These households depend solely on agriculture (73.3%), artisanal work (46.7%), hunting (26.7%), commerce and salaried work (13.3%) or temporary jobs (6.7%) as sources of income. One household reported only subsistence activities. Figure 94 shows the principal sources of income and most important time-consuming activities of households in the area.

Figure 94[199]



	first source	most time	second source	second time	third source	third time
no 2nd or 3rd activity	0.6%	1.3%	1.3%	1.2%	10.3%	9.7%
collection of NTFP	0.0%	2.0%	5.7%	9.3%	6.8%	13.5%
temporary job	2.5%	1.3%	0.6%	0.6%	2.1%	0.6%
salaried work	4.4%	11.8%	6.4%	2.5%	2.7%	4.5%
hunting	5.7%	13.7%	30.6%	24.7%	26.7%	21.3%
commerce	7.0%	5.2%	5.7%	4.3%	10.3%	5.8%
fishing	10.1%	7.8%	14.6%	20.4%	15.8%	16.1%
artisanal work	10.1%	3.3%	11.5%	11.7%	18.5%	20.0%
agriculture	59.5%	53.6%	23.6%	25.3%	6.2%	8.4%

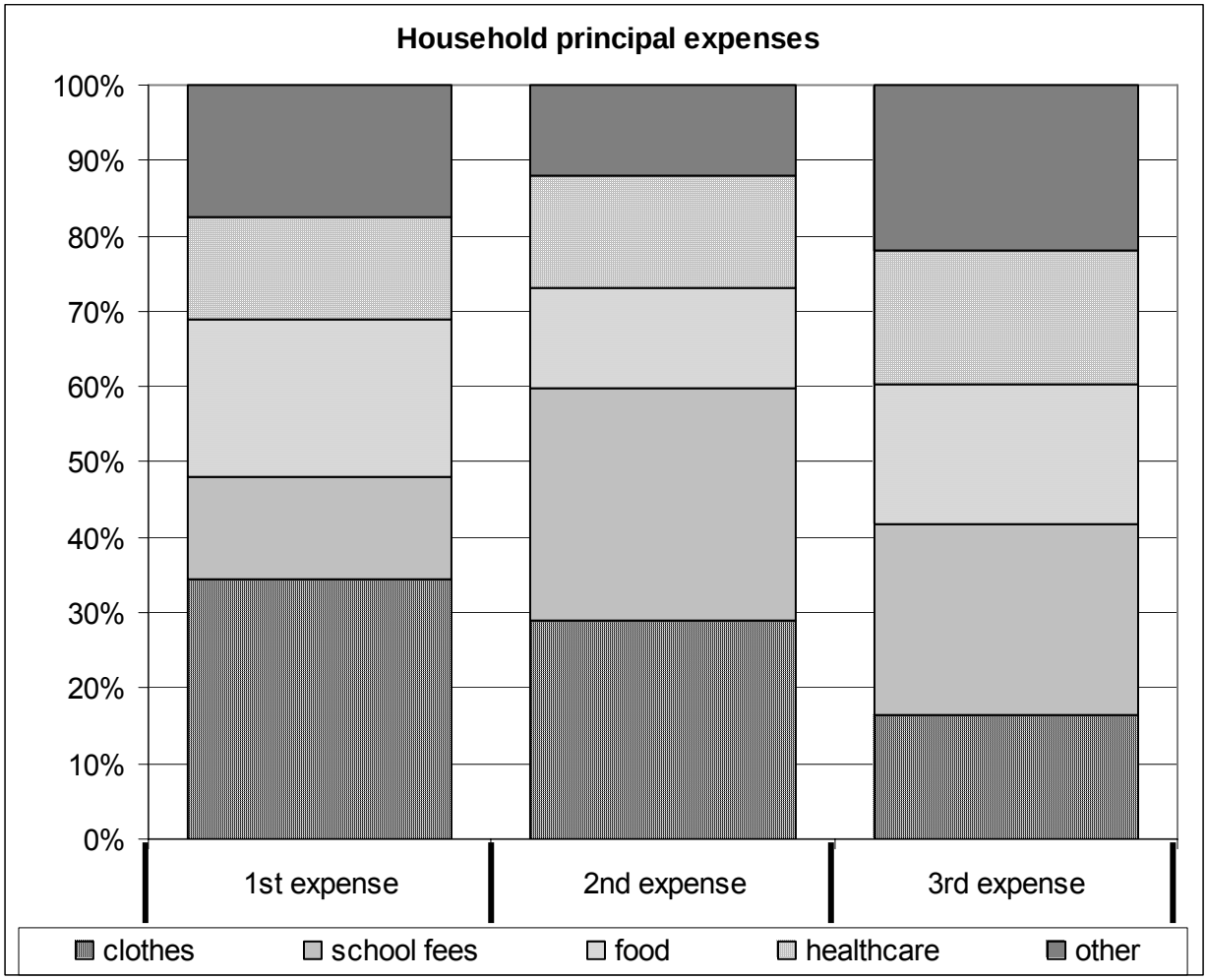
Correlation between income and time was strong for the three principal sources (First source/first time r=0.96, Second source/second time r=0.95, and third source/third time r=0.91).

2. Household expenses

Household earnings are used to buy manufactured goods and pay for services like education and healthcare (figure 95). Clothing was mentioned among the three principal expenses by 81.5% of households, followed by school fees and materials (71.2%) and food (54.1%).

[199] Three households reported traditional medicine as their second source of income. One household reported pension earnings as its third source of income.

Figure 95

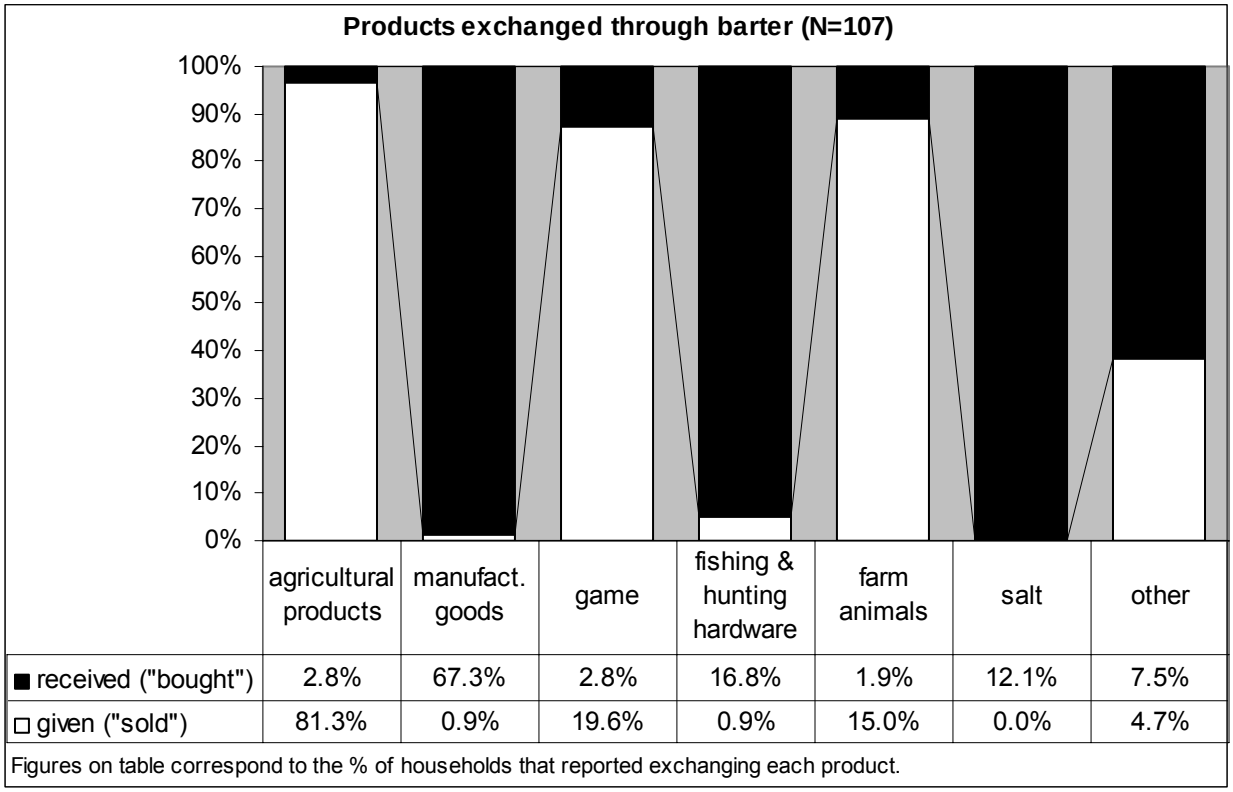


Other expenses included salt, soap, manufactured goods, home improvement, savings, fishing and hunting equipment, alcoholic drinks, paying daily laborers and savings for the payment of bride prices. Seventy-three percent (73%) of households reported relying on barter to obtain manufactured products and services. Figure 96 illustrates the principal products traded by local populations (agricultural products, bushmeat, and farm animals) in exchange for manufactured goods, fishing and hunting hardware, and salt sold by traders. Other products and services exchanged included NTFPs (given), farm and construction labor (given and received) and services like education and healthcare (received)[200].

« My wife and I work in other people's agricultural fields. My wife is paid with cloth." (327 Monkoto)

[200] The complete list of examples provided by households is included in appendix 5.

Figure 96



	agricultural products	manufact. goods	game	fishing & hunting hardware	farm animals	salt	other
■ received ("bought")	2.8%	67.3%	2.8%	16.8%	1.9%	12.1%	7.5%
□ given ("sold")	81.3%	0.9%	19.6%	0.9%	15.0%	0.0%	4.7%

Figures on table correspond to the % of households that reported exchanging each product.

The most frequently given agricultural products are palm oil (52.2% of agricultural products), followed by cassava (16.4%) and goats (14.2%). The most frequently manufactured good received is cloth (52.8%). Other manufactured products received are cooking utensils (8.5%), plastic jugs and containers (6.6%), bicycles (4.7%) and flip flops (3.8%). Hunting hardware received includes wire for snares (53.8%), shotguns (15.4%) and ammunition (15.4%).

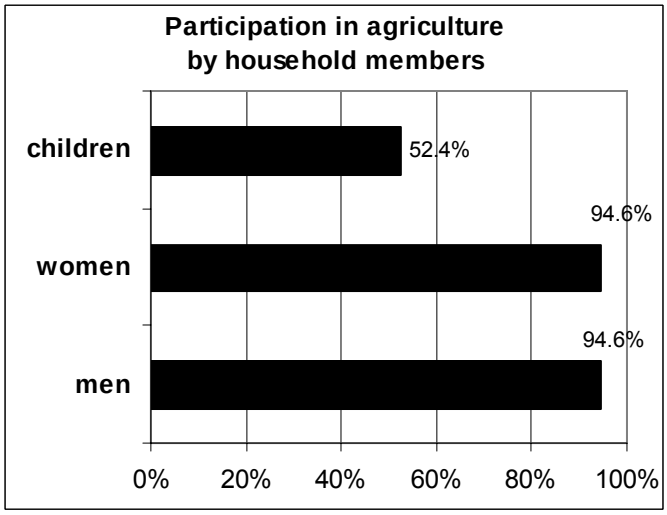
Barter is sometimes considered disadvantageous to local populations. Examples provided by participants included giving 70 bottles of palm oil, at a value of 100FC each (7000 FC total), in exchange for 6 yards of cloth equivalent to 3000 FC; five quarters of duiker bushmeat (3500 FC) for one machete (2500 FC); and 40 bottles of palm oil (4000 FC) in exchange for health services (2000 FC).

D. Principal subsistence and economic activities

1. Agriculture

Among households' economic activities, agriculture as well as the collection of NTFPs engaged more members of the family (figure 97). Only four households did not report agriculture as either a subsistence or economic activity.[201].

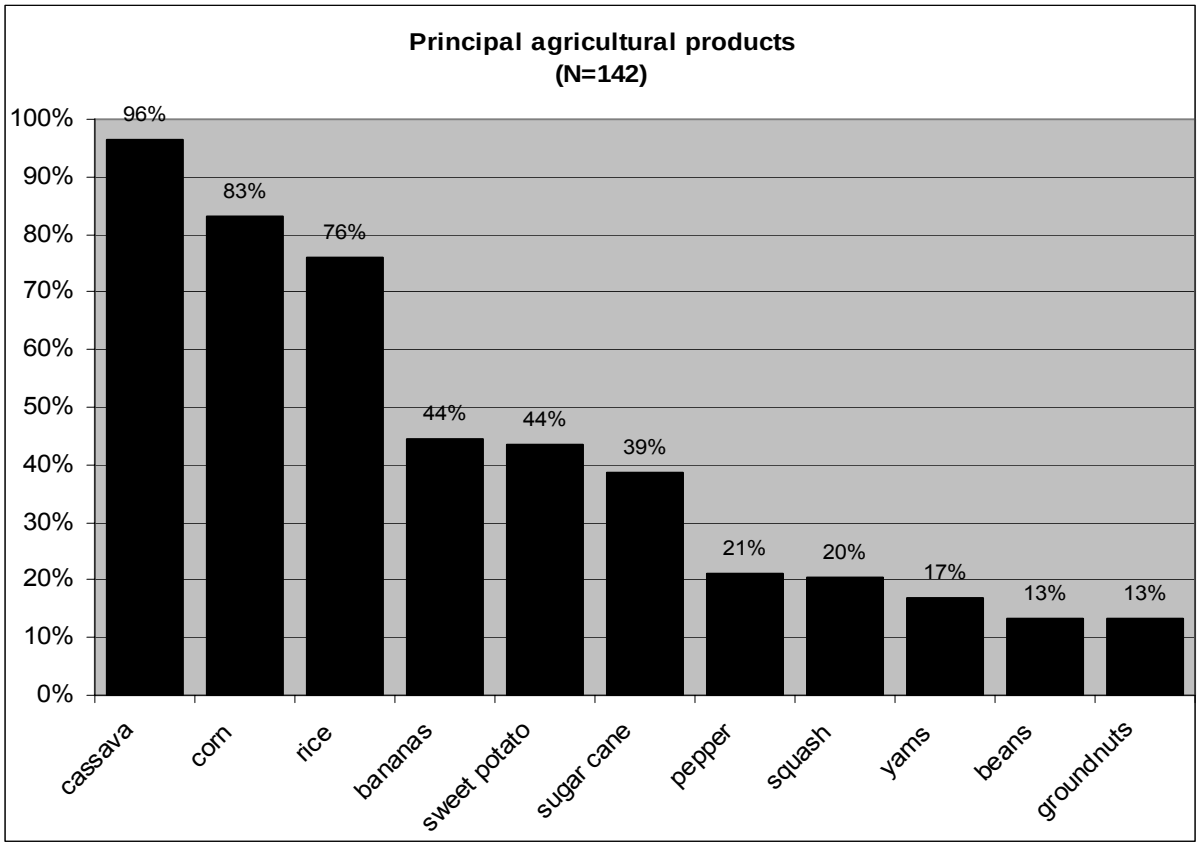
Figure 97



Agricultural tasks are differentiated by gender, with men responsible for clearing and preparing agricultural fields and women involved in planting, weeding and harvesting. Men also set traps for crop-raiding wild animals.

Households reported growing between one and eight products, with an average of 5.02 products per household (SD=1.46), the highest number in the landscape. Cassava (*Manihot esculenta)* is the most prevalent crop in the area, grown by 96.5% of households. Corn (*Zea mays)* and rice (*Oryza sativa)* are also important crops, grown by 83.1% and 76.1% of households, respectively. Other crops mentioned by households included bananas, sweet potato, sugar cane, peppers, squash, yams, beans, and groundnuts (figure 98).

Figure 98



[201] Of the 147 sampled households, 4 did not practice agriculture. Three households mentioned buying these products locally, and one household reported receiving agricultural products from family members.

Table 74 Field Size

Size of fields in ha	% households
0 - 0.05	0.7
0.051-0.1	1.7
0.101-.5	43.8
0.51 – 1	44.7
1.01 - 1.5	2.0
1.51 – 2	1.9
2.01 - 2.5	0.9
2.51 – 3	0.0
3.01 – 3.5	4.3

Table 75 Distance to fields

Distance in km	% of households
0 - 0.05	2.0
0.051-0.1	4.4
0.101-.5	19.4
0.51 – 1	34.8
1.01 - 1.5	22.5
1.51 – 2	9.0
2.01 - 2.5	7.3
2.51-3.0	0.0
3.01-3.5	0.6

Field size in the area varied between 0.05 and 3.95 ha, with an average field size of 0.84 ha (table 74). Most fields (84.7%) are accessible by forest footpaths, 10.8% by a combination of road and footpath, 3.0% by road, and 1.6% by river and footpath. Fields are located within villages' traditional land use zones, often within 1.5 km of the household (table 75).

In terms of land ownership, 95.4% of households said they own their fields,1.6% of households reported renting, while 3.0% of households reported other forms of access including use without authorization from traditional authorities.

The main method for preserving soil fertility is fallow (100%). Participants from focus groups reported that some households also rotate crops as a means of improving yields. Fallow periods range from 2-10 years.

Changes and adaptation in agriculture

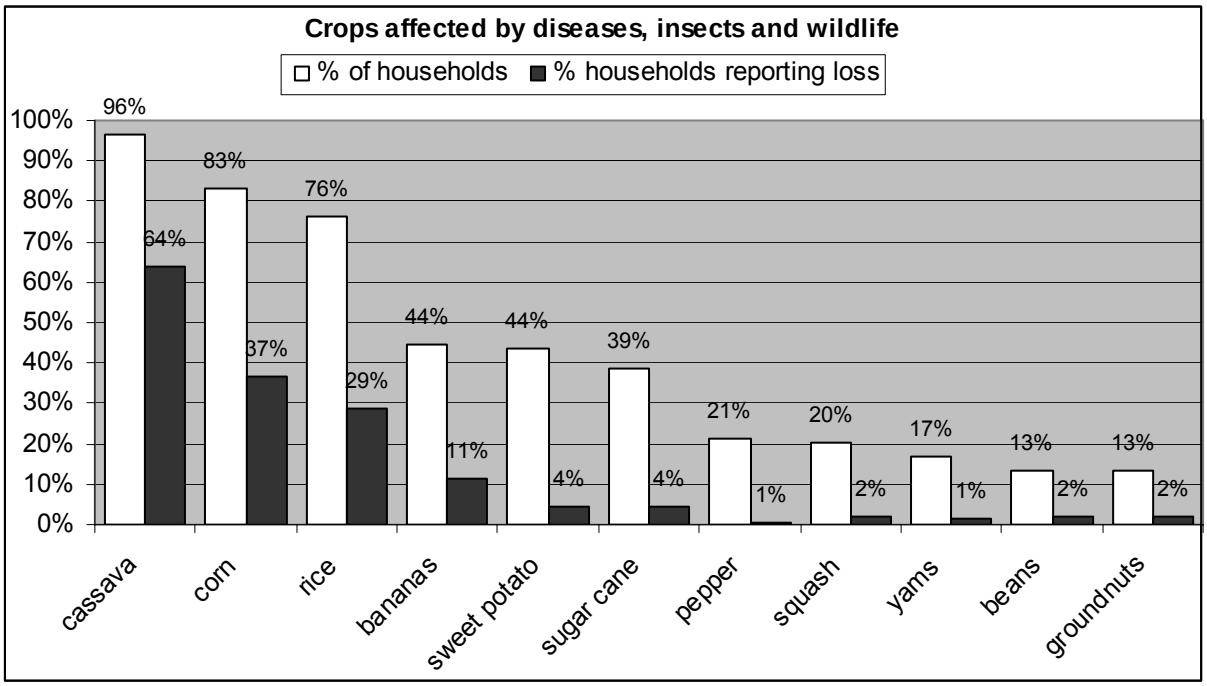
Agriculture was perceived to have changed the most of all subsistence and economic activities, with 34.9% of changes reported by focus groups concerning agriculture (table 76). The single major change mentioned by villages in Monkoto was a decrease in agricultural production.

Table 76 Changes in agriculture and their perceived causes (N=10)

		Changes
		Decreased production (9 villages)
Associated causes	Insects, disease and wildlife	6
	Deterioration of rural roads, absence of buyers	4
	Supernatural	2
	Decreased soil quality	2
	Loss or lack of equipment	2

Damage by wildlife, insects and disease was cited as the cause of recent declines in production by 80.3% of households that farm. Farmers' stated that they did not have the capacity or knowledge to treat or limit associated damage. Cassava was reported as the most vulnerable crop, affected by both disease and wildlife. Corn and rice were the second and third most impacted crops, destroyed by birds, wildlife, and plant diseases. Bananas, beans and groundnuts were also among the ten most impacted crops (figure 899 While crop-raiding animals are partially controlled through the use of traps and scarecrows, participants stated that they were unable to treat plant diseases, and that the only solution was to open new fields for farming and/or to harvest before all plants were lost.

Figure 99



Of the ten most important cultures in Monkoto, peppers, yams and sweet potatoes appear as the least affected crops. The correlation between crop prominence and reports of disease was high (r=91). Table 77 presents wildlife species most frequently cited as causing damage to crops and productivity. Among domestic animals, goats were the most frequently mentioned cause of destruction (10.5% of households).

Table 77 Crop raiding wildlife (N=114)

Animals	% households
Monkeys	59.6
River red hog	51.8
Birds	40.4
Duikers	7.9

Participants reported that the deterioration of roads (and transportation systems in general) was the principal cause for the decline in commercial agricultural.

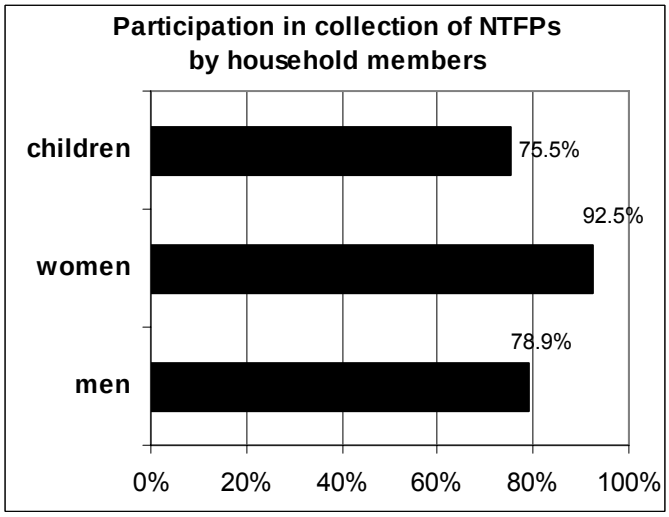
> *"All participants agreed on the importance of agriculture as a source of revenue. They also agreed that the decline of agriculture as a commercial activity started with the shutting down of the Office of Transport and the resulting deterioration of local and regional roads."* (Notes, men's focus group, Weta)

The village of Bonkoni mentioned the introduction of new crops such as beans and rice as a positive change (2002), stressing their increasing commercial importance. Another change mentioned by one village was an increase in the commercialization of cassava. Participants from Itongu expressed mixed views on this change because, while commercialization increases income, it also has a negative effect on local availability.

2. Collection of NTFPs

Ninety-five percent (95%) of households in Monkoto collect NTFPs for subsistence and/or commercial purposes. Five out of the six households that do not collect NTFPs reported obtaining them through barter or purchase from neighbors. Similar to other areas in the landscape, collection of NTFPs is practiced by men, women and children (figure 100). Collection of NTFPs involves a higher percentage of children than any other activity. NTFP collection was reported as a secondary source of income by 5.7% of households and as a tertiary source by 6.8%. Another 30.3% of households reported periodic sales of NTFPs.

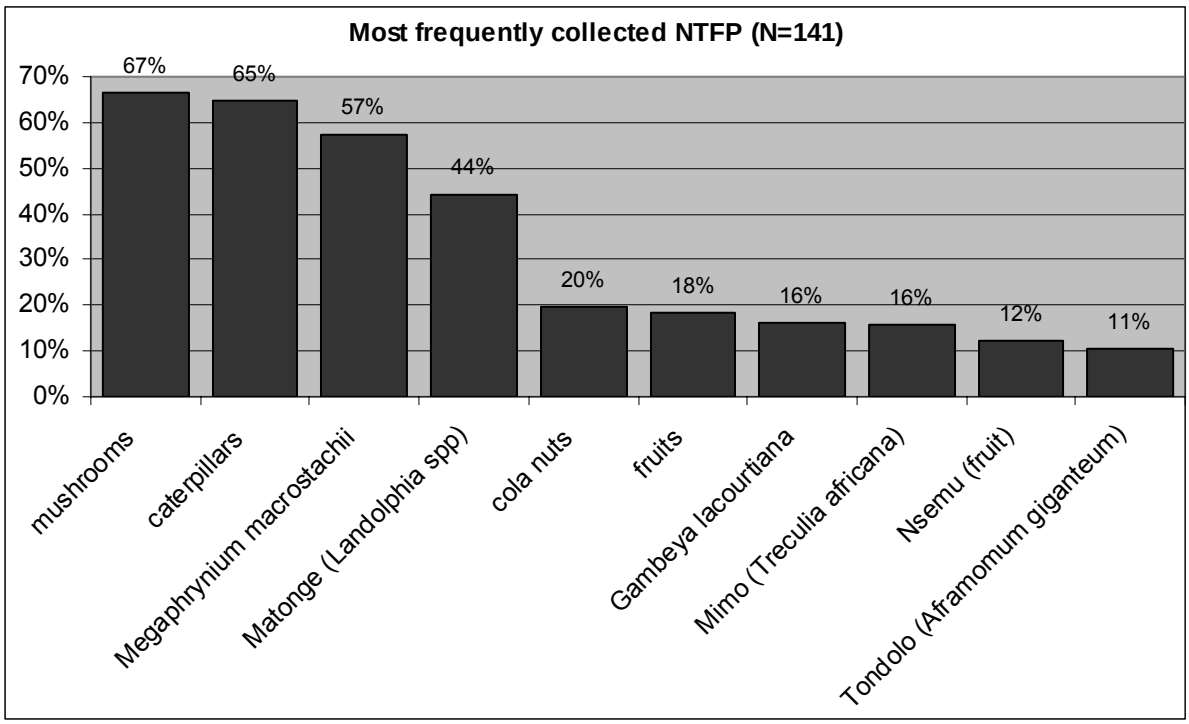
Figure 100



Households in Monkoto collect between one and nine products[202], with an average of 4.16 products per household (SD=1.50). Principal NTFPs collected in villages in the area included caterpillars (65%), mushrooms (59%), and beeya (*Megaphrynium macrostachii,* 57%) (Figure 101). Other products included fruits and cola nuts[203].

Harvesting of NTFPs, including principal products such as caterpillars and mushrooms, is mostly seasonal (70.6%).

Figure 101



[202] One household from Itongu reported 21 products (MK 017)

[203] Fewer than 10 households also mentioned: cassava leaves (from fallow or abandoned fields), mayebo, basendja, mpunga, ndombo, roofing material, mbele, mbila, ngadiadia, nkoyo, safou (*Dacryodes edulis*), *Scorodophloeus zenkeri,* wrapping leaves (Marantaceae), mbole, ntsukuna, bakoko, bankondjo, honey, ketsu (peppers), kongo ya sika, mbaka, mponoko, ntende, palm nuts, and sorrel.

The majority of NTFPs are collected within 1 km of villages (table 78) and are accessed through forest footpaths (83.6%), roads (2.7%), a combination of paths and roads (11.9%), or sometimes rivers (1.8%).

Table 78

distance in km	% of households
0 - 0.05	6.3
0.051-0.1	6.9
0.101-.5	25.2
0.51 – 1	23.3
1.01 - 1.5	10.5
1.51 – 2	9.1
2.01 - 2.5	10.5
2.51-3.0	1.0
>3.00	7.3

NTFPs were commercialized by 45% of collecting households with an average of 2.09 products (SD=1.17) sold or bartered per household. Households that collected a wider variety of NTFPs tended to commercialize more products as well. The correlation between the number of products collected and commercialized was 0.65. Most frequently commercialized products included caterpillars (57.1% of households that sell part of their harvest), *M. macrostachii* (38.1%), mushrooms (23.8%), matonge (19.0%), and fruits in general (14.3%). Few households in Monkoto reported earning more than $15 (6750 FC) per season from the sale of NTFPs. Like elsewhere in the landscape, income from this activity was difficult to estimate as harvesting follows no particular pattern aside from adhering to the seasonality of specific species. Thirteen households reported selling larger volumes of caterpillars and mushrooms (one sack of caterpillars, three or four buckets of mushrooms, etc) but transactions were intermittent or only once per season. Table 79 includes the principal commercialized products in the area and their respective prices.

Table 79 Principal commercialized NTFP[204]

Product	% of households (N=63)	Prices	Weekly sales
Caterpillars	57.1	$0.02 - $0.44 cup (10-200FC)	$0.11 to $17.78
Beeya (*M. macrostachii)*	38.1	$0.02- $0.11 cup or pile (10- 50FC)	$0.02-$2.22
Mushrooms	23.8	$0.02- $0.11 cup or pile (10- 50FC)	$0.13-$1.33

NTFPs are sold locally. Only two households reported traveling to larger markets to sell their NTFPs.

Locally perceived changes in the availability of NTFPs

Among economic activities, the fewest changes were recorded for NTFPs. For example, only 11.1% of all changes mentioned by focus groups pertained to NTFPs and most of the changes (four out of six villages) were in reference to decreasing caterpillar populations. In six out of seven villages focus group participants were unable to provide a reason for the changes. Household interviews revealed that 24.1% of households perceived changes in the availability of NTFPs. Household level participants cited the following causes: supernatural (48.4%), unknown (30.7%), land transformation (9.7%), changes in the weather (3.23%), and increased numbers of local users of the same resources (3.23%).

[204] The season during which the data from this area was collected (February) may have impacted the percentage of households reporting each product.

3. Fishing

In the Monkoto area, 61.2% of households reported fishing as a subsistence and/or commercial activity, and 40.5% reported it among their three most important income generating activities. This figure is lower than that recorded in the areas of the Salonga and Lomela Rivers and Oshwe Territory. Women and men participate equally in fishing activities (57.1%). More than one third of households also reported that children participation in this activity (36.7%) (figure 102).

In addition to households that fish for subsistence and commerce purposes, 36.7% of households in Monkoto reported purchasing fish for household consumption from fishers in their own villages.

Figure 102

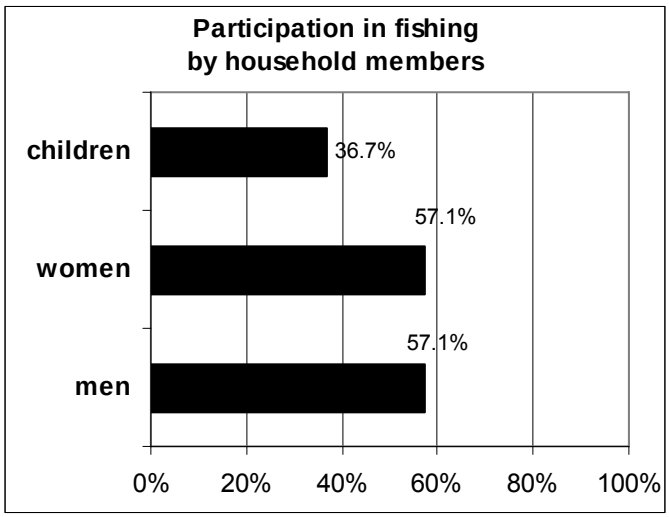
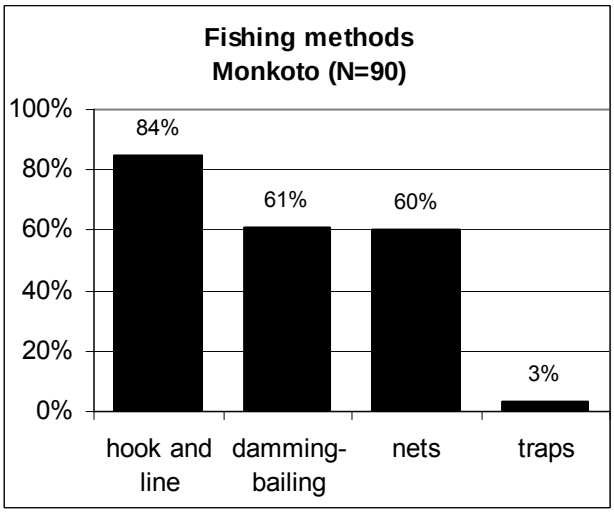
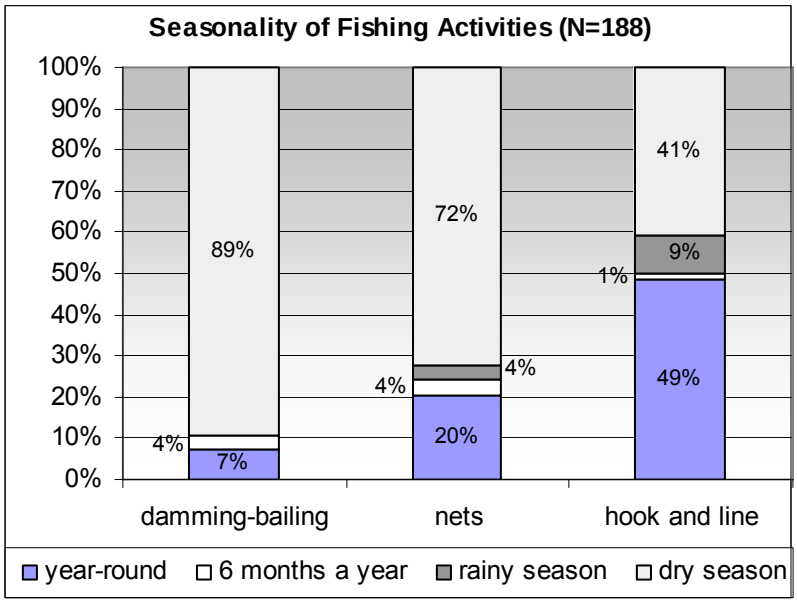


Figure 103



Households reported between 1-3 fishing techniques, with an average of 2.03 per household (SD=0.76). The most popular fishing method is hook-and-line, followed by dam construction and bailing, and nets. Figure 103 includes the methods reported by Monkoto households.

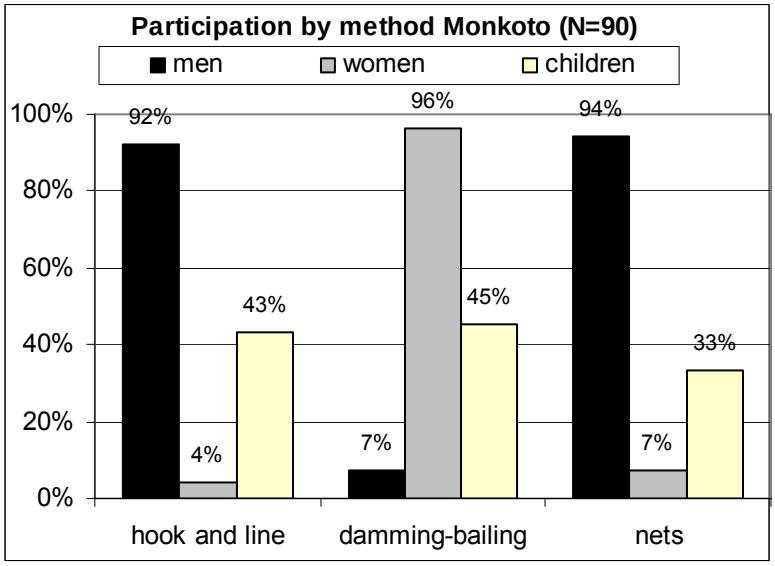
Figure 104



Almost half (49%) of households that fish with hooks and lines reported practicing this method year-round. Damming-bailing and net fishing are practiced mostly during the dry (peak) season (figure 104).

Participation by household members varies according to method. Men fish with nets, hooks and lines, and seldom participate in the damming and bailing of watercourses. The damming-bailing system is practiced almost exclusively by women, sometimes helped by their children. As illustrated in figure 105, activities are gender differentiated among adults.

Figure 105



Women fishing in the Monkoto area use between 1-8 baskets to bail dammed waterways [205]. Table 80 includes the number of nets, and line and hook implements reported by households in the area.

Table 80 Number of instruments per household

	Line and hook (N=76)	Nets (N=54)
<10	1.3	14.8
10 – 49	7.9	61.1
50 - 99	10.5	18.5
100 - 199	44.7	3.7
>200	35.5	1.9

When referring to areas where they practice fishing by constructing dams, participants talked about using their villages' forests and all small waterways within them, as well as "ponds". Participants provided 76 specific names of sites used for different methods.

The principal fishing area for this portion of the corridor between SNP is the Luile River (19.0%), used by five of the area's villages. While larger waterways are fished using various methods, 14 out of the 76 different fishing zones were used exclusive for damming and bailing. Table 81 includes the principal fishing zones, the number of villages reporting fishing in these areas, and the percentage of households using each[206].

Table 81 Principal fishing zones

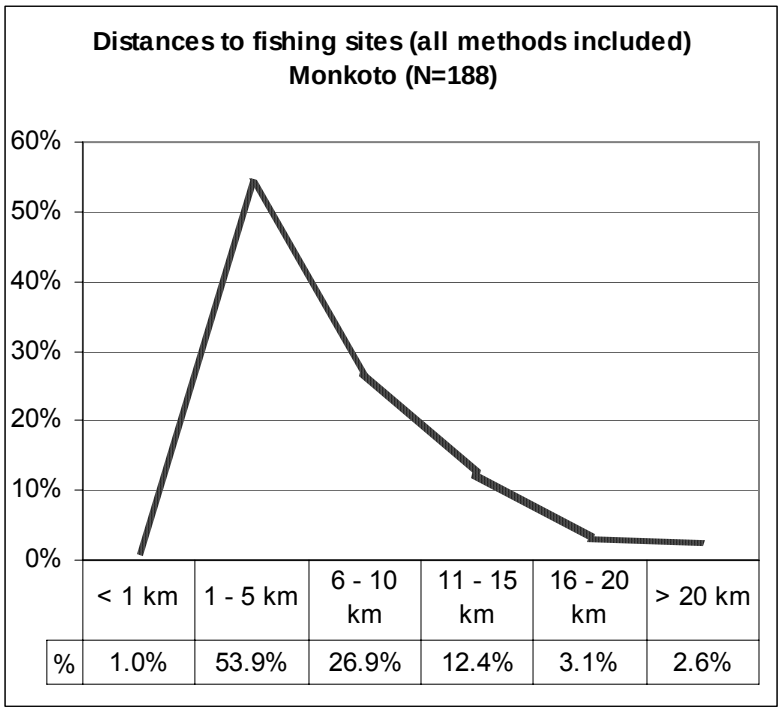
Fishing zones	Villages (N=12)	% of fishing activities (all methods included) (N=369)
Luile	5	19.0
Itsuadi	2	7.9
Momboyo	2	6.8
Lioko	2	4.3
Luanga	2	4.1
Ituali	2	3.8
Kango	4	3.3

[205] Only one participant reported using more than 8 baskets.

[206] A complete list of rivers and streams used by all participating villages is included in appendix 6. Participants did not mention whether any of these zones were located within the park's boundaries.

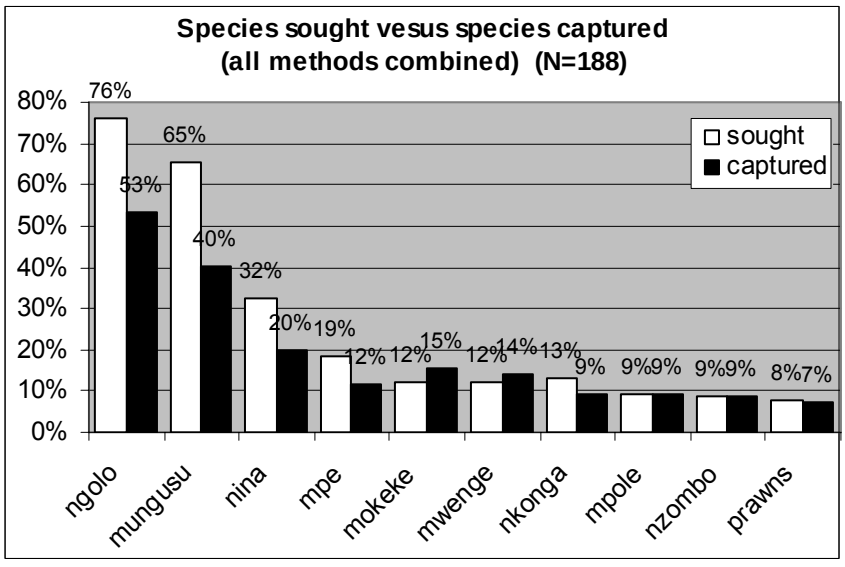
Nyaetango	2	2.4
Boleki	3	2.2

Figure 106



Distances between villages and fishing zones ranged from under one to over twenty kilometers (figure 106). Estimating average distances between villages and sites proved difficult because participants sometimes gave rough estimates that differed by one or more kilometers from those provided by other members of the same village. Differences in distances are also due to people having fishing camps on the same river but some kilometers away from each other, as well as to neighboring villages using the same resources but in different parts of the river.

Figure 107



Fish preferences

Target species were listed as ngolo *(Claria bothopogon)* mungusu (*channa obscurus)*, nina *(Malapterururs electricus)* and mpe *(Bagrus spp).* Other desired fish included nkonga *(Polypterus spp)*, mokeke(*Hemichromis fasciatus)*, and mwenge *(Hepsetus odoe).* Most frequently targeted fish were also the most frequently caught species (figure 107).

Revenue from fishing

In Monkoto, 82.2% of households that fish commercialize a portion of their catch. The number of fish species that households trade ranged from one to seven, with an average of 4 (SD=1.7). The majority of fish sold by households is smoked (87.9%) and packed in baskets of different sizes for transport, or sold individually or in pieces for local consumption. The principal species commercialized in the Monkoto area are mungusu (87.8% of households that report selling fish),

ngolo (85.1%), nina (47.3%)[207], mwenge (35.1%), mpe (28.4%), and nkonga (21.6%). More than 10% of households also mentioned yofa (14.9%) and mpole (10.8%). Table 82 includes the fish species most often commercialized in the area and the range of prices for the principal units of sale.

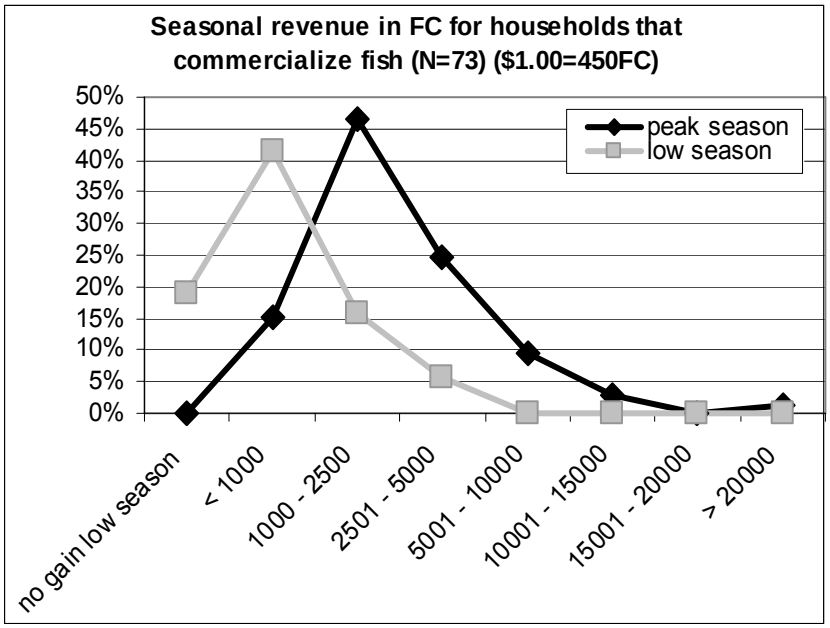
Table 82 Commercial fish species

Fish species	% households (N=74)	Price range (per fish)	Price range (pile of smoked fish)
Mungusu	87.8	$0.17- $1.11 (75FC- 500FC)	$0.33- $0.44 (150FC- 200FC)
Ngolo	85.1	$0.11-$0.44 (50FC-200FC)	$0.33- $0.44 (150FC- 200FC)
Nina	47.3	$0.33-$1.33 (150FC-600FC)	$0.22-$0.44 (100FC-200FC)

The highest prices obtained for fish corresponded to sales by local fishers in larger towns and markets, where participants reported selling baskets and "suitcases" of mungusu, ngolo and mwenge from 1500FC up to 15,000 FC ($3.33 to $33.33). Nina, an important commercial species, is not sold in larger markets but only traded locally.

In terms of seasonal revenue, 75.3% of households reported earning under $10 during the peak season. During the low (rainy) season, the majority of households (73.6%) reported profits of under $5. Nineteen percent (19%) of households that reported gains during the peak season reported no earnings during the low season. In Monkoto, no household reported earnings over 5000 FC ($11.11) during the low season. Figure 108 shows area-level trends in earnings during both seasons.

Figure 108



The correlation between peak and low season profits at the household level was low (r=0.16) and may be partially due to households' different commercial strategies: while some households concentrate their activities in the dry season, others fish year round. Two households reported higher gains during the low season because they wait for fish availability to decline before selling their catch. Differences in profits between the peak and low seasons at the household level ranged from 50 FC to 80,000 FC (SD=9441.5).

Consumption of fish

As with commerce, subsistence use of fish varies according to season. Weekly consumption during the rainy season represented only 27.2% of dry season consumption. This reduction coincides with an increase of 75.5% in bushmeat consumption, which peaks during the rainy season. Forty-five percent (45%) of households (both fishing and non fishing households) that reported consuming fish during the peak (dry) season do not consume fish during the rainy season. A correlation of 0.93 was found between quantities consumed by households during

[207] Mungusu, ngolo, and nina were also among the five most sold species in the Lomela and Salonga Rivers and the Territory of Oshwe.

the peak and low seasons (figure 109).

Figure 109

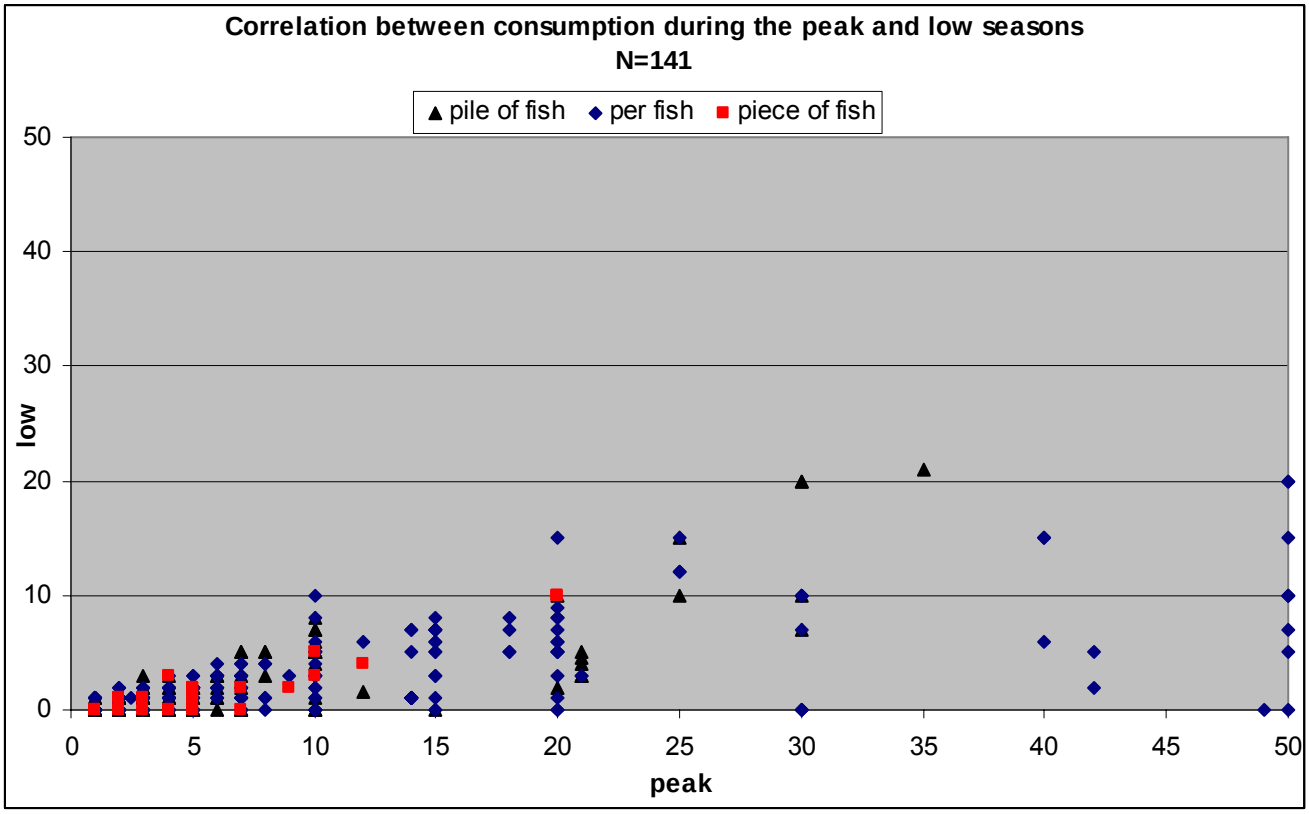


Table 83 Most often consumed fish species

Species	% households (N=141[208])
Ngolo	75.9
Mungusu	56.0
Nina	42.6
Mpe	19.1
Nkonga	12.8

Households reported consuming between one and seven different species of fish, with an average of 3.5 per household (SD=1.3). Ngolo, mungusu, and nina are the three most often consumed varieties in Monkoto. Other important species are mpe and nkonga (Table 83).

Taboos concerning certain fish persist today. Seventeen percent (17%) of households (both fishing and non fishing households) reported prohibitions. Of the 25 taboos recorded, 11 concerned the consumption of nina (*Malapterus electricus)*, and related to custom and health problems. Seven prohibitions were for *bomilintse* and related to custom. While nina restrictions apply to men, bomilintse is taboo for all family members.

Locally perceived changes in fishing activities

The principal perceived change in fishing was a decrease in fish stocks, reported by 51.4% of households[209]. Household-level participants associated a decline in fish stocks to supernatural causes (24.3%), the growing number of fishers (23.0%), and the use of unsustainable techniques such as poison (19.7%), increasing number of fishing implements, and intensification of activities (table 84). Two households reported the presence of Salonga National Park as the cause of decreased availability of fish. The onset of most changes (42.8%) was reported as the decade of the 1990s.

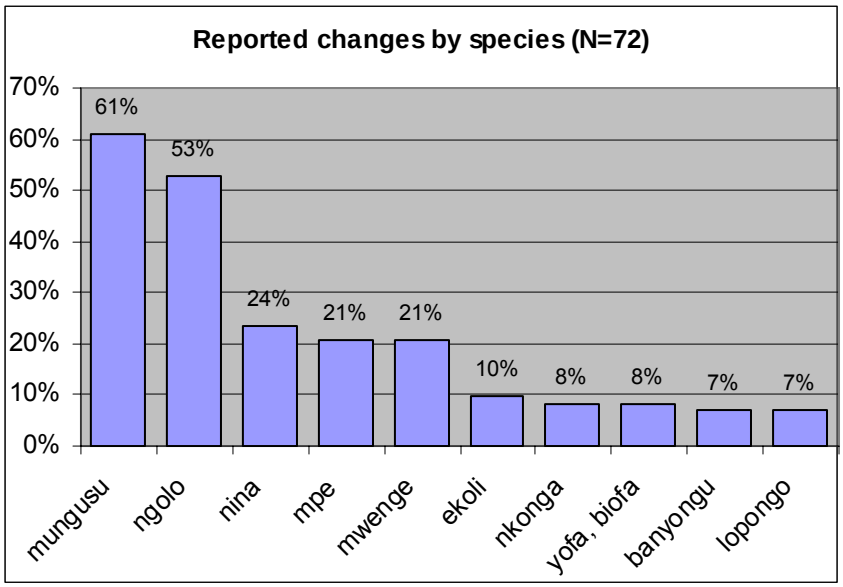
[208] Includes households that do not fish but reported consumption.
[209] The other change mentioned was changes in the weather, mentioned by one household.

Table 84 Causes associated with decrease of fish stocks (N=72)

Causes	% responses[210]
Supernatural	24.3
Demographic pressure	23.0
Use of poison	19.7
Unknown	17.2
Changes in use	13.4
Lack of respect for fishing calendar	6.3

The villages of Bokongo, Bonkoy, and Iyete II Mpuma had the highest number of households reporting changes in fishing activities and availability of fish (81.8% of households in Bokongo and 58.3% in Bonkoy and Iyete II reported changes in fishing activities).

Figure 110



The majority of changes concerned the most targeted, caught, commercialized and consumed species: mungusu (61.1%), ngolo (52.8%), and nina (23.6%) (figure 110).

Focus group participants mentioned decreasing fish populations in eight out of ten villages (table 85). This change was interpreted in two ways: 1) the overexploitation of fish, associated with increased number of implements, and an intensification of fishing activities by local populations and outsiders; and 2) decreased availability of certain species due to lack of equipment and loss of knowledge necessary to catch them. Participants talked about the disappearance of specialized local fishers and the arrival of outsiders who now exploit fish for commercial purposes. Fishers coming from other areas of the Province of Equateur, notably from the Congo River area, sell their catch in markets outside the territory, reducing local market supply of certain species.

Table 85 Changes reported by villages (N=10) and their associated causes

		Changes	
		Decrease in fish stocks (8 villages)	Decreased availability (3 villages)
Associated causes	More locals fishing	3	0
	Outsiders fishing in local waterways	2	0
	Introduction of new practices, instruments	2	0
	Number of instruments has increased	2	0
	Use of poison	2	0
	Lack of equipment and loss of knowledge	0	3

[210] Total exceeds 100% because some changes were associated with more than one cause.

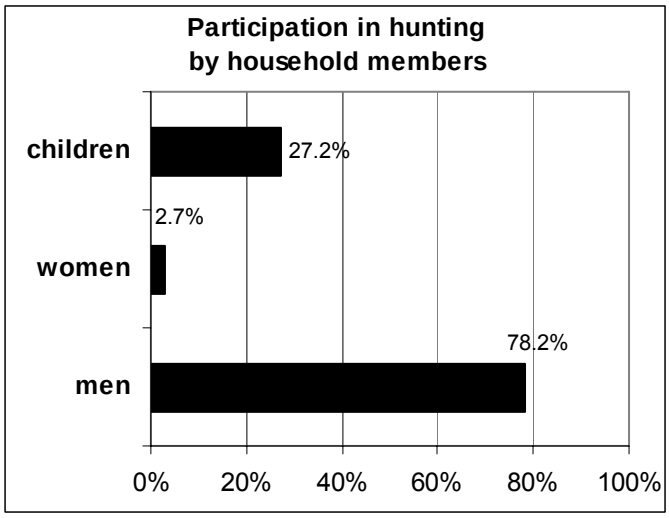
Fishers from outside the territory in their seasonal fishing camp. Luilaka River.

According to participants, fishing was a more important activity in the past. People in various villages talked about "specialized" fishers dying or disappearing and with them the possibility of eating certain species like mboto *(Distilchodus spp)*,ekoli (*Chrysichthys spp)*,nsuni or mpole (*Heterobranchus longifilis)*, and lofongo (*Citharinus macrolepsis)*. Participants did not associate this change with any event in particular, citing simply the disappearance of specialists. The abandonment of some fishing practices is consistent with observations in the field and with the presence of fishers from outside the territory, who fish intensively with methods not used by local populations. Fish in demand by outsiders also included ngolo and mungusu, the most commercialized fish species in the landscape.

4. Hunting

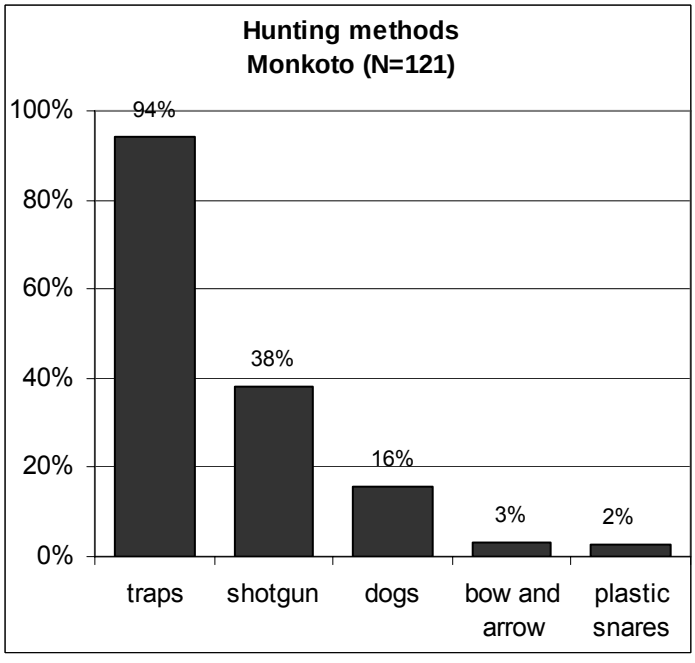
Hunting is almost exclusively a male activity (figure 111) practiced as a subsistence and/or commercial activity by 82.3% of households. Local men engage in individual hunting, sometimes accompanied by older male children. Methods of hunting include traps, shotguns, bows and arrows (including poisoned arrows), dogs and plastic ("nylon") snares (figure 112).

Figure 111



In addition to households that hunt for consumption and commerce, 17.7% of households in Monkoto reported purchasing bushmeat for household consumption from hunters in their own villages.

Figure 112



Households hunt and trap using one to three techniques with an average of 1.5 methods per household (SD=0.63). The most popular method in Monkoto is traps, used by 94.2% of hunting households (figure 112).[211] The percentage of households hunting with more than 100 traps was the highest found in the landscape (table 86).

Table 86 Instruments per household

	Traps (N=112)
≤20	6.3%
21-40	20.5%
41-60	15.2%
61-80	11.6%
81-100	12.5%
>100	33.9%

Other methods, such as shotguns and dogs, were reported by fewer than 40% of households, while bows and arrows and plastic snares use was mentioned by fewer than five households.

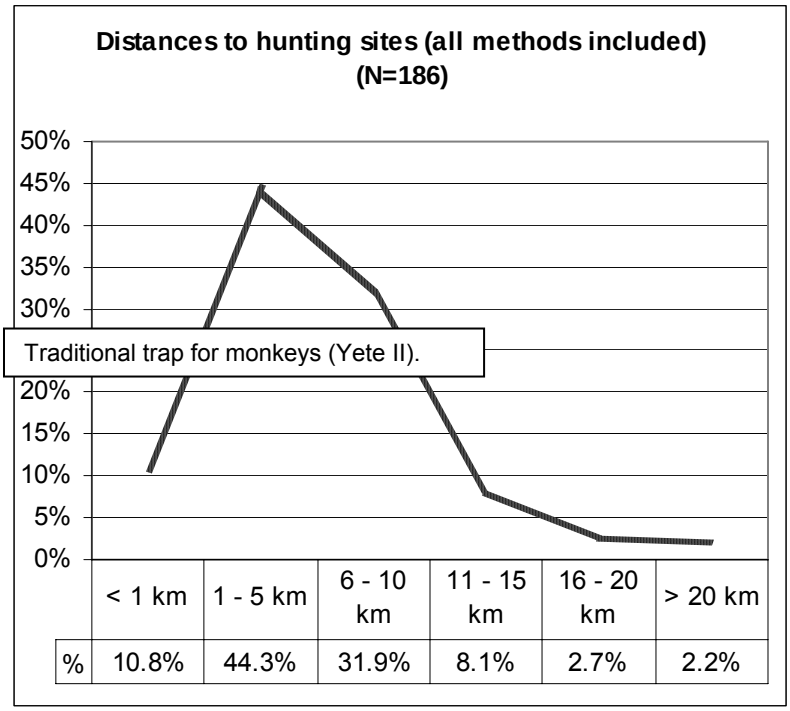
[211] However, field researchers when filling in questionnaires did not always distinguish between traditional traps and those constructed of wire or plastic snares.

Traditional Trap

Most hunting takes place year-round (78.0%). However, some hunting and trapping is exclusive to the rainy season (17.7%). Four households reported hunting during the dry season, while two reported hunting and trapping from January to June.

Men reach hunting and trapping areas by forest paths (76.1%), through the colonial period roads and forest paths (13.5%), and by a combination of forest paths and waterways (10.3%). The majority of participants (55.1%) reported walking from one to five kilometers to get to their hunting sites; including camps (figure 113).

Figure 113[212]



	< 1 km	1 - 5 km	6 - 10 km	11 - 15 km	16 - 20 km	> 20 km
%	10.8%	44.3%	31.9%	8.1%	2.7%	2.2%

Species preferred by Monkoto hunters and trappers include river red hog (*Potamocherus porcus)*, brush-tailed porcupine (*Atherurus africanus*), duikers (*Cephalophus spp),* giant pouched rat (*Cricertomys gambianus)*, and monkeys. Figure 114 compares preferred species to species actually captured. The techniques used to capture the ten principal species mentioned by hunters are summarized in figure 115.

[212] Distances are given per method per household ("activity") because distances sometimes varied depending on the method used by households.

Figure 114

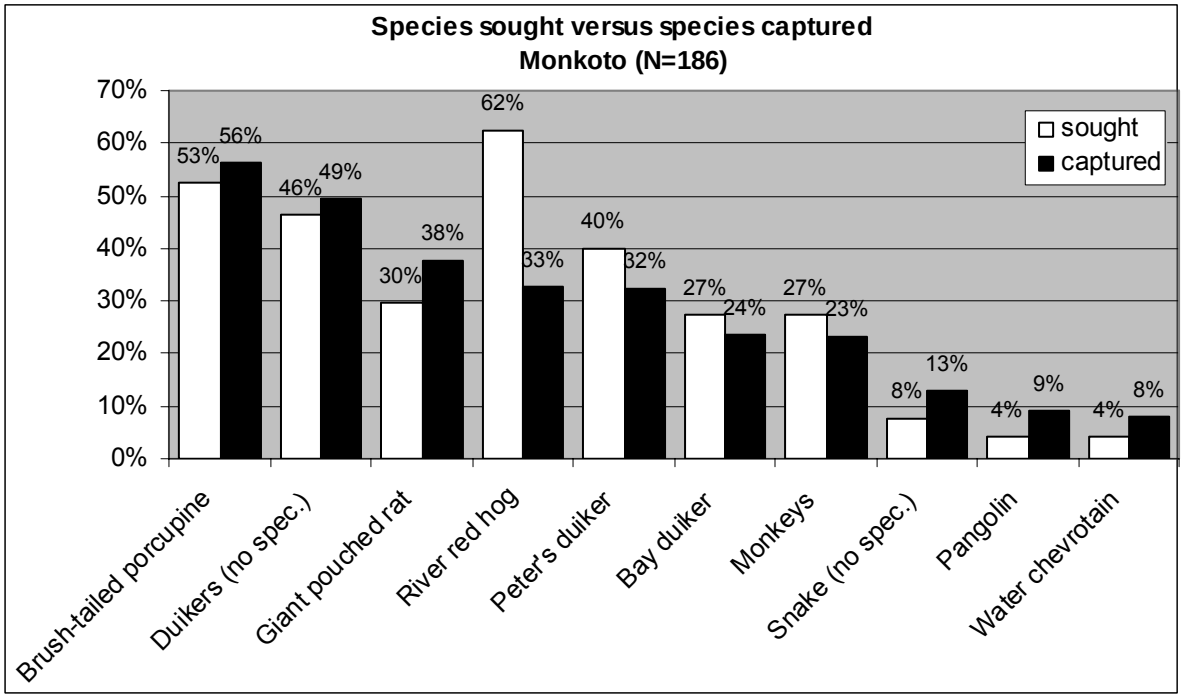
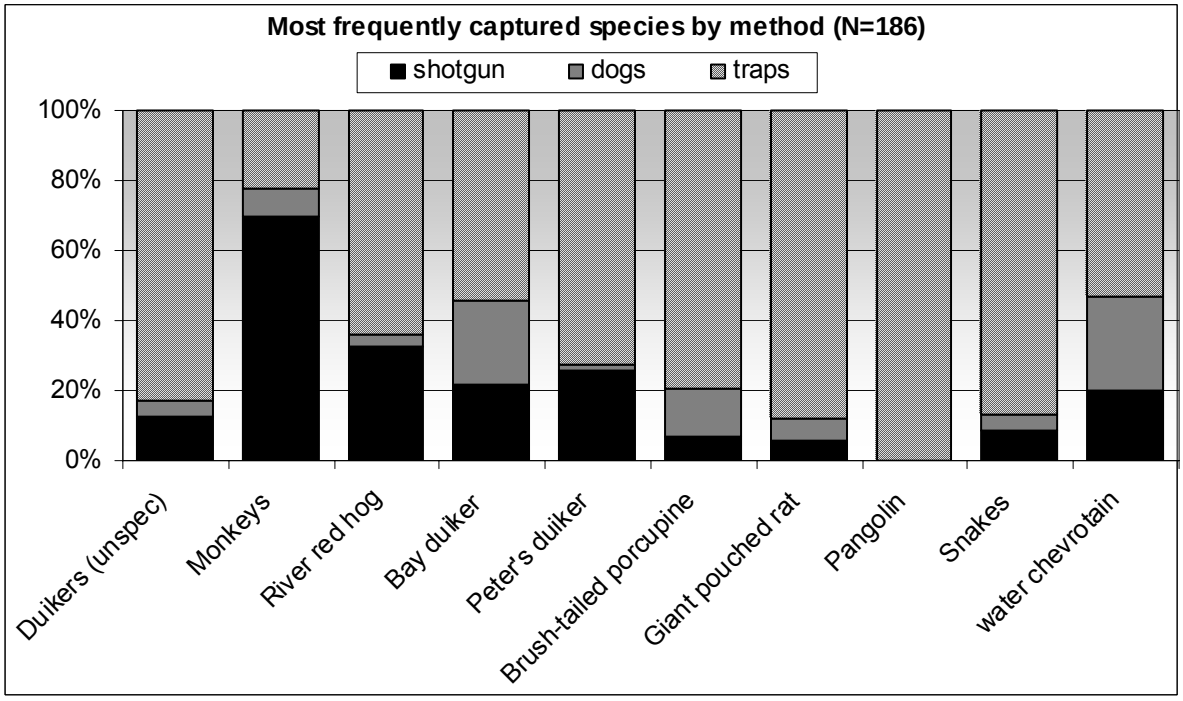


Figure 115



Revenue from hunting

Eighty-four percent (84%) of hunting households commercialize a portion of their capture, a percentage similar to that reported by households that commercialize a portion of their fish catch (82%). Participants reported selling between one and seven species. The average number of commercialized species was 3.38 (SD=1.54). Ninety-five percent (95%) of transactions by local hunters take place in hunters' own villages. Figure 116 includes the proportion of transactions per unit of sale in Monkoto.

Figure 116[213]

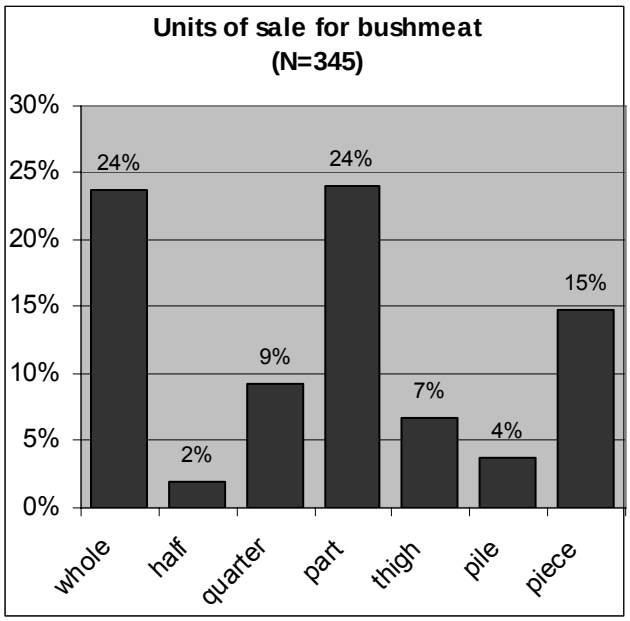
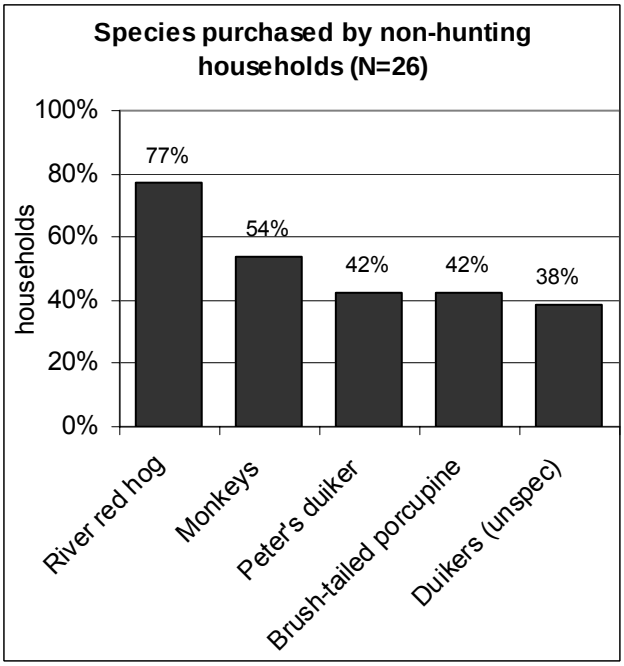


Figure 117



Eighty-seven percent (87%) of bushmeat sold by hunters is smoked. Larger units of sale are normally bought by merchants who resell bushmeat in larger markets. Smaller units are sold or bartered locally to non-hunting households. Non-hunting households reported buying on average 3.2 species. Species most frequently bought by local households are river red hog, monkeys, Peter's duiker, brush-tailed porcupine and unspecified duikers (figure 117). Table 87 presents the species most frequently sold by households as well as their unit prices.

Table 87 Most often commercialized species and prices per units of sale ($1.00=450FC)

Species	% households (N=102)	Piles	Quarters of carcasses	Per animal (individual carcass)
River red hog	71.6	100-200FC	500-5000FC	600-10000FC
Peter's duiker	54.9	100-400FC	250-500FC	2500FC[214]
Brush-tailed porcupine	45.1	200FC[215]	400FC[216]	200-2000FC

Revenue from hunting is low. Only 9% of households reported revenue above 5000 FC during the rainy season and only 2% reported similar earnings during the dry one. The majority of households (59%) reported gains under $5 for the rainy (high) season, and 26% of households that reported profits during the rainy season reported none during the dry (figure 118). Only one household reported profits over $50 for both seasons. This household included the sole hunter who reported selling bushmeat in a market outside the landscape. Higher gains in the rainy (high) season often translated to higher profits in the dry (low) season. A correlation of r=0.92 between rainy and dry season revenue was found in Monkoto, the highest among all research areas (figure 119).

[213] The largest unit is "entier" (whole), followed by "moitié" (half), "quartier" (quarter), "portion" (part), "patte" (leg), "tas" and "mopiko" (pile), and "morceau" (piece).
[214] Only one case.
[215] Only one case.
[216] Only one case.

Figure 118

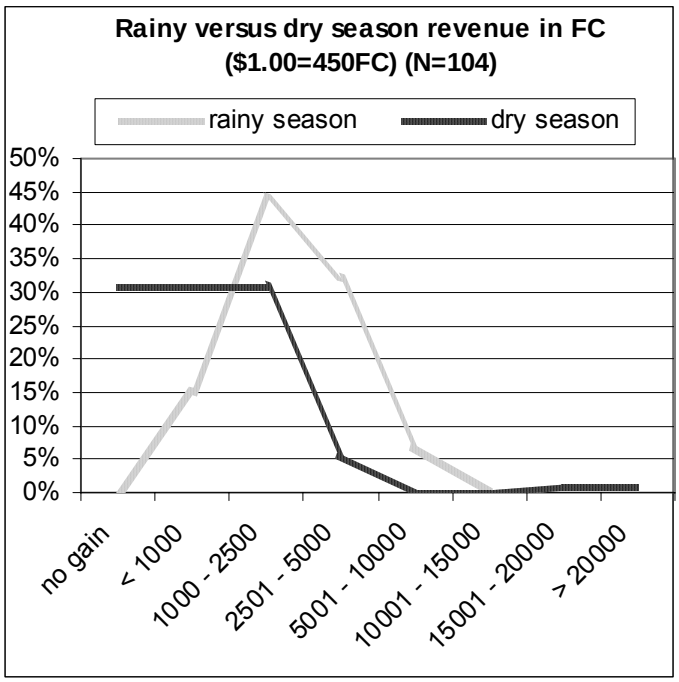
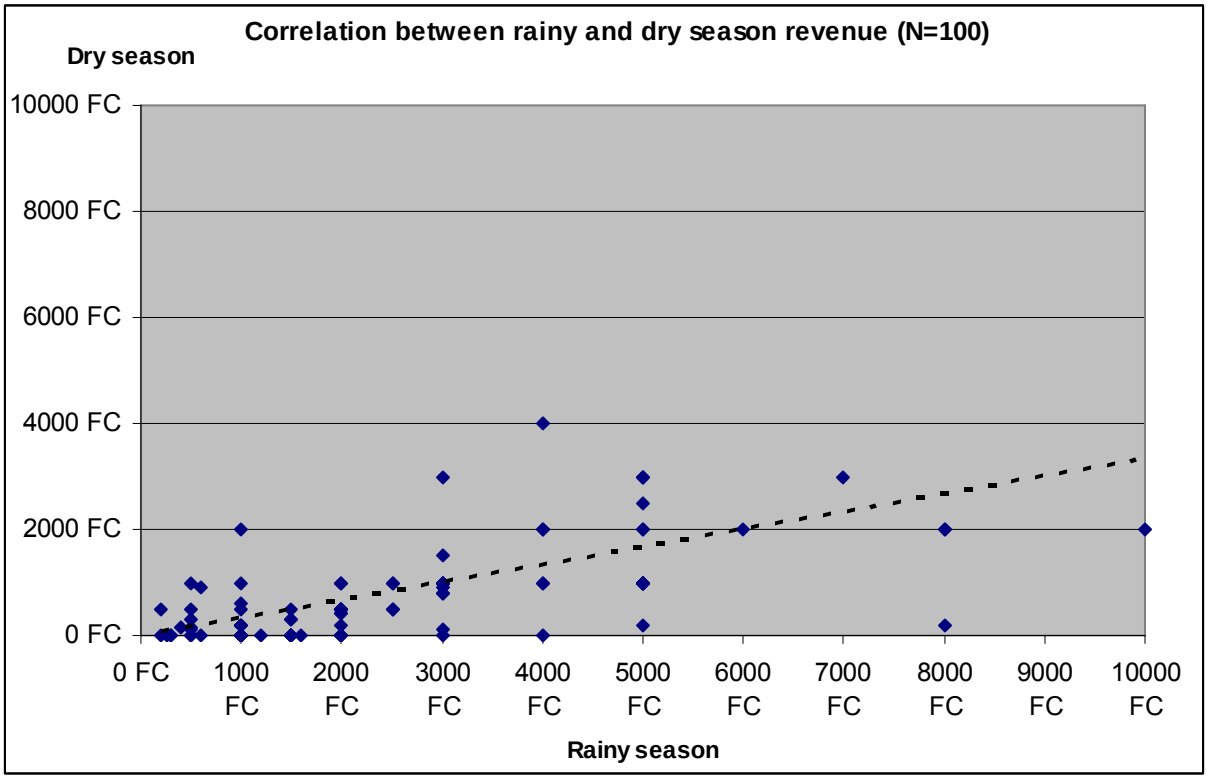


Figure 119

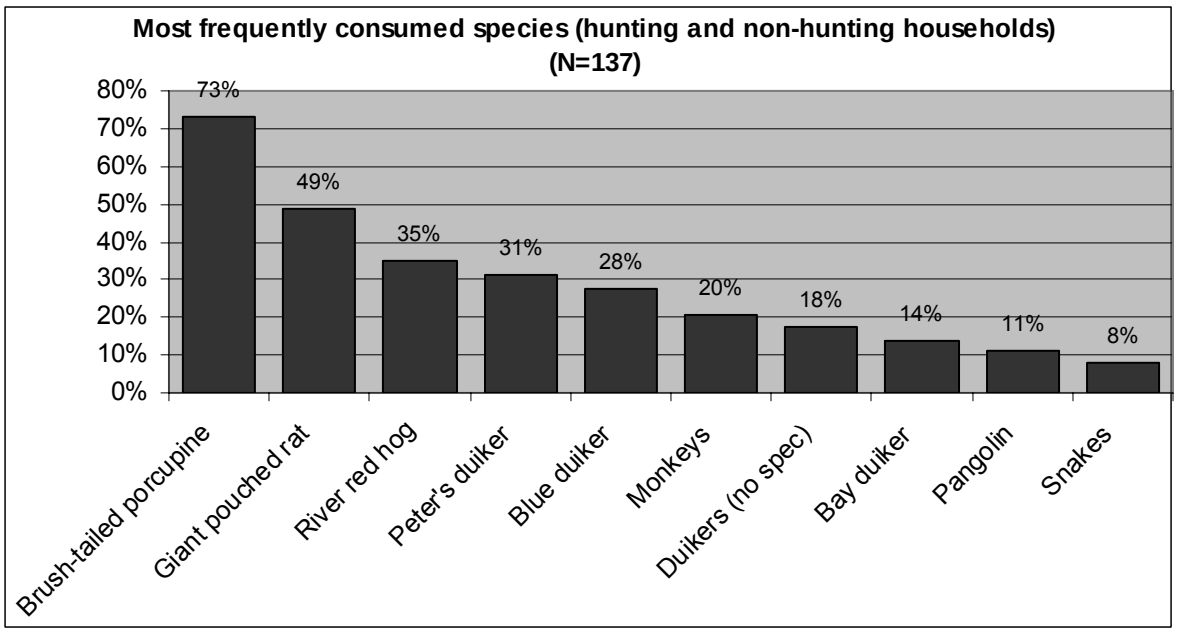


Consumption of bushmeat

In terms of consumption, households in Monkoto reported eating between 1-7 different species (average 3.29, SD=1.24). Figure 120 includes most frequently consumed species by Monkoto households. Responses from Monkoto households differed from those provided by households in other parts of the landscape where percentages of species hunted corresponded to percentages commercialized and consumed. In Monkoto, duikers and monkeys appear to be

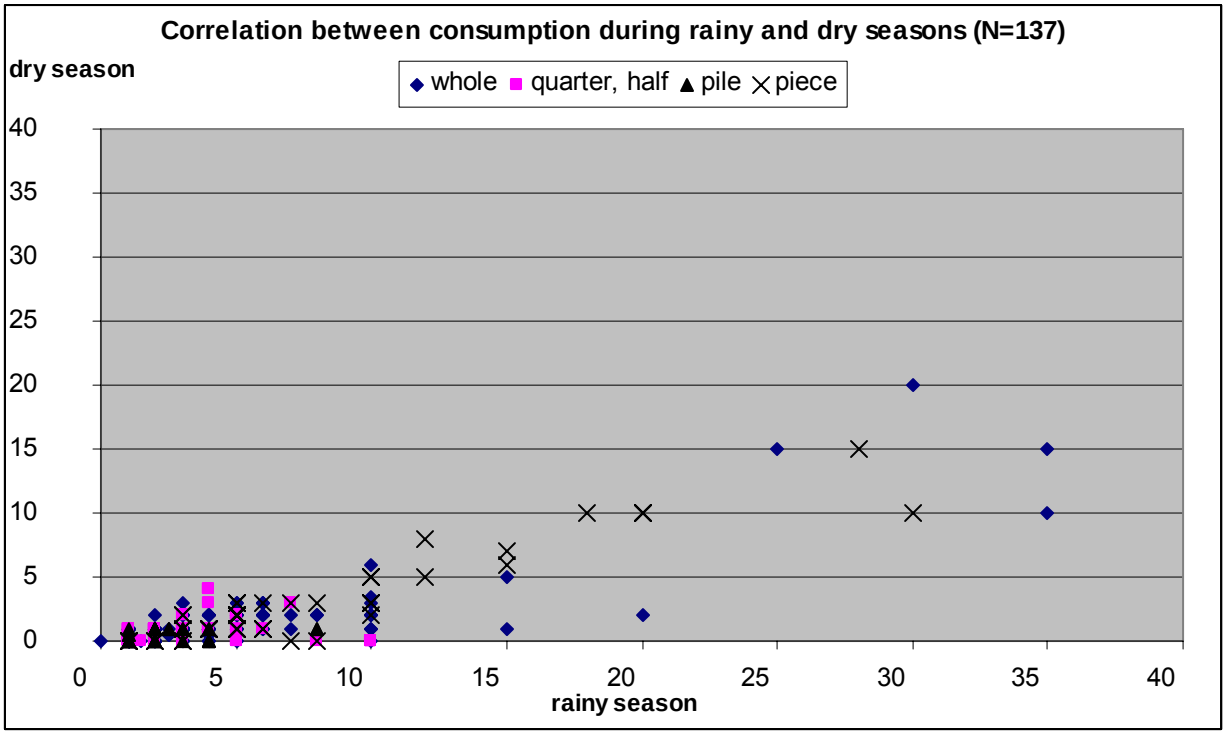
sold more often than they are consumed, while the opposite is true for species like brush-tailed porcupine and giant pouched rat.

Figure 120



The most frequently used measurements of household consumption were whole animal (for smaller animals such as brush-tailed porcupine and giant pouched rat) and “pile” (tas, mopiko) and “piece” (morceau) for larger animals. Weekly consumption of bushmeat decreases during the dry season, but households with greater consumption of bushmeat in the rainy season also consume relatively more during the dry season (r=0.76) (figure 121).

Figure 121



Forty-two percent (42%) of households that reported consumption of river red hog during the rainy season did not report eating it during the dry season. The same was true for 29% of households that reported consuming brush-tailed porcupine and 24.6% of households that eat

giant pouched rat. Amounts of principal species consumed during the rainy and dry seasons appear in table 88.

Table 88 Most often consumed animal species

species	% households (N=137)	Weekly consumption rainy season[217]	Weekly consumption dry season
Brush-tailed porcupine	73.0	1-35 whole (average 3.34[218])	0-20 whole (average 1.22[219])
Giant pouched rat	48.9	1-35 whole (average 4.8[220])	0-15 whole (average 1.59[221])
River red hog	35.0	1-4 piles (average 2.59[222])	0-1 piles (average 0.59[223])

Food prohibitions were reported by 28.3% of households, representing the lowest percentage found across the landscape. These prohibitions relate to custom (79.6%) or individual choice (20.4%). Taboos apply to women (78.6%) more often than to men (50.0%) and children (25.0%). The most often mentioned animals were snakes, leopard, golden cat, and carnivores in general (table 89).

Table 89: Principal taboo species

Species[224]	% of households (N=34)
Snakes	52.9
Leopard *(Panthera pardus)*	32.4
Golden cat *(Felis laurata)*	14.7
All carnivores	14.7

Locally perceived changes in the practice of hunting

In total, 75.4% of households in Monkoto mentioned changes in hunting. The village of Itota had the highest percentage of households reporting changes in hunting activities with 90.0% of participating households reporting changes. The principal change cited by household was decreasing wildlife numbers (96.5%).

Table 90 Causes associated with the decrease of wildlife (N=107)[225]

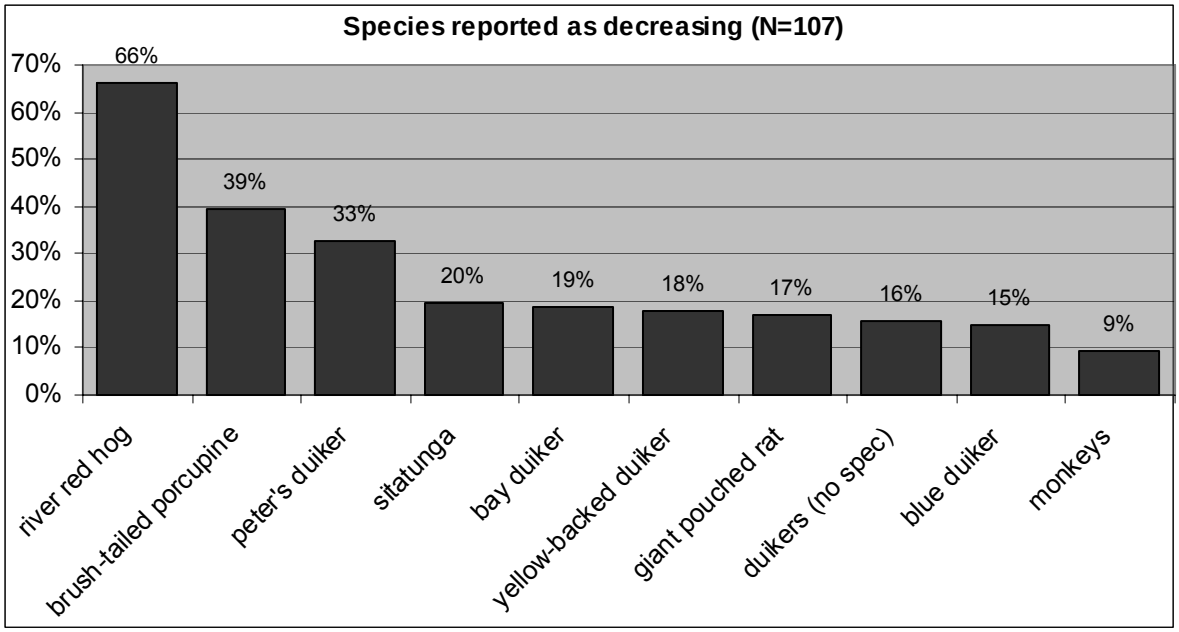
	%
Changes in hunting practices	51.1
Supernatural	15.4
Poaching	11.2
Demographic pressure	11.2
Unknown	9.7
Military	6.6

The majority of dates provided for the onset of changes corresponded to the past ten years (55.5%). Participants strongly associated decreasing wildlife numbers with changes in hunting practices which included the introduction of new methods

[217] Most frequently cited quantities of measure were used in each case
[218] SD=4.90
[219] SD=2.36
[220] SD=5.58
[221] SD=2.64
[222] SD=1.11
[223] SD=0.49
[224] Other species mentioned as taboo included eleka (5.8%), golden cat *(Felis laurata)* (4.7%), bonobo (4.7%), nkoba (3.5%), and African civet (2.3%).
[225] Other causes mentioned included abandonment of collective hunting (4.8%), lack of adequate hardware (2.7%), commercial hunting (2.4%), and seasonal (1.9%).

and the increase in numbers of equipment per household (51.1%). Changes were also associated with supernatural causes, poaching, and increased numbers of local hunters dependant on the same resources (table 90). Only one household mentioned the presence of SNP as a cause of decreased access to wildlife. The species most frequently mentioned as decreasing appear in figure 122.

Figure 122[226]



After agriculture (34.9%), changes (28.6%) were mentioned the most frequently for hunting by focus groups. Just as in household interviews, decreasing wildlife populations was the principal change mentioned by focus groups (table 91).

Table 91 Changes in hunting activities and their perceived causes (N=10)

		Changes
		Decrease in wildlife (9 villages)
Associated causes	Increased number of local hunters	7
	Increased number of equipment (e.g. firearms, wire snares)	4
	Poaching	2

Other causes associated with a decrease in wildlife were the introduction of new practices, supernatural causes, the war, and the commercialization of bushmeat (1 village each). Finally, participants from two villages or 2.7% of households reported decreased capture because of insufficient equipment.

[226] Other species mentioned included elephant (8.4%), water chevrotain (8.4%), bonobo (4.7%), pangolin (4.7%) and snakes (4.7%).

E. *Access to land and resources*

Local households have open access to natural resources located within their village's forests and waters. These traditional areas may also encompass the previous site of the village (e.g., relocated during the colonial era) where people not only hunt and fish but harvest fruits and other products from plants and trees planted by their ancestors. Locals can clear forest for agricultural activities everywhere except cemeteries and other people's fallow fields. Patricipants from Iyete I and Iyete II also mentioned prohibitions concerning areas destined for the division and preparation of totem animals killed by hunters.

Unlike other areas in the landscape, participants from four villages referred to superstition and fear as the main deterrents to the use of cemeteries, versus tradition or custom. The only other restriction referred to was SNP, mentioned by participants from Iyanda. Participants from the villages of Bokombola, Bokongo, Bonkoi, Itongu, Itota, Iyanda, Tumba, and Weta also specified areas within their forest reserved exclusively for farming, hunting, and NTFP activities (table 92)

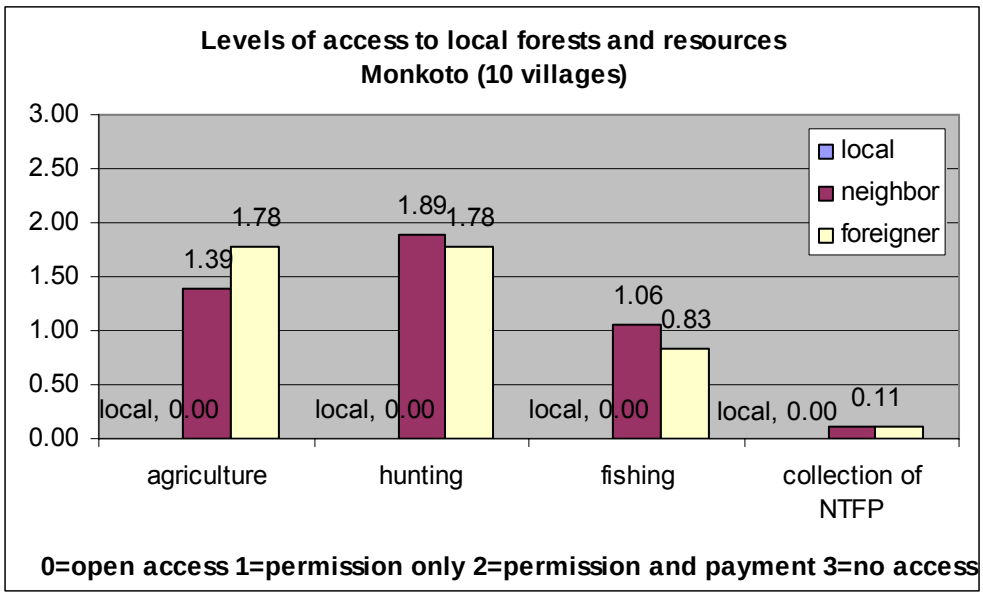
Table 92 Village use zones

Village	Activity	Zone or Forest
Bokombola	Hunting	Ditoko, Bonteko, Tofambe
Bokongo	Hunting	Okongo, Etamba, Mpuya, Omeme
Bokongo	NTFP	Mpuya, Mus'okeli, Asala
Bonkoi	Agriculture	Botuka
Bonkoi	Hunting	Botuka
Bonkoi	NTFP	Botuka
Itongu	Hunting	Atongu, Bolala, Oleli Oleli, Bokungu, Bosofata, Belafa
Itongu	NTFP	Bolala, Oleli Oleli, Bokungu, Bosofata, Belafa
Itota	Agriculture	Mboyo, Mpuma, Ebolabola
Itota	Hunting	Itswali, Besege, Boleko, Bolengua, Baleke, Elenda, Ifomi, Ifoku
Itota	NTFP	Mboyo, Mpuma, Ebolabola, Itswali, Besege, Boleko, Bolengua, Baleke, elenda, Ifomi, Ifoku
Iyanda	Agriculture	Wema, Mpuma, Watshi, Botuka, Elali Iyanda
Iyanda	Hunting	By the Luile River, Mpuma, Watshi, Botuka, Elali, Iyanda
Iyanda	NTFP	Wema, Mpuma, Watshi, Botuka, Elali Iyanda
Tumba	Hunting	Itswali
Tumba	NTFP	Itswali, Lokombo, Wa Teddy, Centrale (beaucoup de mikungu)
Weta	Hunting and NTFP	Boyenge, Bomgolo, Ikoko, Bekako, Boimbo, Boleki, Mbodje, Nkongo, Lokombe, Mbolembe

People from neighboring villages and foreigners to the area access local land and resources by soliciting the permission of traditional authorities, who determine whether people may have open, free access or must pay. Participants in men and women's focus groups were asked about access mechanisms for farming, hunting, fishing and the collecting of NTFPs. Figure 123 depicts the average levels of control for all categories[227].

[227] A complete list of villages and the forms of access and restrictions for locals, neighbors and foreigners is included in appendix 7.

Figure 123



Divergences between men and women's interpretation of access to land and natural resources were recorded only in the village of Iyanda, where women mentioned greater restrictions concerning access to fishing areas, while men mentioned greater restrictions for farming by outsiders. The emphasis by women on fishing access rights may be a reflection of their greater involvement in the activity.

The highest restriction for neighbors concerned hunting and trapping access, followed by farming and fishing. Levels of restriction for hunting were higher in Monkoto than those found in the areas of Oshwe territory and the Salonga and Lomela Rivers, but lower than those recorded in Dekese. Of all participating villages in Monkoto, only the village of Tumba requires permission from traditional authorities alone in order to hunt in local forests. Monkoto and Lokolama (Oshwe territory) were the only areas in the landscape where access for hunting activities was more restrictive for neighbors than for foreigners. Monkoto was also the only area where neighbor use of fishing areas was more limited than for outsiders.

Little difference was found in the amount of payment demanded from neighbors and foreigners, and participants often gave similar examples of what it is required to hunt in their forests:

> *« Through an arrangement with the chef de localité or with the owner of that part of the forest [the hunter] gives ammunition in exchange for permission to hunt for two weeks."* (Women's focus group Iyete I Bankanya)

Participants from Bokongo provided specific information on the quantities of ammunition and products expected as payment for access to their forest and waters. For example, if a hunter brings one box of ammunition he must give 10 cartridges as payment and hunt with the remaining 15. A hunter with five boxes of ammunition is expected to give two boxes as payment, keeping the remaining three for himself. Fishers from the area are expected to provide 30% of their catch as compensation for access to the traditional fishing areas of the same village (Women's focus group Bokongo).

Similar quantities were reported in other villages. Participants from the village of Iyanda said fishers from neighboring villages needed to have *«…the authorization from traditional authorities and [later] pay with two or three baskets of their catch." (Women's focus group Iyanda)*

Access to village forests for the collection of NTFPs is open to neighbors and foreigners in all but one village. Participants from Itota said that neighbors and outsiders needed permission

from traditional authorities in order to collect NTFPs in their forest. Participants from Tumba and Weta also specified that access was permitted only for subsistence use, and that neighbors and foreigners collecting NTFPs for commercial purposes needed to pay access rights. Focus group participants from Itongu and Iyanda declared that neither neighbors nor foreigners had ever attempted or desired to collect NTFPs in their forests. Participants from Itongu added that no outsider had ever expressed interest nor requested permission to fish in their waters.

Even though traditional rules restrict access to neighbors and outsiders, participants reported difficulties in controlling the use of local natural resources by certain individuals and groups. Table 93 includes information for every village reporting the presence of non-authorized users of their land and resources.

Table 93 Groups and individuals exploiting natural resources without seeking permission from local traditional authorities

Village	Who	Activity
Bonkoi, Bokongo	Mwe[228], Ngombe[229], Lokele	Fishing
Iyete (II) Mpuma	Mwe, Ngombe, Mabinza[230]	Fishing
Weta	Hunters from Mbandaka	Hunting
Itongu	Mwe, Ngombe, and poachers	Hunting
Itongu	Mwe	NTFPs
Iyanda	Mwe, Mabinza, Ngombe	Fishing
Iyanda	Ngombe and poachers (both by the Luile River)	Hunting
Iyete (I) Bankanya	Mabinza	Hunting
Iyete (I) Bankanya	Mwe, Imbonga, Bosa[231], Waka, Losako	Fishing

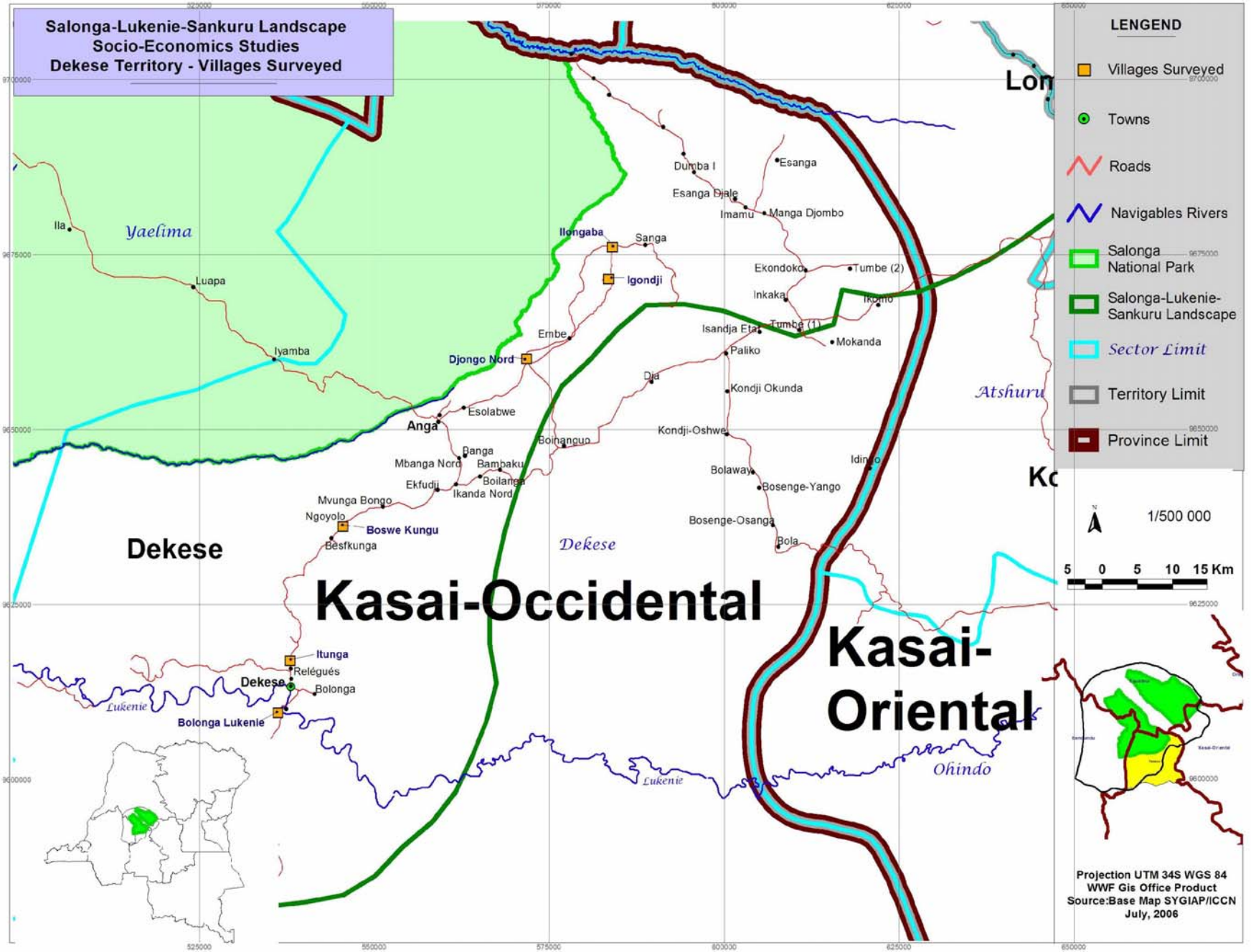
Five villages reported the presence of fishers from other parts of the province, notably from the Congo River area. These groups are associated with the use of fishing techniques different from local methods, and their presence coincides with reports of changes in local participants' own fishing practices and the disappearance of "experts" described in the Fishing section. Some participants believe that fishers from outside the landscape are filling a gap left after the disappearance of local experts. Ngombe, Mwe, Mabinza, and other fishers foreign to Monkoto stay in the area for several months before traveling to Mbandaka and other large markets to sell their catch. Ngombe, Mwe and Mabinza groups were sometimes associated with hunting activities as well. However, participants differentiated between these groups and poachers. Like elsewhere in the landscape, poachers are defined by local populations as outsiders using automatic or military-type weapons for large-scale bushmeat commerce. Poachers differ from hunters also in terms of the limited control exercised over their activities by local authorities. While traditional authorities can still exercise some control over Ngombe and other groups, their power to regulate poaching activities is almost non-existent.

[228] Or Bamwe (from Sud Ubangi?)
[229] From the Congo River
[230] From the Congo River
[231] From Mbandaka?

Dekese Territory

This section includes results from six villages located in the Sector Ndengense-Ikolombe-Isolu in the part of the Territory of Dekese located within the landscape limits. The villages of Djongo Nord, Ingodji, and Ilongaba are located within 10 km of SNP's limits.

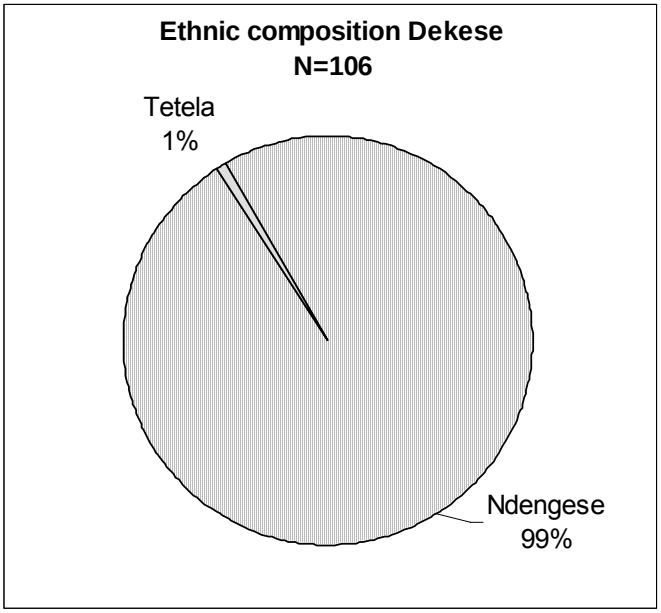
Province	Kasai Occidental
District	Kasai
Territory	Dekese
Sector	Ndengese-Ikolombe-Isolu
Groupements	Ngeledjale, Vefeku, Itende
Villages	Bolonga Lukenie, Boswe Kungu, Djongo Nord, Ingodji, Ilongaba, Itunga


Salonga-Lukenie-Sankuru Landscape
Socio-Economics Studies
Dekese Territory - Villages Surveyed
LENGEND
Villages Surveyed
Towns
Roads
Navigables Rivers
Salonga National Park
Salonga-Lukenie-Sankuru Landscape
Sector Limit
Territory Limit
Province Limit
1/500 000
5 0 5 10 15 Km
Kasai-Occidental
Kasai-Oriental
Dekese
Yaelima
Atshuru
Ohindo
Lukenie
Ila
Luapa
Iyamba
Djongo Nord
Ilongaba
Sanga
Igondji
Embe
Esolabwe
Anga
Banga
Mbanga Nord
Bambaku
Ekfudji
Boilanga
Ikanda Nord
Mvunga Bongo
Ngoyolo
Boswe Kungu
Besfkunga
Boinanguo
Dumba I
Esanga
Esanga Djale
Imamu
Manga Djombo
Ekondoko
Tumbe (2)
Inkaka
Tumbe (1)
Isandja Eta
Mokanda
Paliko
Dia
Kondji Okunda
Kondji-Oshwe
Bolaway
Bosenge-Yango
Bosenge-Osanga
Bola
Itunga
Relégués
Dekese
Bolonga
Bolonga Lukenie
Projection UTM 34S WGS 84
WWF Gis Office Product
Source:Base Map SYGIAP/ICCN
July, 2006

A. Cultural and Historical Context

The majority of participants from the territory of Dekese are of Mongo origin, specifically of the Ndengese group (99.1%) (figure 124). Twenty-five (25) different clans were identified in participating villages, the most frequently mentioned being Djandja (17.0%) Impodje (12.3%), and Indole (10.4%). In terms of ethnic composition, the Dekese area appears as the most uniform in the landscape, with one predominant ethnic group and relatively fewer clans than other study areas.

Figure 124



Local populations trace their origins to the Territory of Bokungu, in the Province of Equateur, about 700 km north of current villages' sites. The historical causes of migration of the Ndengese are similar to those of other groups of Mongo descent found in the landscape. In the case of the Ndengese, however, it was the Nkundu of Bokungu (another Mongo group) who won the ethnic conflict, forcing the Ndengese to migrate south.

> *« All the Ndengese come from Equateur. Conflict between the Nkundu and the Ndengese started with a dispute over a duiker, and this caused a war. That is why the Ndengese left the [Mongo] group and went their own way…Before [splitting], we all called ourselves Mongo[232]."* (Men's focus group Ilongaba)

After the war with the Nkundu, several Mongo sub-groups, including Tetela, Ikela, Ndengese and Nkfutu, settled in Bolong'itoko (somewhere in the Territory of Bokungu north of the Salonga River). All groups lived together, lead by a Tetela chef. The Tetela chef treated the other groups badly, cutting off their ears, plucking out their eyes, etc., so the groups separated again. At the time, the leader of the Ndengese was Bulamba. The Ndengese crossed the Salonga River to settle in the Territory of Dekese, founding the village of Kidji (called Edji today). Kidji means "the place of regrouping." In Kidji the population increased until it became impossible to remain together[233]. Itunga headed south, first settling in Baswe Kungu, and later moving again, in search of game. The three Itunga clans split and founded new villages: the Ndole and Imbaala clans settled close to the river Banto, while the Nkonjolo clan settled by the river Nsaka Mvula. Nkonjolo and Imbaala later regrouped again.

[232] "Bekese" is a type of tree. Colonialist mispronounced the name, becoming "Ndengese" or "people who live close to the trees."

[233] A second version indicates that groups were relocated to Kidji by colonial authorities. Colonial administrators designated one of the relocated leaders as chief over all the clans, creating conflict among traditional authorities.

People from Djongo Nord were among the ones that stayed in Edji, but the village has shifted location with time, and now Djongo Nord is two kilometers away from the original site. Part of Djongo Nord's population relocated yet a second time as the result of disagreements with colonial administrators, founding Boswe Kungu in 1933.

> *«The whites sent our ancestor Efule Mpambi Bosangaye to get water for them. [He] was offended by the request to perform such a menial task because he was, after all, guardian of tradition (Elombe). That is why he decided to move to Itendji, his mother's village. [However, Efule's] Chef Ikonga Samo, did not accept his request… [So instead] he settled in the savanna of Bekungu. That is why our village is called Boswe Kungu, or 'the savanna of Bekungu'"* (Men's focus group Boswe Kungu)

Catholic and Protestant missionaries arrived around the same time as colonial administrators. Table 94 includes the names of the first Europeans to arrive in the area.

Table 94 First Europeans to arrive in villages

Name	Place	Year and Role or Position
Mr. Greens "Tata Madefu"	Bolonga Lukenie, Boswe Kungu	First protestant missionary (ELBECO). American.
Father Alois	Bolonga Lukenie	First Catholic missionary.
Father Casimir	Boswe Kungu	1932. First Catholic missionary.
Mr. Medard	Djongo Nord	1953. Colonial administrator who directed the construction of the road by the *relégués.*
Father Casimir, Father Clement, Brother Bernard Claude	Itunga	1932. First Catholic missionaries.

Before the arrival of Europeans, the Ndengese group practiced hunting, collection of NTFPs, produced salt (*vefo ndengese*), and artisanal products such as pottery (*mpoke)*, hunting materials (*loolo,* a material used to make arrows; *bekfula* and *besiki* or arrows; and *botayi*, or nets), raffia cloth (*mbala*), matches (*iyo),* and dye (*ntshiyo*) that they traded with the Kuba people, south-east of their territory.

Agriculture was introduced by Europeans at the time when all groups still lived together in Kidji. Colonial administrators imposed the collection of resin and rubber, and the production of rice, cotton, and palm nuts on local populations. Products were purchased and bartered by European merchants. Table 95 includes the names of some of the traders that bought local products.

Table 95 Companies and traders in the area 1910s-Independence

Villages	Companies or traders	Type of business
Boswe Kungu, Djongo Nord, Ilongaba, Ingodji	Mr Grum (also owned a coffee plantation), Mr Rolot, Mr Repasse, Mr Antoine, Mr. Kitoko	Purchased palm oil, rubber, resin, cotton, groundnuts, and coffee.
Boswe Kungu	Longomo Djema, and Basa, Sylvain	Congolese merchants that took over agricultural trade after independence
Itunga	Companies Galik Penaza, and Nogeira	Purchased palm oil, rubber, resin, cotton, groundnuts, and coffee.

The road from Boswe Kungu to the territory's seat was built between 1937 and 1938. The road connecting Djongo Nord and Ilongaba to the territory's seat was completed in 1955. However, European traders stopped coming to the area in 1959 because of pre-independence unrest and

were replaced in some cases by Congolese traders that started appearing soon after independence.

The village of Bolonga Lukenie ("Brazza" or "Bolonga Bac") was not founded until 1967. Families from Bolonga Piste led by Mbie Loola, a former employee of a freight boat company operating in the area, relocated close to the river and founded Bolonga Lukenie, seeking more forest and "tranquility". People from other villages later settled in Bolonga Lukenie, located on the Lukenie River, in a colonial-era plantation abandoned after independence.

Other historical events mentioned by participants included the arrival of GEOCO, a geological company that prospected for oil in the area in 1974.

Similar to other parts of the landscape, economic decline during the 1980s and 1990s translated into isolation and lack of economic alternatives for local populations.

While recognizing the difficulties faced by local groups during the colonial period, such as forced labor and in-country exile for troublesome people ("relegation"), participants also talked about pre-independence advantages such as the existence of roads, trade, and services. Participants mentioned migration of young men to urban centers and diamond fields as one of the consequences of post-independence isolation.

Members of the rebel group RCD (Rassemblement Congolais pour la Democratie) were present in the area in the late 1990s. Few participants mentioned DRC's recent civil war, but those who did compared the effect of rebels to kwashiorkor. Local populations fled their villages and had to abandon their agricultural fields to hide in the forest (men's focus group Boswe Kungu). After hiding for almost one year, communities had to begin from scratch because rebels had plundered villages and seized and consumed farm animals and other products. Participants from the town of Dekese also mentioned destruction of schools and hospitals, as well as killings, by the rebel group.

B. Present day context: General demographics and social organization

Villages in this area remain located along colonial period roads presently reduced to footpaths, with travel by bicycle difficult or impossible in many locations. Seasonal inundations further complicate transport between villages.

> *« Cars used to arrive at the village. They stopped coming between 1981 and 1982 when the bridge over the Loayi River collapsed. »* (Men's focus group, Ilongaba)

> *«[W]e are forced to transport our products on our backs all the way to Mweka. »* (Men's focus group, Djongo Nord)

Villages vary in size from 25 to 230 households. Local authorities include the *Chef de localité*, the principal representative of the Congolese government, as well as the *Chef de terre*, elders *(notables)*, *chefs de clan,* and in some cases, a *chef de groupement,* all recognized locally but not considered part of the state's administrative hierarchy. Other local leaders included local church officials (Catholic, Kimbanguiste, Protestant, Muslim, etc.) and CBO leaders. Participants from, Ilongaba, located within 10 km of SNP's limits, also mentioned the ICCN guards among their local authorities.

Table 96 General demographic information

Average age of head of household	46.0 (men), 38.3 (women)
Female heads of household	3.8%

Average household size	7.2 (SD=3.27)
Nuclear families	61%
Polygamist families	19%
Average educational level of head of household	No schooling (women[234]) D4[235] (34.0% men)
Group membership	Participation in groups and associations equals 1.39 per household. Most membership corresponds to religious groups (88%), followed by agricultural associations (18%). Only 8% of households report participating in three or more groups.

Size of households, as well as their composition, varied greatly. The average size was 7.25 members (SD= 3.27). The number of members per household varied between one and 19 (table 97). As in the rest of the landscape, the composition of households also varied from case to case. Non-nuclear households included up to ten members in addition to the head of household's immediate family.

Table 97 Household size

Members per household	**%**
1 – 3	8.6
4 – 6	37.1
7 – 10	40.0
11 – 15	11.4
16 – 20	2.9

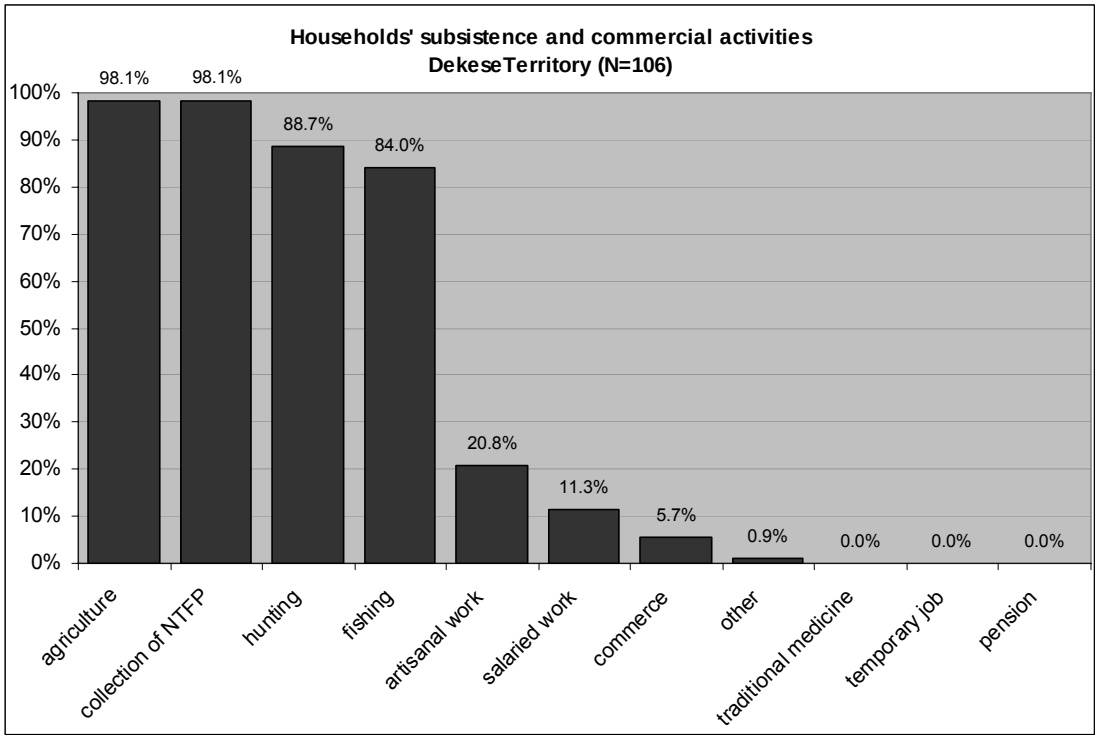
Participants whose parents were not from their current village of residence were, in all cases but one[236], from villages in the vicinity. Less parental migration was reported in this part of the landscape than in others: 85.8% of the fathers and 83.0% of the mothers of heads of household were from the participant's village. Only 3.8% of participants reported that their mothers moved out of their villages of origin because of marriage[237]. The desire of participants to move out of their villages was less frequent in this area than in the Oshwe Territory: 10.4% of heads of household reported plans to move[238], a figure similar to that found in the Salonga and Lomela river areas[239].

C. General information on household and village level subsistence and economic activities

Households in this area report on average four commercial and/or subsistence activities, with agriculture and the collection of NTFPs cited most frequently. Hunting and fishing represent the third and fourth most reported activities (figure 125).

[234] All except one participant with a secondary school degree.
[235] short cycle of secondary education
[236] Mbuji Mayi
[237] Compared with 23% in Lokolama, 24% in Nkaw, and 27% in the Salonga and Lomela river areas.
[238] Compared with 21% in Lokolama and 25% in Nkaw.
[239] 9.6%.

Figure 125



The number of activities per household was higher where one or more members were also engaged in salaried work (4.67 versus 4.08 activities). Table 98 includes the activities reported by households with at least one wage earner.

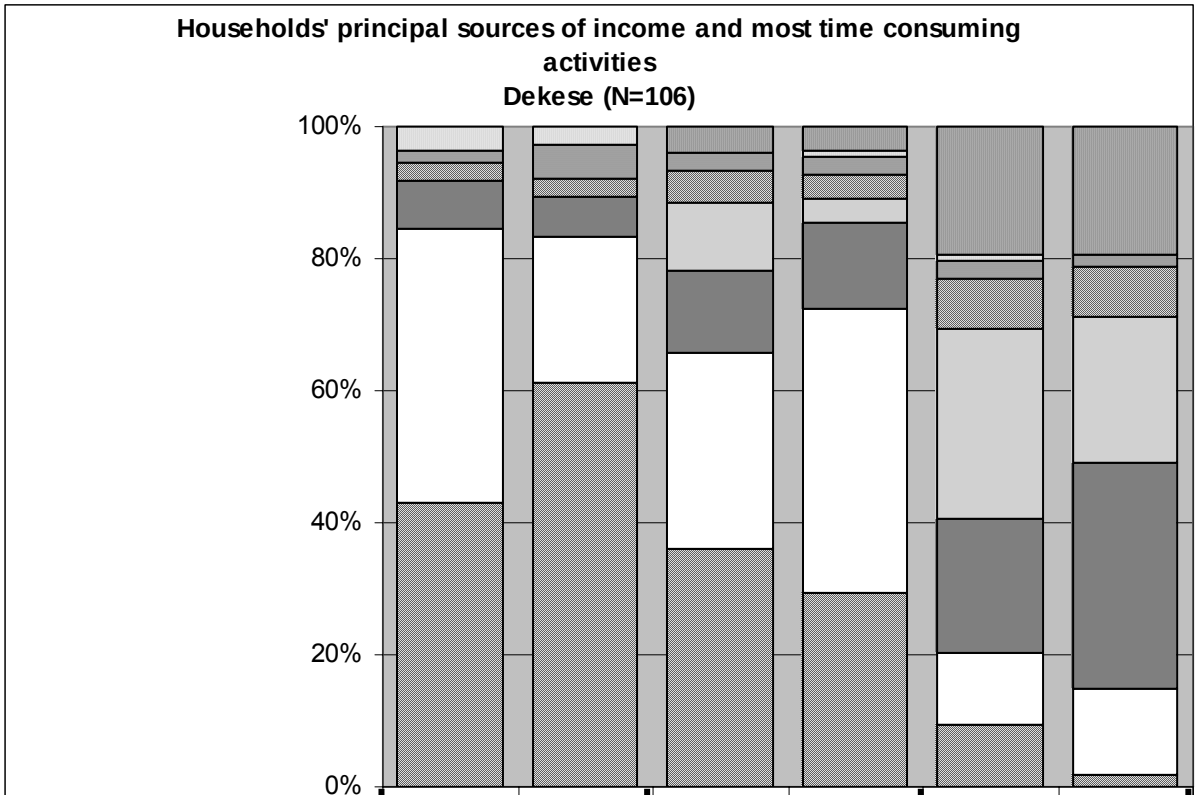
Table 98

Households (N=12) with at least one wage earner also engaged in	#
Agriculture	12
Collection of NTFP	12
Hunting	10
Fishing	8
Artisanal work	1

1. Income generation and time allocation

Like elsewhere in the landscape, most income generating activities in the area involve NR exploitation, notably agriculture, hunting, fishing, and collection of NTFPs (figure 126). The importance of the collection of NTFPs in terms of revenue was higher in this area than in other parts of the landscape.

Figure 126



	first source	most time	second source	second time	third source	third time
no second or third activity	0.0%	0.0%	3.8%	3.8%	19.8%	19.8%
commerce	3.8%	2.8%	0.0%	0.9%	0.9%	0.0%
salaried work	1.9%	5.7%	2.8%	2.8%	2.8%	1.9%
artisanal work	2.8%	2.8%	4.7%	3.8%	7.5%	7.5%
collection of NTFPs	0.0%	0.0%	10.4%	3.8%	29.2%	22.6%
fishing	7.5%	6.6%	12.3%	13.2%	20.8%	34.9%
hunting	42.5%	23.6%	29.2%	44.3%	11.3%	13.2%
agriculture	44.3%	65.1%	35.8%	30.2%	9.4%	1.9%

Agriculture and hunting stand out as the two principal sources of income, while fishing and collection of NTFPs are important tertiary sources. The importance of hunting and collection of NTFPs as sources of income was higher among Dekese households than among households from other areas[240]. However, fishing's rank as an income source was as low in the Dekese area as in the territory of Monkoto. In both areas, only 41% of households reported fishing among their three principal sources of income, representing less than half of that reported in Salonga and Lomela areas, 21% less than Lokolama households, and 15% less than households in Nkaw.

Salaried work, although time-demanding, appears to render little income and benefits. Only two percent (2%) of households reported salaried work as their principal source of income, while

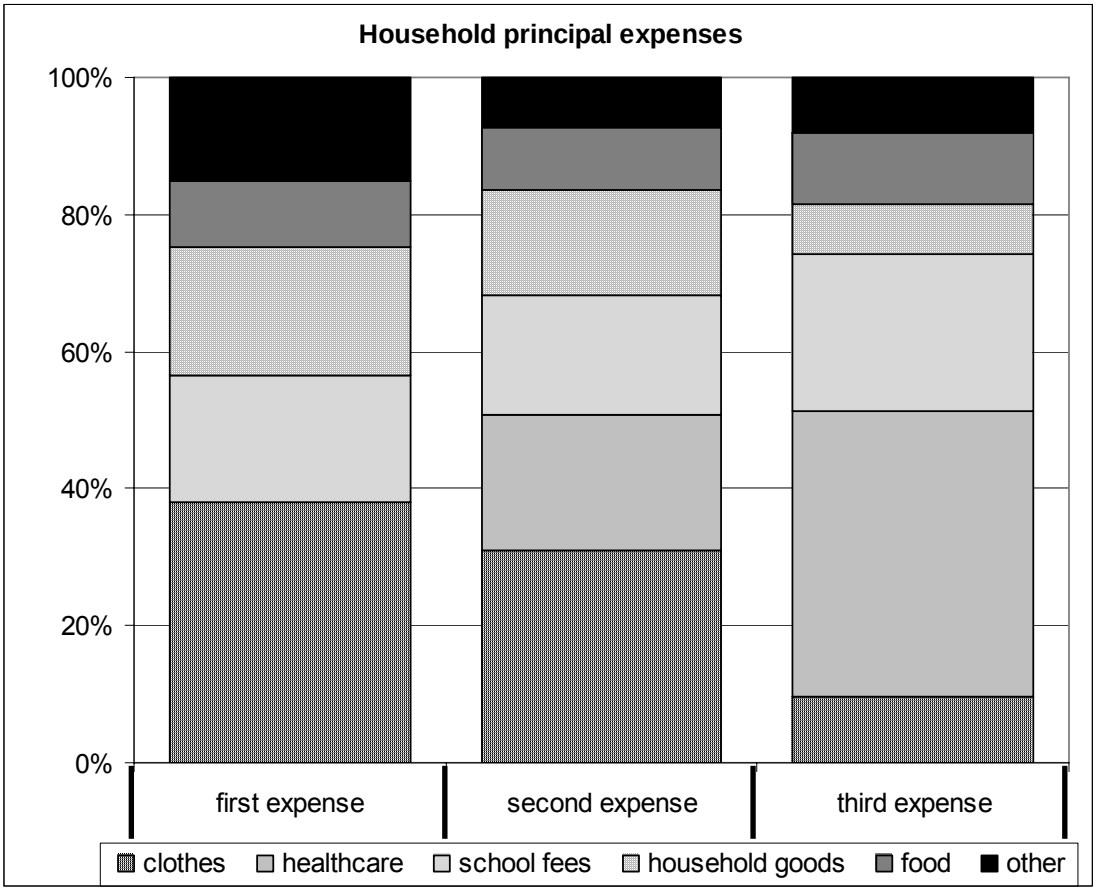
[240] Hunting was reported among the three principal sources of income by 83.0% of households in Dekese, 73.2% in Nkaw, 66.1% in Lokolama, and 62.1% in the Salonga Lomela areas. Collection of NTFP was reported among the three principal sources of income by 39.6% of households in Dekese, 19.5% in Nkaw, 19.3% in Lokolama, and 18.6% in the Salonga Lomela areas.

5.7% reported it as their most time-consuming activity. Also, more households reported agriculture as being time-consuming than as a principal source of income. Correlation between income and time was r=0.88 for first source/most time, r=0.91 for second source/second time, and r=0.85 for third source/third time.

2. Household expenses

Household earnings' are used to buy or barter for clothes, household goods, and food, and to pay for services like healthcare and education (figure 127). Clothes represent the principal expense of households (40.6%) in the territory, and were mentioned by a total of 83.0% households as being among their three principal expenses. Healthcare was the second most frequently cited expense (65.1% of households). The Territory of Dekese was the only area in the landscape where participants did not mention health as a principal expense, but only as secondary or tertiary expense. School fees ranked third in importance, followed by household goods and food.

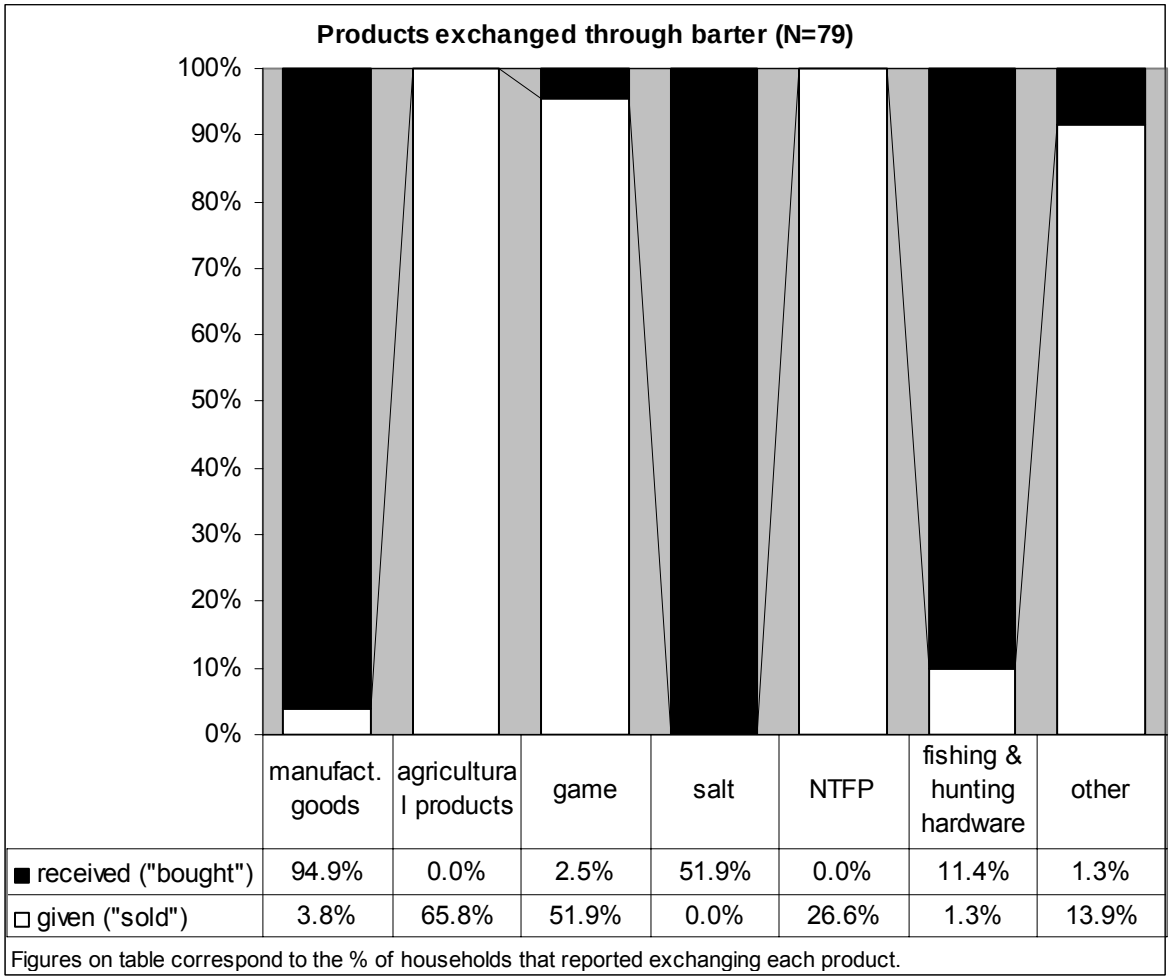
Figure 127



Other expenses include salt and soap (16.0% of households for each), home improvement, hunting equipment, and savings.

Like elsewhere in the landscape, geographical isolation results in a reliance on barter for commercial transactions. Seventy-five percent (75%) of households in Dekese reported practicing barter to obtain manufactured products and services. Figure 128 illustrates the principal products given by local populations (agricultural products and bushmeat) in exchange for mostly manufactured goods brought by neighbors engaged in commerce or by merchants traveling from larger market towns in the south as well as Tshikapa, Luebo and Mweka.

Figure 128



	manufact. goods	agricultural products	game	salt	NTFP	fishing & hunting hardware	other
■ received ("bought")	94.9%	0.0%	2.5%	51.9%	0.0%	11.4%	1.3%
□ given ("sold")	3.8%	65.8%	51.9%	0.0%	26.6%	1.3%	13.9%

Figures on table correspond to the % of households that reported exchanging each product.

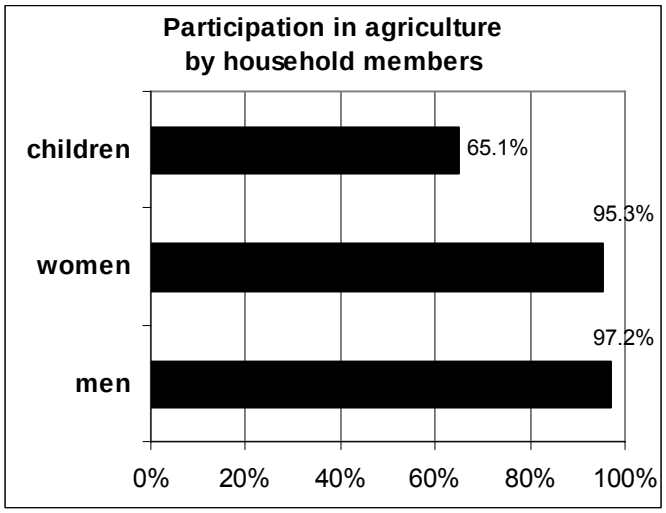
Some examples of barter transactions include locally made furniture for farm animals and clothes; caterpillars for salt; and timber for farm animals. Participants consider the barter system a poor substitution for cash transactions. The shift from cash to barter is associated with the decline in commercial agriculture that took place in the 1970s and 1980s. Barter is directly associated with isolation and the need to accept merchants' terms of exchange, which are viewed as being disadvantageous to and by local populations.

D. Principal subsistence and economic activities

1. Agriculture

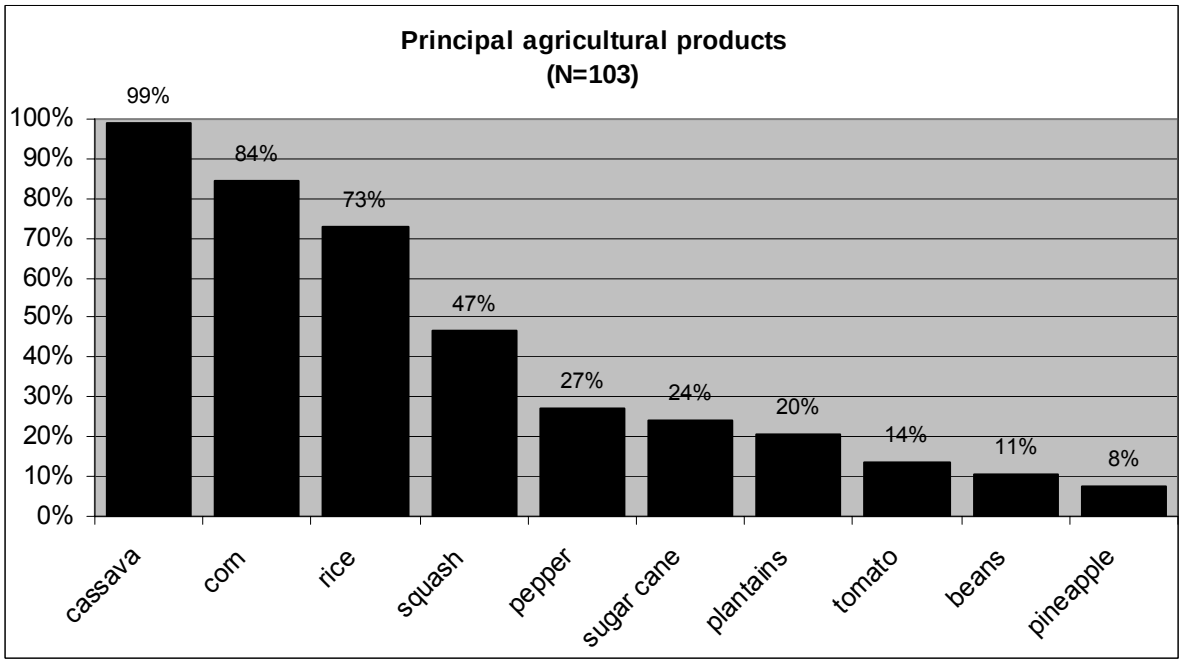
Among households' economic activities, agriculture and collection of NTFPs involve more members of the family: men, women and children participate (figure 129). Only two households did not report agriculture as an economic or subsistence activity. Like elsewhere in the landscape, agricultural activities are differentiated by gender.

Figure 129



Households reported growing between one and six products, with an average of 4.11 products per household (SD=1.31). Cassava *(Manihot esculenta)* is the most prevalent crop in the area, grown by 99% of households. Corn *(Zea mays)* and rice (*Orzya sativa)* are also important crops, grown by 84% and 73% of households, respectively. These figures were very similar to those reported in the Monkoto territory, where these three products were reported in almost the same proportions. Other crops mentioned by households included squash, peppers, sugar cane, plantains, tomato, beans and pineapple (figure 130).

Figure 130



Field size in the area varied between 0.04 and 1.5 ha, with an average field size of 0.40 ha (SD 0.26) (table 99). Most fields (88.8%) are accessible by forest footpaths or by forest paths connected to the colonial road system (11.2%). Fields are located within villages' traditional land use zones, often within 3 km of the household (table 100). Dekese households reported traveling longer distances to reach their fields than households from other parts of the landscape. This difference may be in part due to the proximity of villages to savannas, which are not arable, forcing farmers to travel longer distances to find land suitable for agricultural fields. Almost half of agricultural fields (49.0%) were located between 1-3 km from the village, and 10.2% were located over three kilometers away.

Table 99 Field Size

Size of fields in ha	% households
0 - 0.05	0.2
0.051-0.1	4.5
0.101-.5	75.8
0.51 – 1	15.7
1.01 - 1.5	3.8
1.51 – 2	0.0
2.01 - 2.5	0.0
2.51 – 3	0.0
3.01 – 3.5	0.0

Table 100 Distance to Field

Distance in km	% households
0 - 0.05	5.6
0.051-0.1	0.0
0.101-.5	9.6
0.51 – 1	25.2
1.01 - 1.5	17.6
1.51 – 2	14.9
2.01 - 2.5	13.1
2.51-3.0	3.3
3.01-3.5	10.2

In terms of land ownership, 93.8% of households said they own their fields, 1.3% said they were farming in relatives' plots, and 4.8% reported use without authorization or ownership.

Participants reported few methods for maintaining soil fertility. The most widely used method is fallow (90.5%), followed by rotation of crops (7.9%), and slash and burn (1.6%). Fallow periods last from 3-10 years, with an average of 5.29 years (SD 1.31).

Changes and adaptation in agriculture

Participants talked about negative changes in land use when referring to shortened fallow periods and lack of support from extension agents or technicians to improve farming methods. The need to "reuse" fallow land is equated with the lack of equipment necessary to clear primary forest in order to expand agricultural fields. Participants from the men's focus group in Itunga mentioned decreasing fallow periods as a cause of desertification.

Changes included a decrease in production due to shortening of the fallow period. This phenomenon is identified with the lack of tools to clear primary forest, a consequence, in turn, of the absence of merchants since the mid 1970s (Ilongaba, Itunga, Boswe Kungu, Djongo Nord).

Table 101 Changes in agriculture and their perceived causes (N=7[241])

		Changes		
		Decreased production (6 villages)	**Decrease in commercialization (4 villages)**	**Lack or loss of equipment (4 villages)**
Associated causes	Negative changes in land use	4	0	0
	Deterioration of rural roads, disappearance of buyers	4	4	2
	War	3	1	2
	Decreased soil quality	2	0	0
	Insects, disease and wildlife	2	0	0

Other changes mentioned during focus groups included growing problems with plant disease (mosaic affecting cassava and "njandjoso" affecting sugar cane, squash and cassava) and destruction of fields by wildlife. Causes associated with these problems were unknown or attributed to the supernatural. Participants from Ilongaba reported that animals raided their fields more frequently since the creation of SNP which prevents local populations from hunting and chasing animals that destroy fields.

Destruction of crops was reported by 88.2% of farming households. Interviews revealed that over a third (35.3%) of cassava fields were affected by disease and 50.8% of all fields had experience some destruction by animals (table 102).

[241] Data on changes included information collected from two focus groups organized with associations in Dekese Cité

Table 102 Crop-raiding Wildlife (N=7)

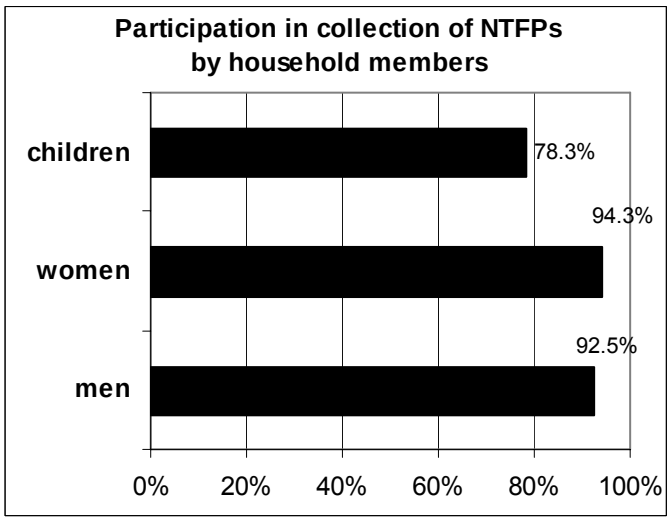
Animals	# Villages
River red hog *(Potamocherus porcus)*	7
Birds	6
Cane rat *(Thryonomys spp)*	4
Bay duiker *(Cephalophus dorsalis)*	3
Bonobo *(*Efuku) (*Pan paniscus)*	2
Brush-tailed porcupine *(Atherurus africanus)*	2
Red-tailed monkey *(*kse kse in Lingala, nkema in Ndengese) *Cercopithecus ascanius)*	2

Participants reported little success in controlling crop-raiding animals. The use of traps was often mentioned, but qualified with comments on their limited impact. Other measures of control included the use of fire, fences, poisoned arrows, and increasing field size to compensate for lost production.

2. Collection of NTFPs

Ninety eight percent (98%) of households in Dekese collect NTFPs for subsistence and/or commercial purposes. Collection of NTFPs is practiced by men, women and children (figure 131). Men's participation in this activity was the third highest in the landscape, after Lomela River (96%) and Nkaw (94%). NTFP collection was reported as secondary source of income by 10.4% of households and as tertiary source by 29.2%, the highest reported in the landscape. Another 42.5% of households reported periodic sales of NTFPs.

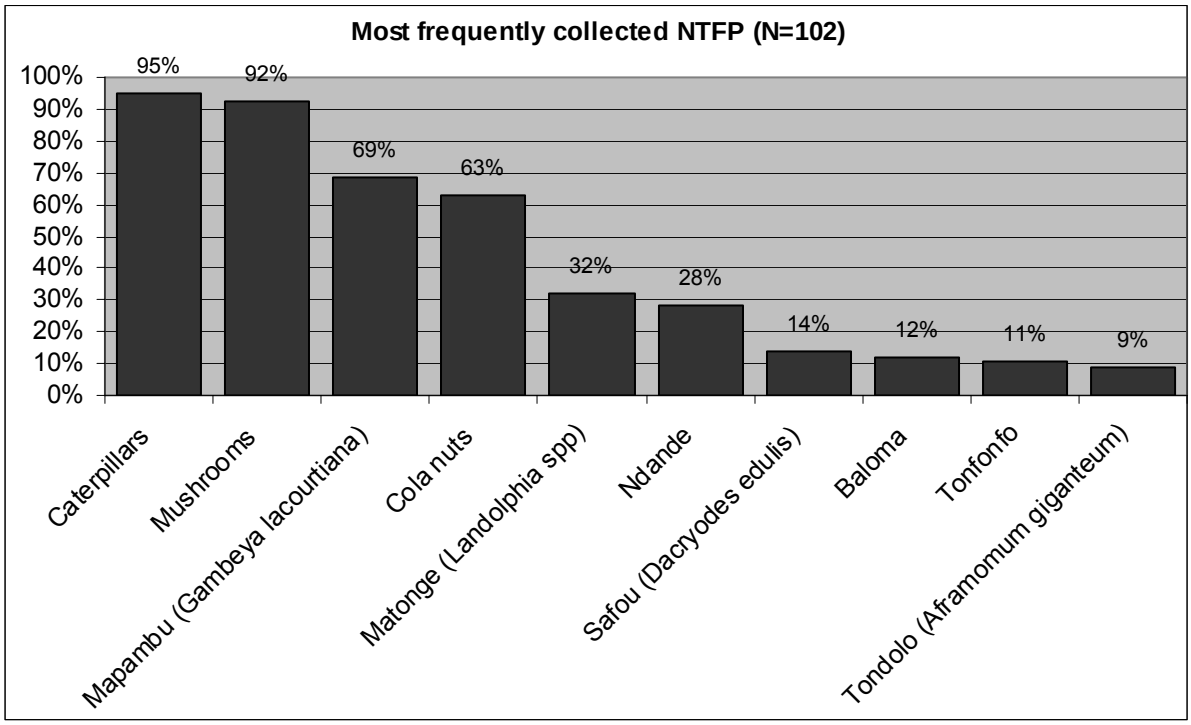
Figure 131



Households in Dekese collect between two and eight products, with an average of 4.79 products per household (SD=1.06). Principal NTFPs collected in area villages included caterpillars[242] (95%) and mushrooms (92%)[243]. Households that reported collecting caterpillars and mushrooms mentioned between one and three different varieties. Other products mentioned included mapambu *(Gambeya lacourtiana)*, and cola nuts. The ten principal products collected appear in figure 132.

The majority of collection activities, including those concerning principal products like caterpillars and mushrooms, are seasonal (82.1%)

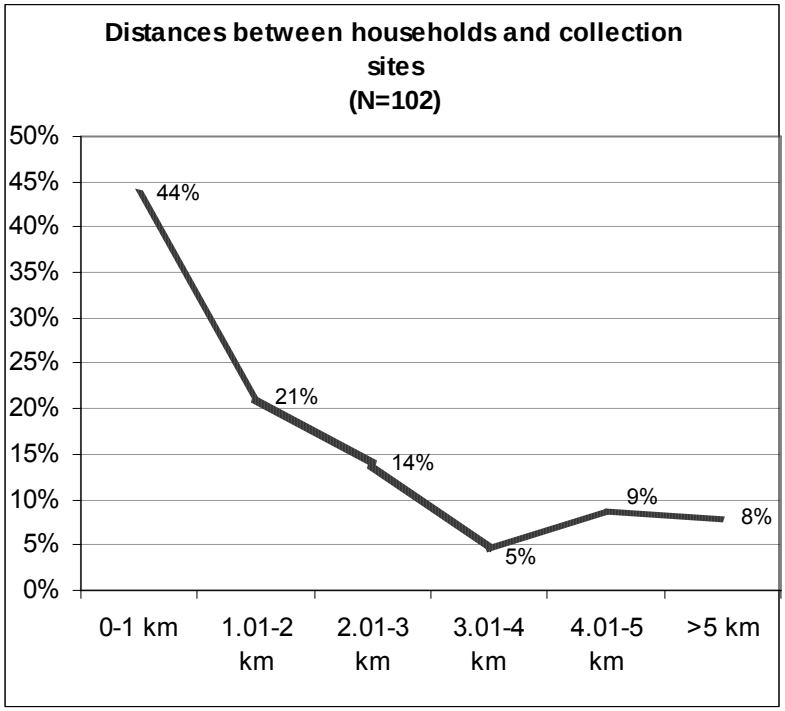
Figure 132[244]



[242]Local caterpillar names: *Bapaka*, *mananga*, and *tombenga.*
[243]Local mushroom names: *Bansonsa*, *banyeke*, *befoo*, *besake*, *masenza*, *ntukunu*, *nyeke*, and *totsanganye.*
[244]Other products included mpunga (*Synsepalum dulcificum)* (7.8%), *Raphia laurentii* (5.9%), mpose (4.9%), copal (*Guibourtia spp)*, honey, and mimo *(Treculia africana).*

The majority of NTFPs (64.7%) are collected within 2 km of villages (figure 133) using only forest footpaths (88.5%), both paths and colonial-era roads (10.3%), or colonial-era roads alone (1.2%).

Figure 133



Revenue from NTFPs

Eighty-five percent (85%) of households that collect NTFPs reported commercializing part of their harvest. These households reported commercializing between one and five products, with an average of 2.79 products (SD=1.39). Most frequently commercialized products included caterpillars (94.3% of households that sell part of their harvest), mushrooms (70.1%), cola nuts (54.0%), and mapambu (31.0%). More households in Dekese than elsewhere in the landscape reported income from sale of NTFPs, with profit exceeding $15 (6750 FC) per season. While the majority of households reported weekly earnings under $10, weekly sales of caterpillars and cola nuts sometimes exceeded $20 (table 103). However, seasonal income is difficult to estimate because sales are intermittent.

Table 103

Weekly gains	% Caterpillars (N=74)	% Cola nuts (N=42)	% Mushrooms (N=45)
< $10	64.9	90.5	93.3
$11-$20	23.0	2.4	6.7
$21-$30	6.8	2.4	0.0
$31-$40	1.4	2.4	0.0
$41-$50	1.4	0.0	0.0
>$50	2.7	2.4	0.0

While measures used were, for the most part, small (piles, cups, glasses), eleven households reported selling over 100 piles of caterpillars per week, and four households reported selling over 1000 pieces of cola nuts. Table 104 includes the principal commercialized products in the area and their respective prices.

Table 104 Principal commercialized NTFP[245]

Product	% of households (N=87)	Prices	Weekly sales
Caterpillars	94.3	$0.02-$0.33 glass and pile (10-150FC) $0.33-$044 cup (150-200FC)	$1.11-$166.67
Mushrooms	70.1	$0.02-$0.11 pile (10-50FC)	$0.22-$11.11
Cola nuts	54.0	$0.02-$0.22 pile of ten pieces (10-100FC)	$0.07-$111.11

Sixteen households that commercialize NTFPs (18.4%) reported selling in larger markets (Luebo, Mweka). Five of these households sell between four and five different products, reporting profits ranging between $7.33 and $68.89 per trip to the market.

Prices provided by households were similar to those provided by the three merchants of NTFPs interviewed in the area. The three reported buying caterpillars by the glass, cup or sack and selling them in Tshikapa and Luebo. Price paid per glass was 100 FC and by cup 200 FC. Selling prices were 200 FC by glass and ranged between 250 and 350 FC by cup, equaling between 93 and 227 FC by unit sold, or between $37.11 and $153.82 per trip.

Locally perceived changes in the collection of NTFPs

More participants reported changes in NTFPs availability in Dekese than elsewhere in the landscape. The higher percentage may be due to higher levels of exploitation as well as to participants' increased awareness of change due to the importance of NTFPs as an income source.

Of households collecting NTFPs, 67.7% reported changes with 89.9% of these changes attributed to caterpillars and 65.2% to mushrooms. Other products reported as decreasing included cola nuts (36.2%), and *Gambeya lacourtiana* (20.3%). The decrease or disappearance of certain products represented 70.3% of reported changes. The causes associated with decrease and disappearance of NTFPs are summarized in table 105.

Table 105 Causes associated with decrease of NTFP (N=122)

Causes	% cases[246]
Changes in land use	25.5
Demographic pressure	23.9
Supernatural	23.4
Seasonal	21.2
Unknown	6.0
Unsustainable collection methods	3.8

Increased availability of certain NTFPs, representing 20.7% of changes, was associated with natural changes (44.9%) and supernatural causes (53.1%). The availability of caterpillars, in particular, appears to be controlled by the supernatural powers of traditional leaders and shamans.

Changes mentioned during focus groups and their associated causes mirrored those mentioned by households, and concerned caterpillars (76.5%) and mushrooms (23.5%) (Table 106) . Changes were mostly reported by women (13 versus 5 cases).

[245] The season during which the data from this area was collected (February) may have impacted the percentage of households reporting each product.
[246] Total exceeds 100% because some changes were associated with more than one cause.

Table 106 Changes in the collection of NTFPs and their perceived causes (N=7[247])

		Changes	
		Decreased availability (7 villages)	**Increased availability of caterpillars (3 villages)**
Associated causes	Weather	4 (mushrooms) 4 (caterpillars)	2
	Supernatural	4 (caterpillars)	2
	Changes in land use	1 (mushrooms) 3 (caterpillars)	0
	Unknown	1 (mushrooms) 1 (caterpillars)	0

[247] Data on changes included information collected during two focus groups with associations in Dekese Cité

3. Fishing

In Dekese, 84.5% of households reported fishing as a subsistence and/or commercial activity, and 40.6% of households reported it among their three most important income generating activities. This figure was similar to that found in Monkoto (40.5%). Dekese had the lowest levels of participation in fishing by adult men of all areas of the landscape (figure 134) . Male focus group participants from Ilongaba and Ingodji said that men in their village do not fish. While household interviews revealed that some Ilongaba men do participate in fishing, household interviews in Ingodji confirmed that men from that village do not engage in fishing. Children's participation, on the other hand, was higher in Dekese than elsewhere in the landscape with the exception of the Lomela River area (58%).

In addition to households that fish for consumption and commerce, 12.6% of households in Dekese reported purchasing fish for household consumption from fishers in their own villages.

Figure 134

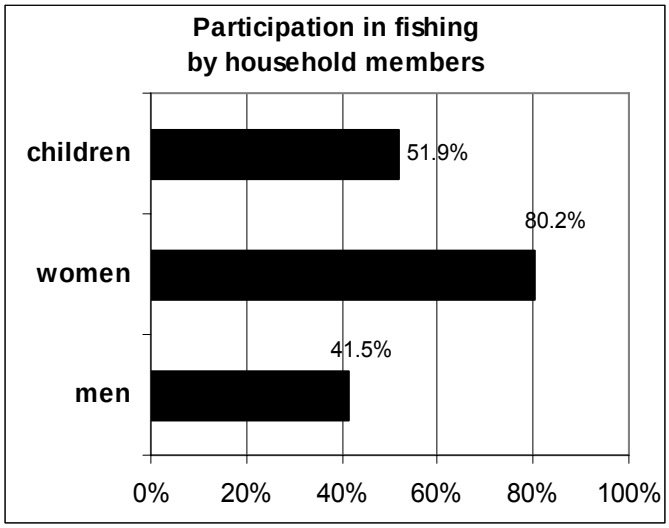


Figure 135

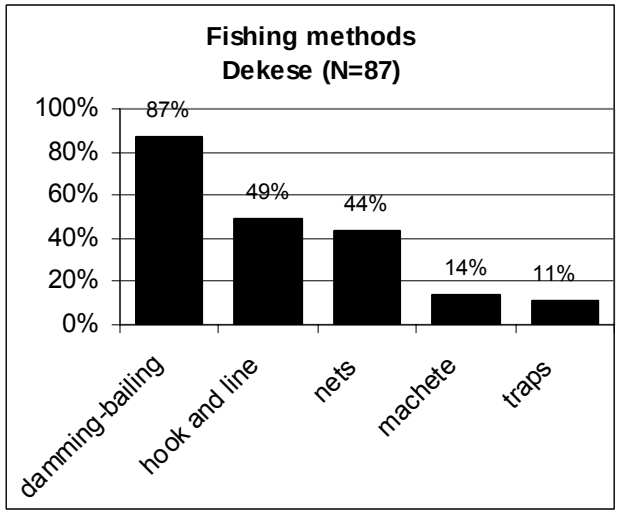
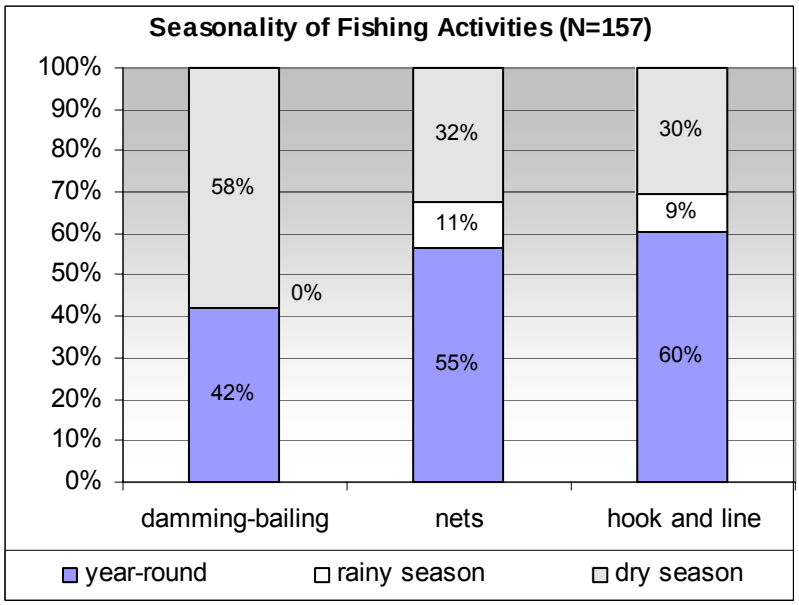


Figure 136



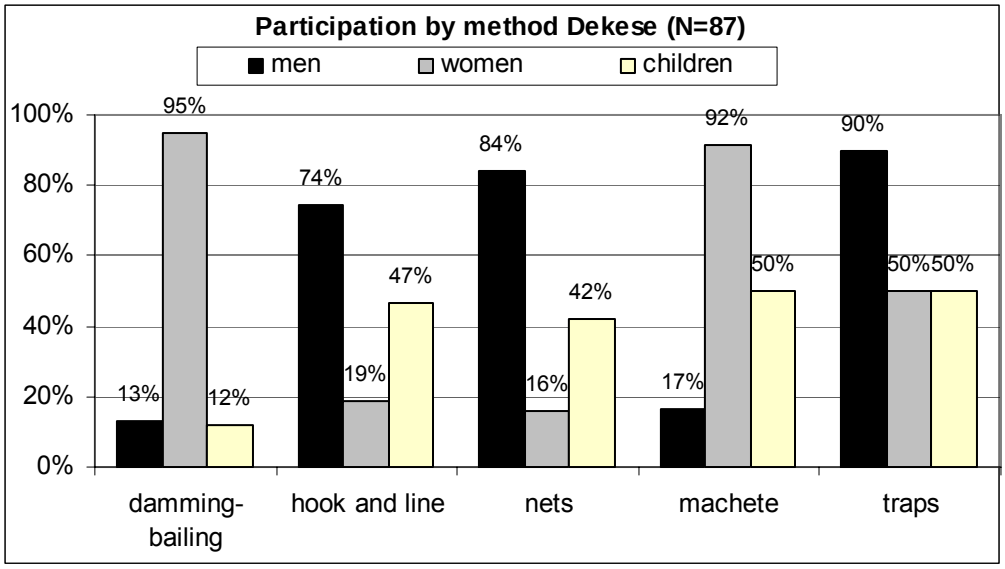
Households reported between one and five fishing techniques, with an average of 2.02 per household (SD=0.98). The most popular fishing methods are damming-bailing[248], hook-and-line, and nets. Less than 15% of households also reported using machetes to cut through roots in swampy areas in order to catch fish. Other methods included traps and spears. Figure 135 includes the methods used by Dekese households.

Fifty-one percent of fishing activities reported by households take place year-

[248] Local names of damming-bailing instruments included bokandja, bondenge and mvuyo.

round (figure 136). Hook and line fishing was the method most frequently reported as a year-round activity. Participation by household members varies according to method. Men fish with nets, hooks and lines, and traps, while women practice damming-bailing, sometimes in combination with the use of machetes, used to access fish hiding among tree roots in inundated or swampy areas. Children help their parents and/or fish by themselves. Figure 137 illustrates the participation of household members by method.

Figure 137



Women fish using between 1-15 baskets for damming-bailing, with an average of 3.5 baskets per woman (SD=2.7). Table 107 includes the number of nets, and line and hook implements reported by households in Dekese.

Table 107 Number of instruments per household

	% Line and hook (N=43)	% Nets (N=37)
<10	14.0	24.3
10 – 49	58.1	62.2
50 - 99	18.6	8.1
100 - 199	7.0	5.4
>200	2.3	0.0

When referring to areas where they practice fishing by constructing dams, participants talked about using their villages' forest and small waterways within them, as well as "ponds" and larger rivers. Participants provided 55 specific names of sites used for different methods.

Table 108 Principal fishing zones

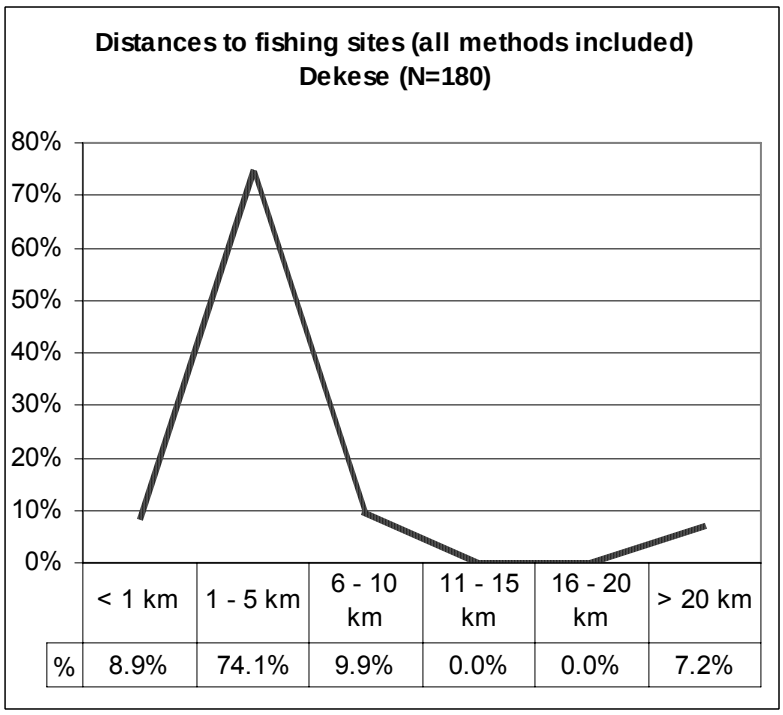
Fishing zones	Villages (N=6)	% of fishing activities (all methods included) (N=366)
Lake Impondja	1	12.8%
Lukenie	3	12.8%
Bantoo	2	8.7%
Luayi	2	4.9%
Lokaki	1	4.1%
Isakanvula	1	4.1%
Insanga	2	4.1%

The principal fishing areas and the number of villages using them are included in table 108. While larger waterways are fished using a variety of methods, 26 fishing zones were used exclusively for damming[249]. Participants did not mention whether any of these zones were located within SNP boundaries, however, several households mentioned that the creation

[249] A complete list of rivers and streams used by all participating villages is included in appendix 8.

of SNP limited their access to fishing zones, which may indicate that some of the waterways are either in, or in the vicinity of the park[250].

.**Figure 138**

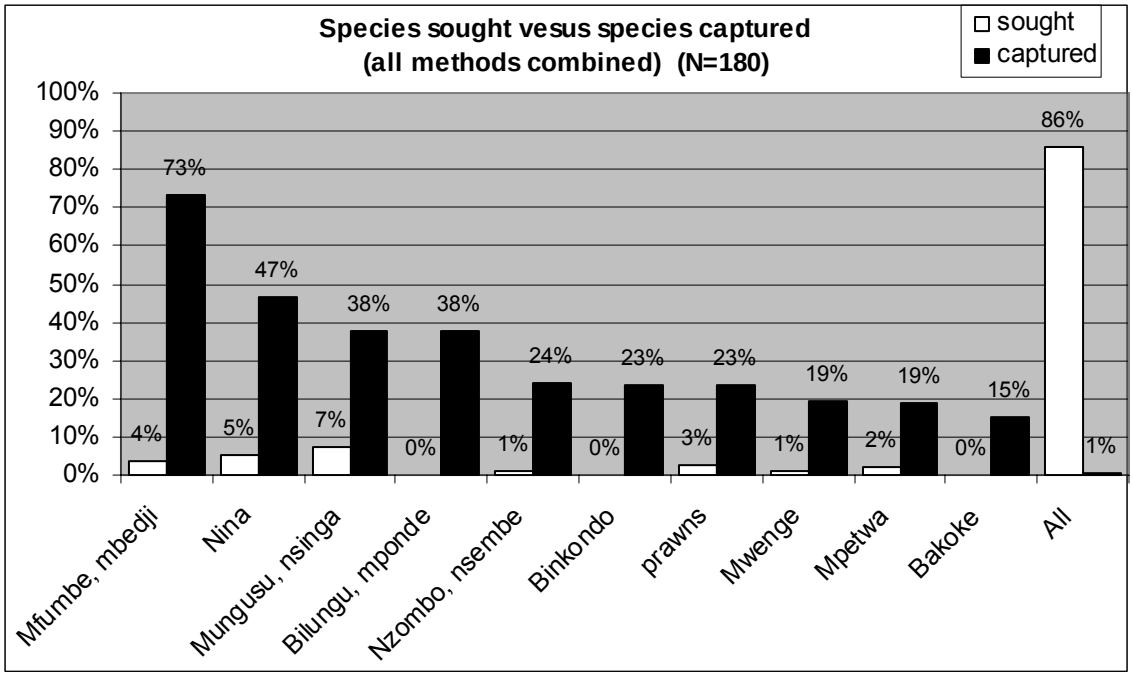


Distances between villages and fishing zones ranged from under one to over twenty kilometers (figure 138). Difficulties in calculating distances between villages and fishing sites were similar to those found in the rest of the landscape. The longest distances reported were from the villages of Boswe Kungu and Itunga. The farthest fishing sites were reported by six households from the village of Boswe Kungu who travel to fishing camps at the Lula River, a two-day walking trip. One household from Itunga also reported traveling two days to their fishing camp, on the Sankuru River.

Fish preferences

The majority of households in Dekese (86%) did not report targeting specific fish but seek "everything." Most frequently caught fish include mfumbe or mbedji *(Gnathonemus spp)*, nina *(Malapterus electricus)*, and mungusu or nsinga *(Channa Obscurus)*. Figure 139 includes the ten most frequently caught species in Dekese.

Figure 139

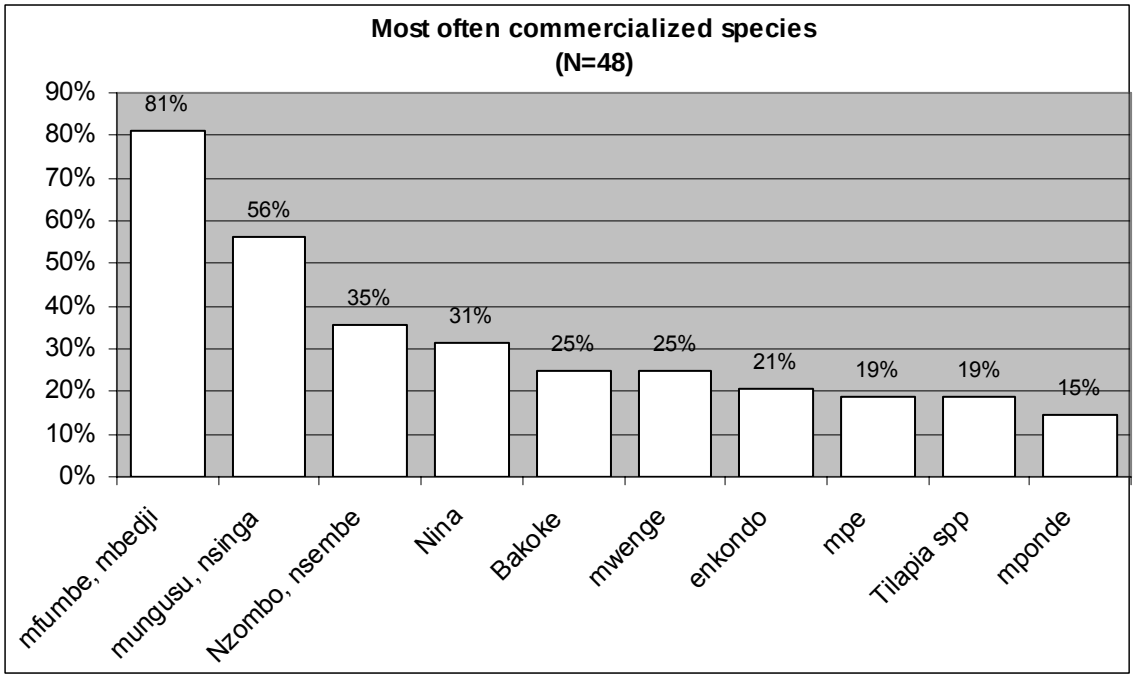


[250] Refer to Perceived Changes section below.

Revenue from fishing

Fifty-five percent (55%) of households that fish sell a portion of their catch. The number of fish species that households trade ranged from one to four, with an average of 2.2 species per household (SD=0.94). The principal species commercialized in Dekese are mfumbe (81%), mungusu (56%), and nzombo (35%). Between 15% and 30% of households also mentioned nina, bakoke, mwenge *(Hespetus odoe)*, enkondo *(Hemichromis spp)*, mpe *(Bagrus spp)*, *Tilapia spp*, and mponde *(Micralestes humilis)* (figure 140). The number of species commercialized by 15% or more households was higher in Dekese than in other parts of the landscape.

Figure 140



The majority of fish sold by households is smoked (78%) and packed in baskets of different sizes for transport, or sold in piles, individually, or in pieces for local consumption. Table 109 includes the fish species most often commercialized in this area and the range of prices for the principal units of sale.

Table 109 Commercial fish species

Fish species	% households (N=48)	Price range (per fish)	Price range (other)
Mfumbe, mbedji	81.3	$0.02-$0.72 (10-325 FC)	**pile of smoked fish**: $0.06-$0.67 (25-300 FC)
Mungusu, nsinga	56.3	$0.22- $3.33 (100-1500 FC)	n/a
Nzombo, nsembe	35.4	$0.11-$2.00 (50- 900 FC)	n/a
Nina	31.3	$0.78-$4.44 (350-2000 FC)	**Piece of smoked fish:** $0.06-$0.22 (25-100 FC)

The highest prices obtained through the sale of fish corresponded to transactions carried out by local fishers in larger towns and markets where prices for baskets of fish range between $60.00 and $200.00 (average $106.11). Six households reported selling fish in larger, neighboring villages, while five households reported traveling to Dekese, Tshikapa and Kananga to sell part of their catch.

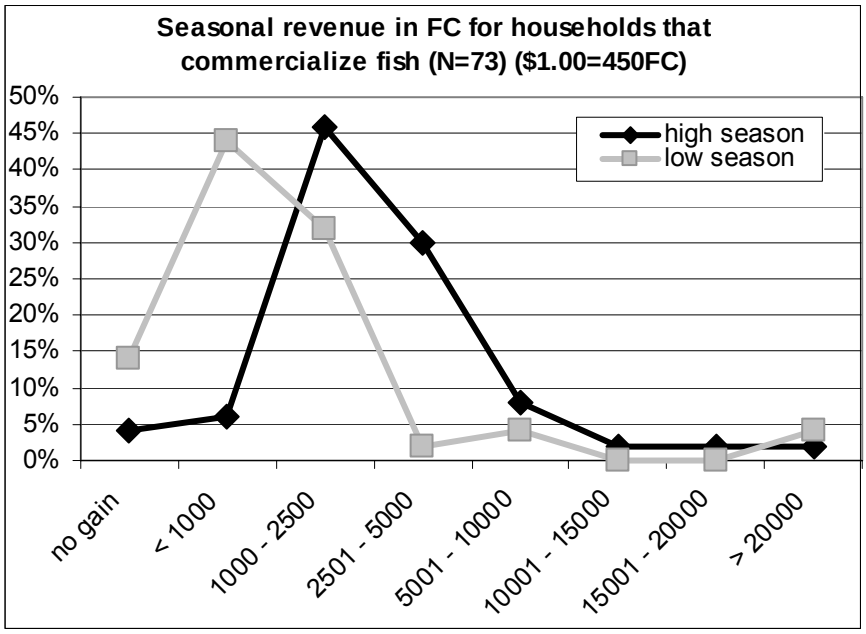
Tshikapa is also among the principal destinations of merchants interviewed in the area. Other destinations of merchants were Luebo and Mweka. Prices quoted by merchants resembled those given by fishers commercializing part of their catch. Table 110 summarizes prices and costs reported by merchants.

Table 110 Prices reported by merchants per unit of sale

Product	Unit	Amounts bought	Price paid	Destinations	Costs per unit	Price sold	Revenue per trip
Various spp	Individual fish[251]	250-500	$0.11-$0.44	Mweka, Luebo, Tshikapa	$0.02-$0.23	$0.22-$1.78	-$0.72-$439.96

In terms of seasonal revenue, 78.0% of households reported earning under $10 during the peak (dry) season. During the low (rainy) season, the majority of households (88.0%) reported gains of under $5 (figure 141).

Figure 141



Fourteen percent (14%) of households that reported profits during the peak season reported none during the low season, but two households reported fishing for commerce only during the rainy season, when fish prices are slightly higher. The difference in earnings during the peak (dry) and low (rainy) seasons ranged from 150FC to 45000FC (SD=9441.5) or $0.33- $100.00, with the greatest difference reported by one of the three households that reported higher profits in the low (rainy) season. No significant correlation was found between gains during the peak and dry seasons (r=0.09).

Consumption of fish

As with fish commerce, subsistence use of fish varies according to season. Weekly consumption during the rainy season represented only 15.0% of dry season consumption. This decease coincides with an increase of 80.9% in bushmeat consumption during the rainy season, which is the peak period for hunting. Fifty-one percent (51%) of households (both fishing and non-fishing households) that reported consuming fish during the peak (dry) season do not consume fish during the rainy season. A correlation of 0.77 was found between quantities consumed by households during the peak and low seasons (figure 142).

[251] 1 *tas* or pile= 4-5 fish.

Figure 142

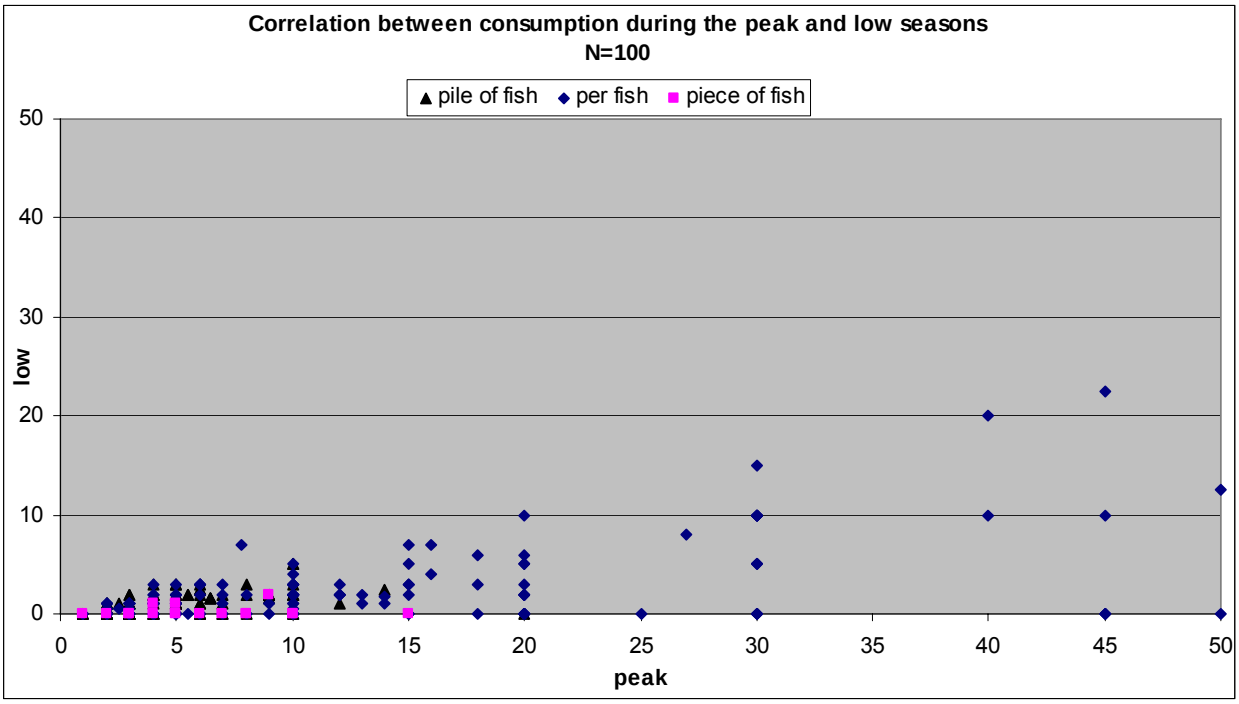
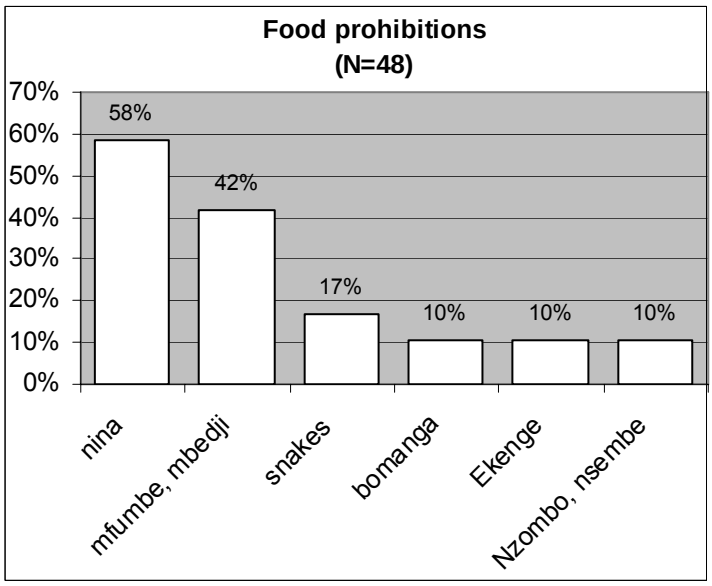


Table 111 Most often consumed fish species

Species	% households (N=100[252])
Bakoke, enkondo	53.0
Mfumbe, mbedji	50.0
Prawns	34.0
Mponde	28.0
Bakoke	27.0

Households reported consuming between one and five species of fish, with an average of 3.09 species per household (SD=0.99). Most frequently consumed species varied from those mentioned by households in other parts of the landscape. While ngolo, mungusu, and nina predominated in Monkoto, Salonga and Lomela Rivers, and the Oshwe Territory, households in Dekese reported consuming bakoke or enkondo *(Hemichromis spp),* mfumbe or mbedji (*Gnathonemus spp),* prawns, and mponde *(Micralestes humilis)* (table 111) more than mungusu (21.0%), nina (18.0%), and ngolo (1.0%).

Figure 143



Taboos concerning certain fish varieties persist today. Forty-seven percent (47%) of Dekese households (both fishing and non-fishing households) reported some food prohibition concerning fish. Principal species are included in figure 143. Restrictions apply, in their majority, to women (70.8%), but also the entire family (16.7%), men (8.3%), and men and children (4.2%). Reasons cited were tradition (70.9%), personal choice (15.5%), and religion (13.6%).

[252] Includes households that do not fish but reported consumption.

Locally perceived changes in fishing activities

Eighty-four percent (84%) of households in Dekese reported changes in fishing activities. Among these households, only one reported increased availability, while the rest reported a decrease in fish stocks. Over half of changes (51.5%) were reported to have begun before 1985. Participating households from all sampled villages reported negative changes, with the village of Bolonga Lukenie (located on the Lukenie River) reporting the highest percent of changes in fishing (100% households), followed by Ilongaba (all but one household).

Household-level participants associated a decline in fish stocks to demographic pressure (74.0%) often associated with two other variables: Increasing numbers of fishers (19.3% of responses), and the creation of SNP (20.7%). Participants said that fish stocks were declining because more people were exploiting the resource, and that decrease occurred even if fishers did not intensify their own individual activities. Other respondents added that pressure on fish stocks occurred because some of their traditional fishing zones lay within SNP boundaries, forcing fishers to use a restricted number of waterways. Responses concerning the park were limited to the villages of Ilongaba, Ingudji and Djongo Nord, the three villages located within 10 km of the park's boundaries.

Table 112 Causes associated with decrease of fish stocks (N=85)

Causes	% responses[253]
Demographic pressure	74.0
Regular activities	27.6
SNP	25.0
Use of poison	19.4
Supernatural	10.7
Commercial fishing	10.2

Another cause associated with decreasing fish stocks was the use of a variety of poisons (*emonoliya, booso,* thionate), representing 19.4% of responses. Other associated causes were supernatural (10.7%), and the need to fish to generate revenue (10.2%). Changes in practices, such as the introduction of new techniques or the lengthening of the fishing season were mentioned only in 5.6% of cases, differing from other areas of the landscape where this cause was mentioned by a higher percentage of participants.

The majority of changes concerned all fish species (57.6%), followed by some commercially important fish: mfumbe or mbedji (23.5%), mungusu or nsinga (20.0%), bakoke (18.8%), and mponde (17.7%). Prawns, which are not frequently commercialized but have important consumption value, were also reported as decreasing (17.6%).

Participants from all focus groups also mentioned decreasing fish stocks as the principal perceived change. Responses from focus groups mirrored those provided by households. The principal cause associated with decreasing fish stocks was the increased number of locals fishing. Participants from focus groups also added the need to generate income as a driver, as well as the introduction of new practices, and the creation of SNP. Table 113 summarizes changes reported by participants in focus groups and the causes associated with these changes.

Table 113 Changes in fishing activities and their perceived causes (N=7[254])

		Changes		
		Decrease in fish stocks (7 villages)	**Difficult access to resources (3 villages)**	**Fish commerce (2 villages)**
Associated causes	More locals fishing	7	0	0
	Need to generate	3	0	2

[253] Total exceeds 100% because some changes were associated with more than one cause.

[254] Data on changes included information collected during the fo.cus group with associations in Dekese Cité

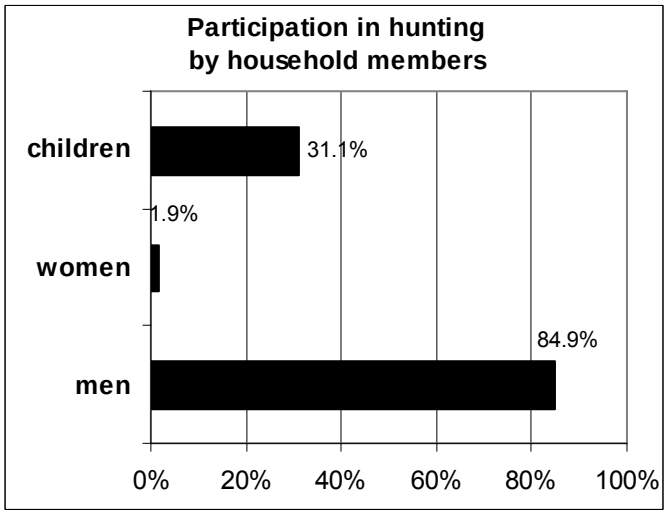
		Changes		
		Decrease in fish stocks (7 villages)	**Difficult access to resources (3 villages)**	**Fish commerce (2 villages)**
	income			
	Introduction of new practices, instruments	2	0	0
	Creation of SNP	2	3	0

Focus groups in the three villages located within 10 km of SNP also mentioned difficult access to fishing sites as a consequence of the creation of SNP, which reduced the number of waterways available for fishing. Finally, fish commerce was mentioned as a change by itself, associated with the need to generate income.

4. Hunting

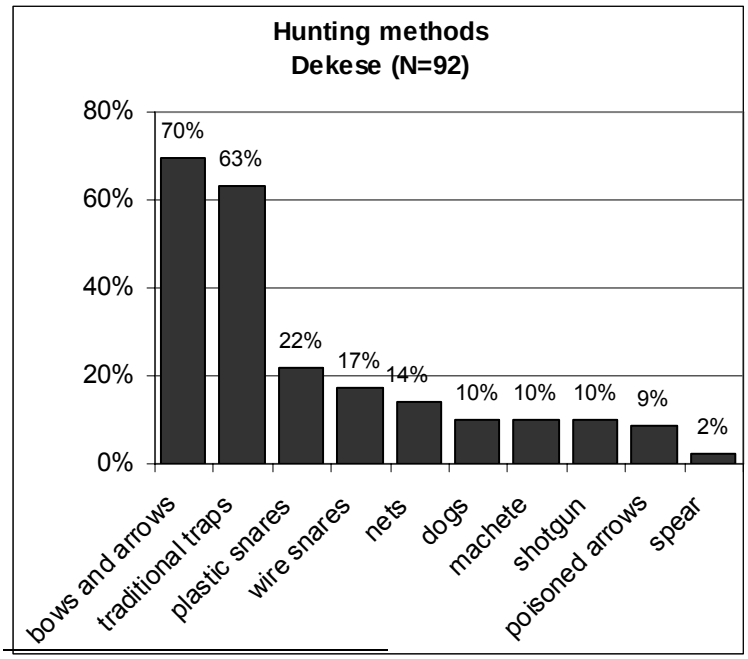
Hunting is almost exclusively a male activity (figure 144) practiced as a subsistence and/or commercial activity by 88.7% of households. Even though reported participation by women is low, female participants in focus groups mentioned that some women engage in collective hunting on specific occasions. Participants mentioned that women's hunting activities were determined through divination rituals. Even though male participants did not mention this phenomenon, reference to this activity by women from five[255] out of the six participating villages indicates that periodic engagement in hunting does occur. Methods used by women include machetes and clubs and most likely refer to hunting with nets and when setting fires in savannas. Women also contribute by helping their husbands check traps, and by transporting and smoking bushmeat for consumption and sale. Methods of hunting employed by men include bows and arrows, traps, dogs, shotguns, nets, and spears.

Figure 144



In addition to households that hunt for consumption and commerce, 11.3% of households in Dekese, (equal to all remaining households) reported purchasing bushmeat for household consumption from hunters in their own villages.

Figure 145



Households hunt and trap using one to five techniques with an average of 2.1 methods per household (SD=0.96). The most popular method in Dekese is bows and arrows, reported by 69.6% of hunting households. The second most frequently mentioned method was traditional traps, reported by 63.0% of households. Additionally, 21.7% of households reported hunting with plastic snares and 17.4 % reported using wire snares. Fewer than 15% of households also mentioned the use of nets, dogs, machetes, shotguns, poisoned arrows, and spears among their hunting methods (Figure 145). The number of

[255] Bolonga Lukenie, Boswe Kungu, Djongo Nord, Ilongaba, and Ingodji.

instruments reported by households is summarized in table 114.

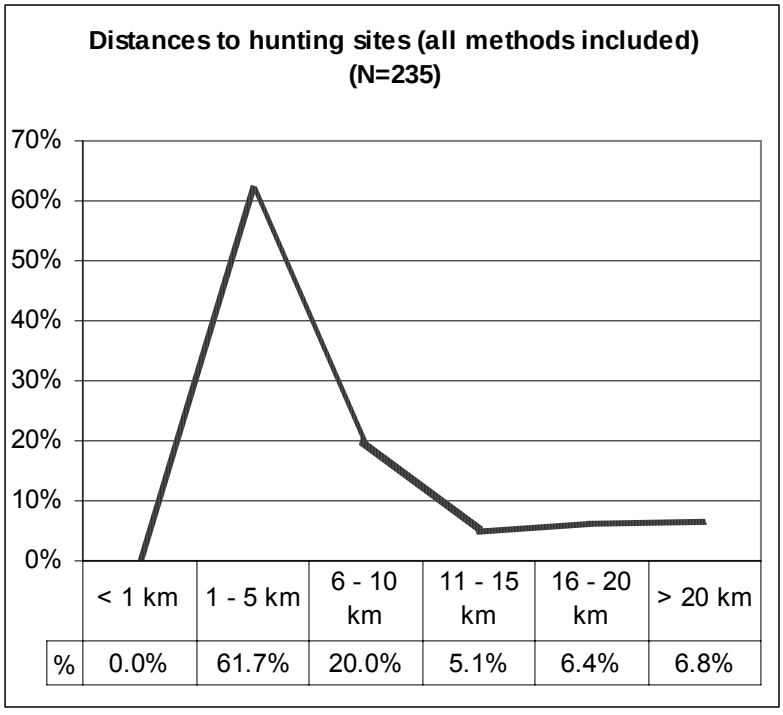
Table 114 Instruments per household

	Arrows (N=64)	Traditional traps (N=58)	Wire and plastic snares (N=35)
≤20	95.3%	12.1%	5.7%
21-40	0%	19.0%	5.7%
41-60	1.6%	19.0%	22.9%
61-80	0%	15.5%	11.4%
81-100	0%	8.6%	17.1%
>100	3.1%	25.9%	37.1%

Most hunting (70.3%) takes place year-round. However, some hunting and trapping is exclusive to the rainy season (27.3%), additionally, three households reported hunting only during the dry season. The majority of techniques reported as being exclusive to the rainy season were traditional methods including traditional traps (52.7% of all rainy-season activities), bows and arrows (20%), poisoned arrows (3.6%), and dog hunting (1.8%).

Men access hunting and trapping areas by forest footpaths (92.3%), and in some cases through colonial period roads and forest paths (7.7%). The majority of participants reported walking from one to five kilometers to get to their hunting sites, including camps. However, a higher proportion of households reported walking over 15 km than elsewhere in the landscape (figure 146).

Figure 146



When referring to hunting areas, participants talked about hunting within the limits of their traditional forests. Participants from Itunga, Djongo Nord and Boswe Kungu also provided specific names of traditional forests (table 115).

Table 115 Village land-use zones

Village	Name of forests
Boswe Kungu	Mfutuamba, Bekongekongo, Kako, Lula
Djongo Nord	Boswamba, Mfunga, Nkoolo, Bekombe, Befumbo, Eyakayaka, Lokongo
Itunga	Bolalosi, Nkete

Regarding the most targeted species, the majority of households (88.7%) reported no preference, stating that they hunt and trap all species. Among these households, four specified seeking all species but elephants, one reported targeting all but elephants and leopards, another one reported all but leopards, while a third one reported hunting all but elephants and forest buffalos. Species most frequently captured by Dekese hunters and trappers include Peter's duiker (*Cephalophus callipygus)* duikers in general *(Cephalophus spp*), bay duiker *(Cephalophus dorsalis),* river red hog *(Potamocherus porcus)*, and brush-tailed porcupine *(Atherurus africanus)*. Figure 147 compares preferred species to species actually captured. The techniques used to capture the ten principal species mentioned are summarized in figure 148.

Figure 147

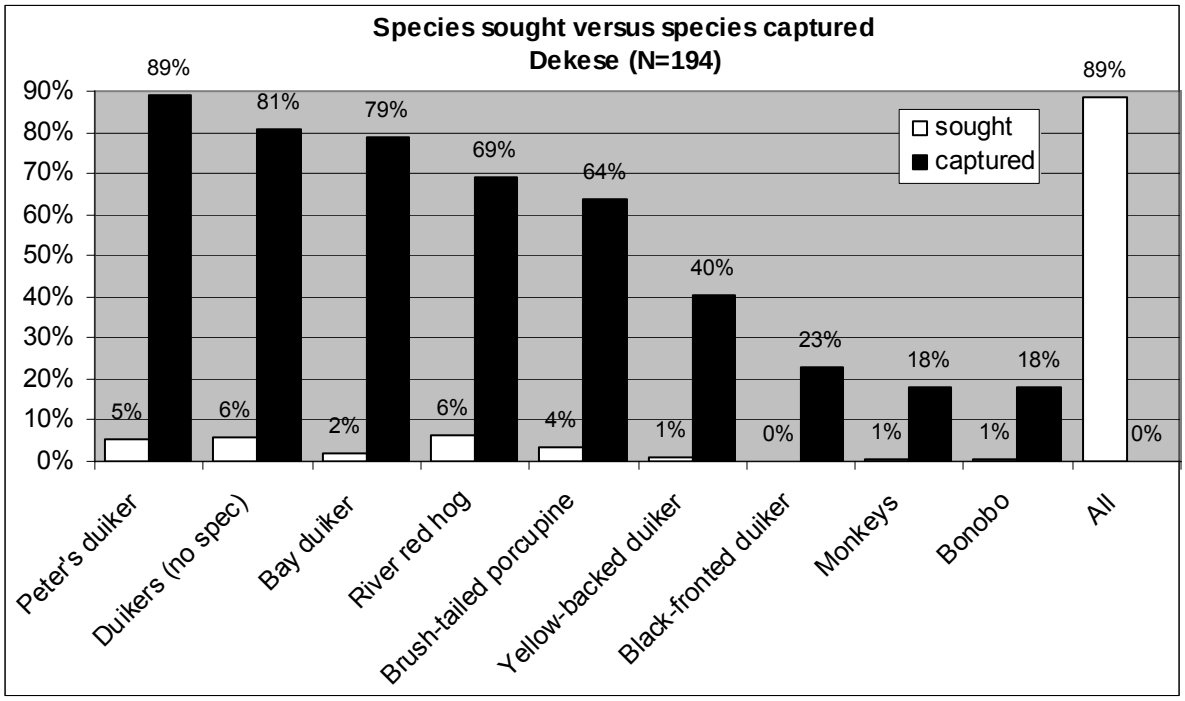
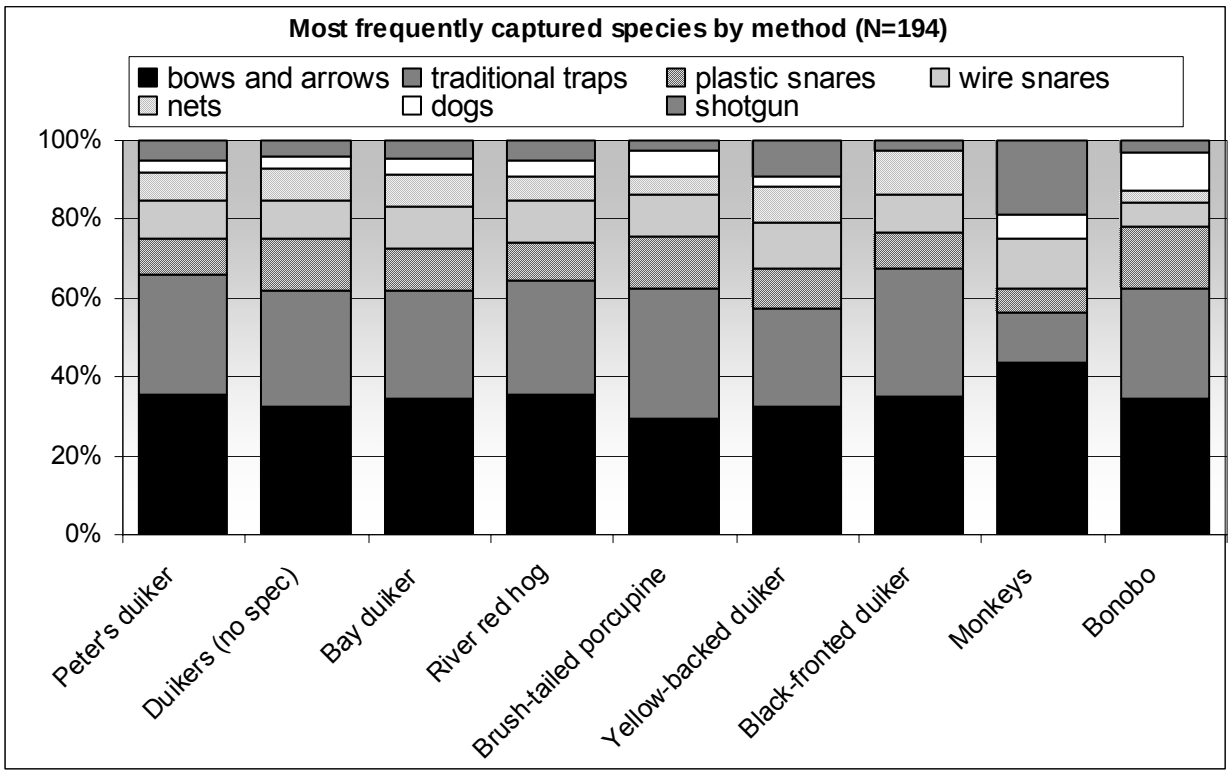


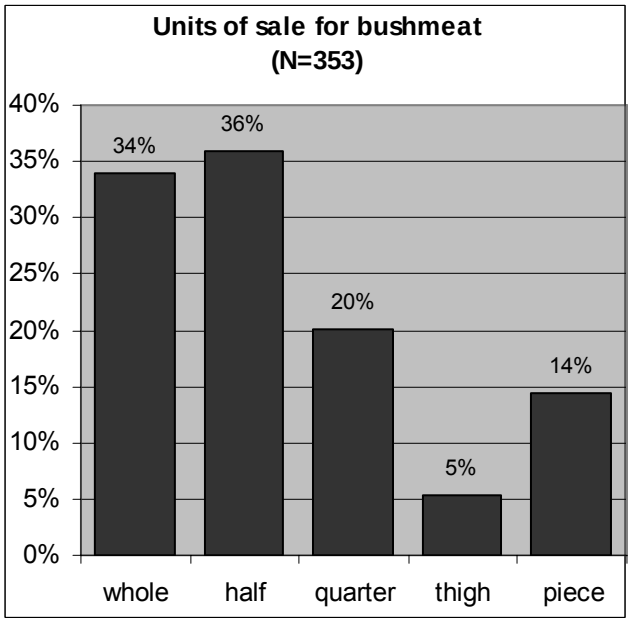
Figure 148



Revenue from hunting

Ninety-eight percent (98%) of hunting households in Dekese commercialize a portion of their capture. This percentage is higher than that reported by households that commercialize a portion of their fish catch (55.2%). Participants reported selling between one and seven species, with an average of 3.92 species per household (SD=1.29), the highest in the landscape.

Figure 149



In Dekese, 86.2% of transactions occur in a hunter's own village, while 13.8% take place in larger markets, a figure similar to those of Lokolama (14.6%) and Salonga (13.9%), the highest

in the landscape. Eight of the households that commercialize part of their capture reported traveling long distances to sell bushmeat - to the towns of Mweka, Tshikapa, Luebo, and Kananga. A higher percentage of transactions involved large units of sale in Dekese than elsewhere in the landscape. Dekese also differed from other places in that even transactions at the village level involved larger units such as whole and half carcasses. Larger units of sale are frequently purchased by merchants and not local consumers, as evidenced by the smaller units reported for consumption by local hunting and non-hunting households (figure 149).

Table 116 presents the species most frequently sold by Dekese households, as well as their unit prices.

Table 116 Most often commercialized species and prices per units of sale ($1.00=450FC)

Species	% households (N=90)	Piece	Half carcass	Per animal (individual carcass)
Peter's duiker	90.0	25 FC	$1.11-$4.44 (500-2000 FC)	$3.56-$8.89 (1600-4000 FC)
Bay duiker	78.9	25 FC	$1.11-$8.33 (500-3750 FC)	$4.44-$6.67 (2000-3000 FC)
River red hog	63.3	25 FC	$1.11-$6.67 (500-3000 FC) (one quarter)	n/a

Prices quoted by households, commercialized species, and principal destinations of bushmeat were similar to those mentioned by interviewed merchants. Species commercialized and costs and prices quoted by these merchants appear in table 117.

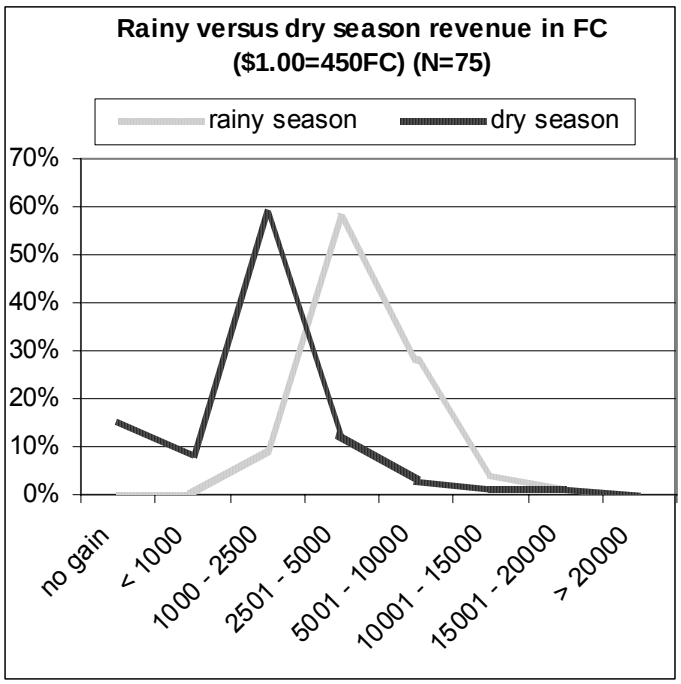
Table 117 Bushmeat Prices for select species[256]

Product	Unit	Number of units	Price paid	Destination	Costs per unit	Price sold	Revenue per trip
Peter's duiker[257]	Half (epese)	4-100	$2.22-$3.11	Bulango, Luebo, Mueka, Ndjoku Tshikapa	$1.60-$10.08	$3.33-$11.11	-$27.89-$347.44
Bay duiker[258]	Half (epese)	5-50	$2.24-$2.89		$2.38-$4.10	$3.33-$11.11	-$47.89-$197.13
Blue duiker[259]	Whole	3-80	$0.89-$1.78		$1.07-$6.77	$1.78-$8.89	-$32.33-$183.22

Revenue from hunting is generally low. Forty-seven percent (47%) of households that commercialize bushmeat reported revenue under $10 and no household reported gains over $40 during the high (rainy) season. Revenue during the dry season decreases, with 68.1% of households reporting gains under $5, and 15.3% reporting no gains (figure 150).

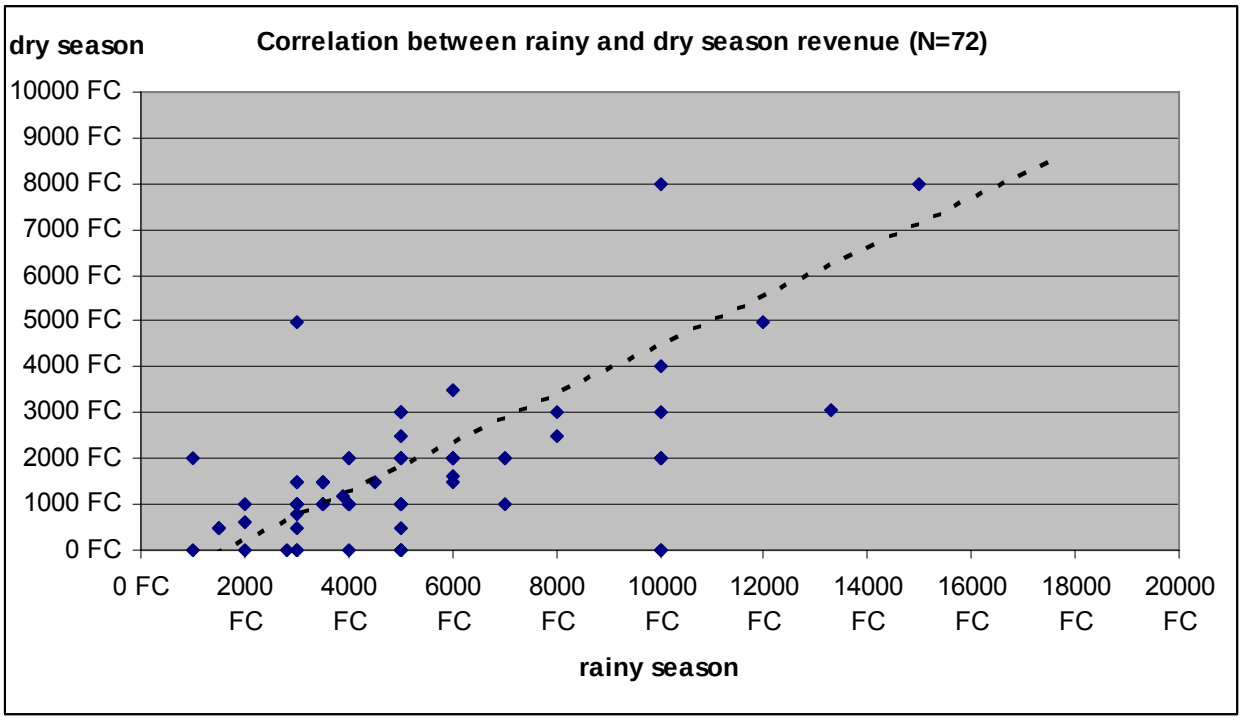
[256] 43 cases. Other species mentioned were river red hog and black-fronted duiker (two cases each), and porcupine, (unspecified) monkey, and inkfuta (one case each).
[257] (Mbengele)14 participants.
[258] (Nkulupa)12 participants.
[259] (Mboloko) ten participants.

Figure 150



Higher revenue during the rainy season sometimes translated into higher gains during the dry season (r=0.60) (figure 151). The difference in gains during the rainy and dry seasons ranged from 1000FC to 10250FC (SD=2747.4) or $2.22- $22.78. Four households reported higher gains during the dry (low) season when scarcity results in increased bushmeat prices.

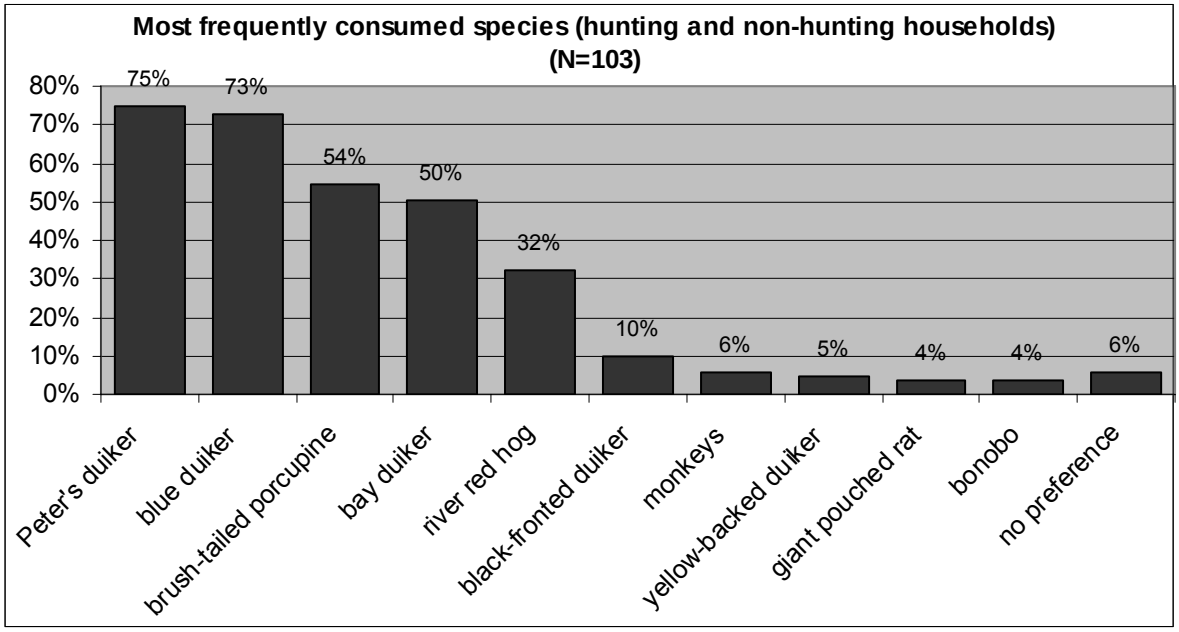
Figure 151



Consumption of bushmeat

In terms of consumption, households in Dekese reported eating between 1-7 different species (average 3.17, SD=1.23). Figure 152 includes the species most frequently consumed by Dekese households.

Figure 152



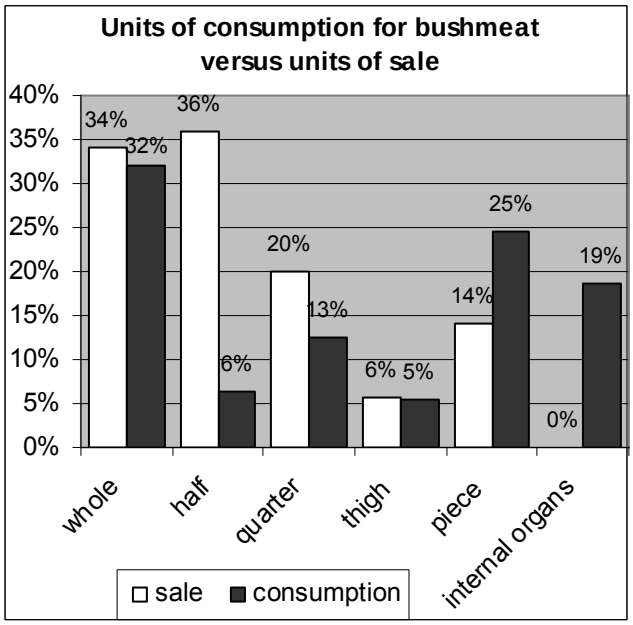
Differences were found in terms of units of consumption and units of sale. While Dekese hunters reported selling large units of bushmeat, consumption also involved a high percentage of smaller units, such as pieces of bushmeat (25%) and internal organs (19%). The reliance on internal organs is sometimes viewed as a consequence of commercial hunting, because larger, more desirable parts are destined for sale, leaving little for household consumption.

« [Because of] commercial hunting, we do not eat well. We eat little more than the bones" (Women's focus group, Bolonga Lukenie)

"We do not eat well. We eat only the neck and the head of the animals." (Women's focus group Djongo Nord).

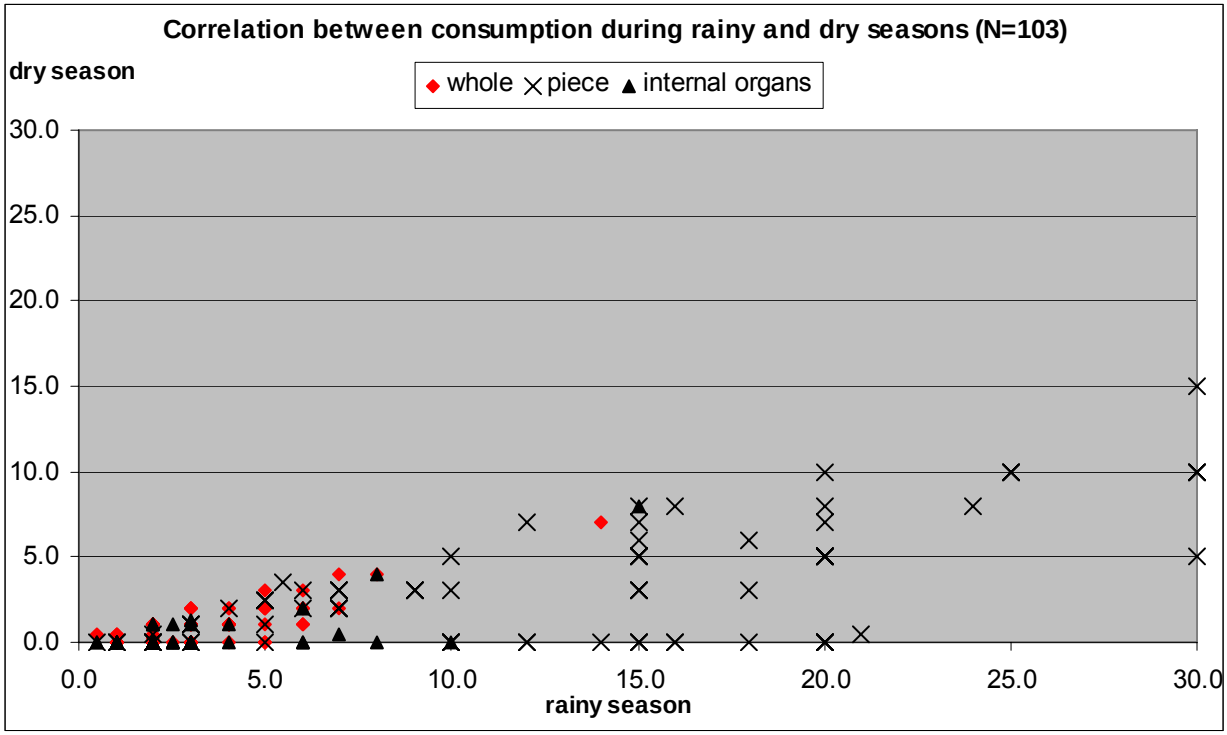
Figure 30 illustrates the difference between principal units of sale and consumption.

Figure 153



Weekly consumption of bushmeat decreases during the dry season, but households with greater consumption of bushmeat in the rainy season tend to consume relatively more during the dry season (r=0.71) (figure 154).

Figure 154



Fifty-two percent (52%) of households that reported bushmeat consumption during the rainy season reported no consumption during the dry season. This percentage was inversely proportional to patterns in fish consumption: 51% of households reported that they do not eat fish during the rainy (off-season for fishing) season. Amounts of principal animal species consumed during the rainy and dry seasons appear in table 118.

Table 118 Most often consumed animal species

species	% households (N=103)	Weekly consumption rainy season[260]	Weekly consumption dry season
Peter's duiker	74.8	2-30 pieces (average 13.0[261])	0-10 pieces (average 2.27[262])
Blue duiker	72.8	1-8 whole (average 2.7[263])	0-4 whole (average 0.61[264])
Brush-tailed porcupine	54.4	1-14 whole (average 3.03[265])	0-7 whole (average 0.95[266])

Food prohibitions were reported by 95.1% of households, the highest percentage of the landscape[267]. These prohibitions relate in their majority to custom (87.5%) and in some cases

[260] Most frequently cited quantities of measure were used in each case
[261] SD=7.70
[262] SD=2.91
[263] SD=1.58
[264] SD=0.99
[265] SD=2.21
[266] SD=1.21
[267] Only Lokolama households reported similar figures (92.2%)

to religion (9.9%), health (1.4%) and personal choice (1.4%). Most prohibitions concern only women (70.6%), but some apply to the whole family (24.0%), and in some cases only to men (4.0%) or men and children (1.5%). The most often mentioned taboo species appear in table 119.

Table 119: Principal taboo species

Species[268]	% of households (N=99)
Bonobo *(Pan paniscus)*	52.5
Long-snouted mongoose *(Herpestes naso)*	41.4
African civet *(Civetta viverra)*	39.4
Yellow-backed duiker *(Cephalophus silivcultor)*	29.3
Leopard *(Panthera pardus)*	28.3
Dwarf crocodile (Lokese, *Osteolaemus tetraspis*)	26.3
Snakes	25.3
Turtles	25.3
Giant pangolin *(Manis gigantea)*	22.2
Loombe or Mbambe (crocodile, unspecified)	17.2

Locally perceived changes in the practice of hunting

In total, 97.0% of Dekese households mentioned changes in hunting. Of these households, the principal change cited is decreasing wildlife numbers, articulated in terms of decreased yields per hunting trip and the need to travel longer distances to find wildlife (87.1%). The majority of dates provided for the onset of these changes corresponded to the decades of the 1970s and 1980s (64.2%). Three percent (3%) of changes concerned the appearance and growing numbers of cane rats (*Thryonomys swinderianus)* and brush-tailed porcupines, associated with supernatural or unknown causes.

Participants associated decreasing wildlife numbers with demographic pressure (68.5%), sometimes mentioning that increased numbers of local hunters have had a negative impact on the availability of wildlife, even if the methods and hunting intensity per individual hunter has not changed. Fifteen percent (15%) of households identified increased numbers of hunters as a cause as well (table 120).

Table 120 Causes associated with the decrease of wildlife (N=96)[269]

	%
Demographic pressure	68.5
Changes in hunting practices	41.0
SNP	25.9
Commercial hunting	18.0
Regular activities by more hunters	15.4
Supernatural	13.8

Households in Dekese also associated decreasing wildlife numbers with changes in hunting practices and techniques (41.0%). The use of wire snares, for example, is considered problematic because they last longer than traditional traps and they can capture animals of all sizes.

The villages of Ingodji, Ilongaba and Djongo Nord, located within 10 km of SNP borders, reported the creation of SNP as one of the causes of decreased availability of wildlife (25.9%).

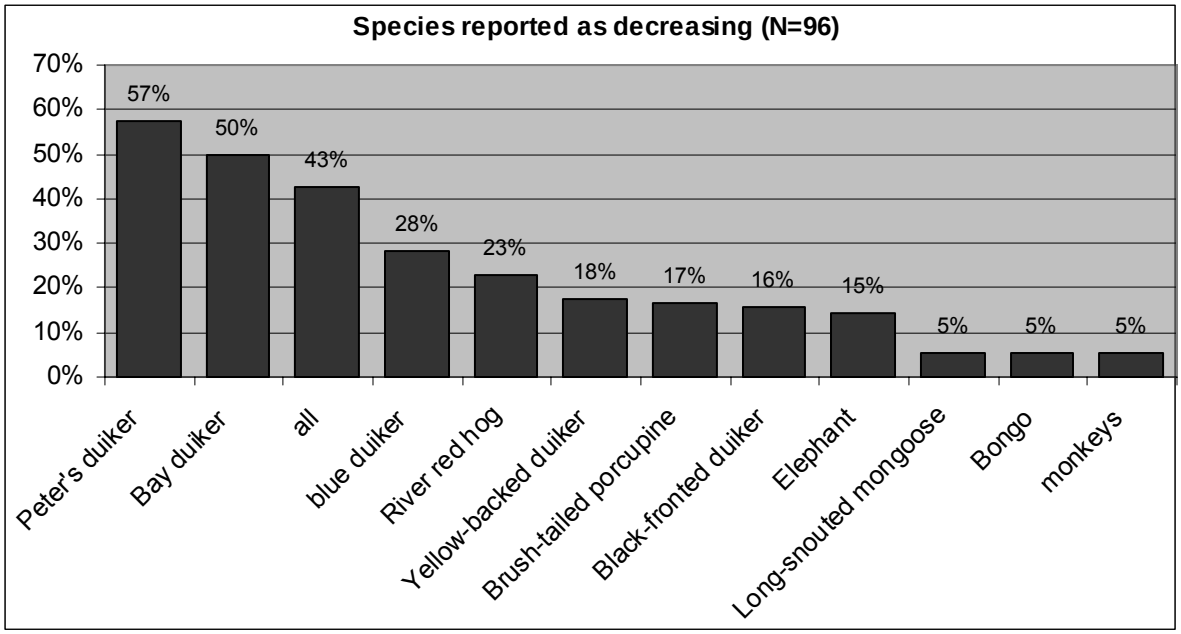
[268] Other species mentioned as taboo by over 10% of households included Nile Monitor Lizard, *Varanus niloticus* (12.1%), African Rock Python or "boa", *Python sebae* (11.1%), monkeys (10.1%), river red hog (10.1%)
[269] Other causes mentioned included abandonment of collective hunting (4.8%), lack of adequate hardware (2.7%), commercial hunting (2.4%), and seasonal (1.9%).

Some of the traditional forests of these villages fall within the park's limits, reducing the area available for hunting by local households.

Other causes mentioned by households were supernatural (13.8%), poaching (5.6%), and military presence (1.6%).

Forty-three percent (43%) of households said all species were decreasing in numbers. When citing the decline of specific species, Dekese households most frequently mentioned Peter's, bay, and blue duikers, and river red hog (figure 155).

Figure 155



A third (32.6%) of all changes mentioned in focus groups concerned hunting. Answers provided by focus group participants confirmed responses provided by households. Additionally participants mentioned the abandonment of traditional hunting as a negative change, explaining that it was caused by the migration of youth to urban centers and diamond fields. One of the consequences of this change is reduced availability of bushmeat for members of the community who are unable to hunt (e.g., widows or the elderly) but who customarily received a share of game captured using traditional methods such as net hunting (women's focus group Djongo Nord).

Decreasing wildlife was associated with increased number of local hunters and equipment, and also with poaching. Poaching activities were directly linked to decreasing numbers of elephants, leopards, buffalos, and bonobos. Participants that mentioned poaching as driver of decreasing wildlife dated the beginning of these activities to the early 1980s. Other causes associated with this change, including increased number of local hunters and equipment were dated earlier, to the 1970s.

As in household interviews, focus group participants from Djongo Nord, Ingodji, and Ilongaba, also associated decreasing wildlife with the creation of SNP, which forced local hunters to concentrate their activities in smaller areas of forests outside the park's boundaries.

Table 121 summarizes changes in hunting activity mentioned during focus groups and their associated causes.

Table 121 Changes in hunting activities and their perceived causes

		Changes		
		Decreasing wildlife (7 villages)	**Abandonment of collective hunting (4 villages)**	**Increased numbers of simbiliki[270] (4 villages)**
Associated causes	Increased number of local hunters	7	0	0
	Increased number of equipment (e.g. firearms, wire snares)	6	0	0
	Need to generate income	4	4	0
	Poaching	4	0	0
	Introduction of new technology (e.g. firearms)	3	1	0
	Supernatural	2	0	3
	SNP	3	0	0

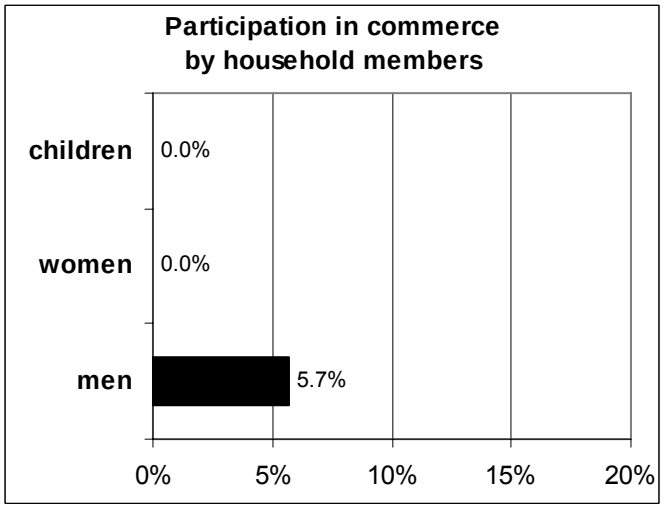
Increased numbers of cane rats (simbiliki, *Thryonomys spp*.) are associated with the introduction of this animal's bones to villages, provoking its supernatural multiplication and availability. This change is considered positive by hunters but negative by farmers who complain of crop destruction by this rodent species. The increased number of cane rats was also associated with their higher birth rates, as well as with their ability to hide in bushes where they are difficult to hunt (men's focus group Itunga).

[270] Cane rat

5. Commerce

Commercial activities in Dekese include the trade of agricultural products, fish, bushmeat and NTFPs which are sold or bartered for manufactured goods that are brought into the area by merchants traveling by foot or bicycle. The characteristics of commerce in the area are very similar to those found in other parts of the landscape: the challenges of reaching distant markets, limited transportation, and infrequent commercial exchanges at a local level. Traveling to Kinshasa, for example, takes between one and three months by boat. These conditions render long-distance commerce an exclusively male activity (figure 156, table 122).

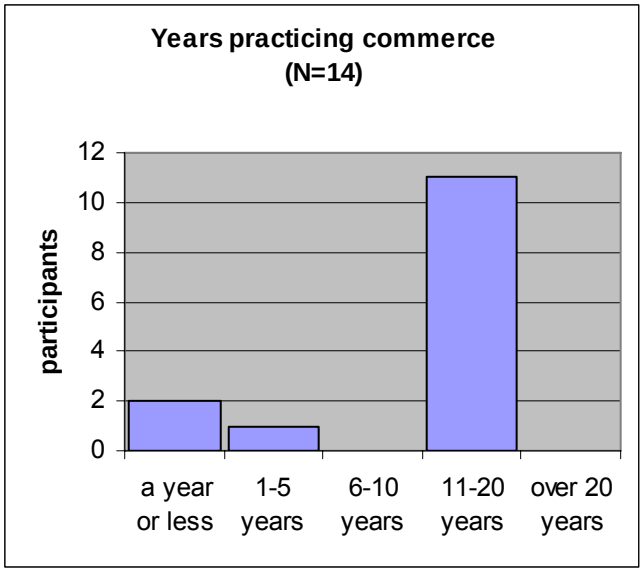
Figure 156



Interviews with merchants revealed that they began trading after seeing others succeed, after finishing secondary school and not finding work, or simply as a strategy for increasing household earnings. Most merchants interviewed in Dekese have been trading for over ten years (figure 157). This differed from answers obtained from merchants in the Oshwe Territory where merchants reported, for the most part, having practiced commerce for five or less years.

Table 122 General information of merchants (N=14)	**%**
Male	100.0
Average age	34.1 years
Foreign to the area	85.7
Average educational level	Secondary (64.3)
Commerce is their principal activity	85.7
Members of merchant associations	21.4
Original source of funds	Own (74.1)
Volume of trade[271]	
Retail	7.1
Semi-bulk	7.1
Bulk	100.0
Products traded	
Hunting	100.0
Fish	71.4
NTFP	50.0
Agricultural	35.7

Figure 157



For many (85.7%), commerce is their principal income-generating activity. The majority of participants (74.1%) self-financed their business.

« I began in the diamond fields It was just afterwards that I had the money to finance the trade of these products » (merchant d1023 Boswe Nkungu)

[271] One merchant reported trading in semi-bulk and retail, depending on the product.

Changes and barriers in the practice of commerce

Geographic isolation and difficult communications in general appear to be the largest barrier to the development of commercial activities. Principal destinations were the same for all products: Tshikapa, Luebo, and Mueka appear as the most important markets for products coming from Dekese (figure 158). Regional markets like Lodi (78 km from the town of Dekese) and Bajenge (located between Benga and Djombo on the Sankuru River) attract merchants from Mweka, Ilebo and Tshikapa. Tshikapa and the diamond fields appear to dominate as centers of demand for local products from Dekese, as well as for other areas in the southern part of the landscape, including the sectors of Nkaw and Lokolama.

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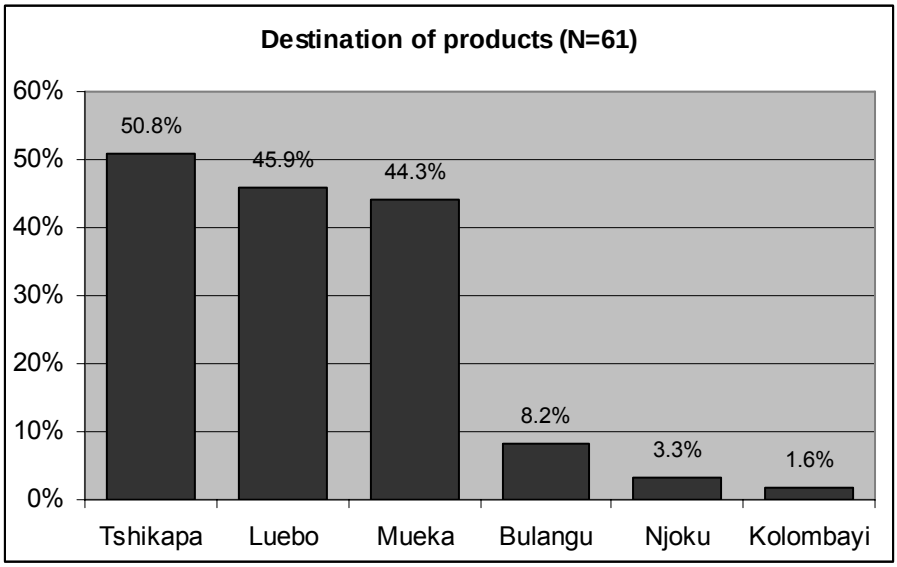
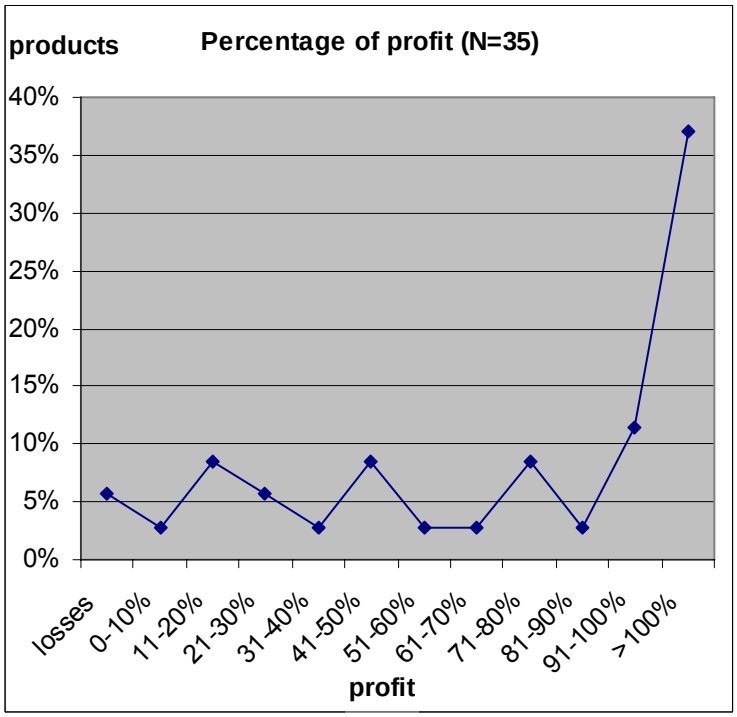
Figure 158



Unforeseen costs of travel and illegal taxation are among the causes of the wide variation in profit margins. Higher costs sometimes, but not always, represented lower revenue: the correlation between average costs and revenue was of r=-0.6.

Figure 159



No particular product stood out as more profitable than the rest. Low revenue from one product is sometimes compensated for with gains from other products sold at the same time, contributing to the continuation of trade in certain products that offer limited gains.

Despite the risks involved in trade, and the high variability in profit margin (figure 159), 4 out of 11 merchants that trade in more than one product reported gains of over 100% for two products or more, and one of them reported over 100% for all products traded.

E. *Access to land and resources*

Local households have open access to natural resources located within their village's forests and waters. Locals can clear forest for agriculture everywhere except other people's fallow fields. Participants from Bolonga Lukenie, Boswe Kungu, Djongo Nord, Ilongaba, and Itunga also mentioned prohibitions concerning cemeteries, while participants from the village of Ilongaba reported the disappearance of this prohibition "*because people reject old customs in favor of Christianity, so they no longer treat the cemetery as a sacred place."* (Women's focus group, Ilongaba). An additional prohibition was mentioned in Boswe Kungu, where cemetery (Bakamba) restrictions also apply to places where people have died (Bosongi).

Participants from Ilongaba, Djongo Nord and Ingodji mentioned SNP as a zone banned for use by local populations. The reduction of their traditional forest and water areas because of the presence of the park was mentioned at various times during focus groups and household interviews. The impact of the park on these communities differentiated them from villages located farther from the park's limits, where people made no reference to SNP.

The villages of Bolonga Lukenie, Djongo Nord, Ilongaba, Ingondji and Itunga identified specific areas within their forests reserved exclusively for agriculture, hunting, and NTFP activities (table 123).

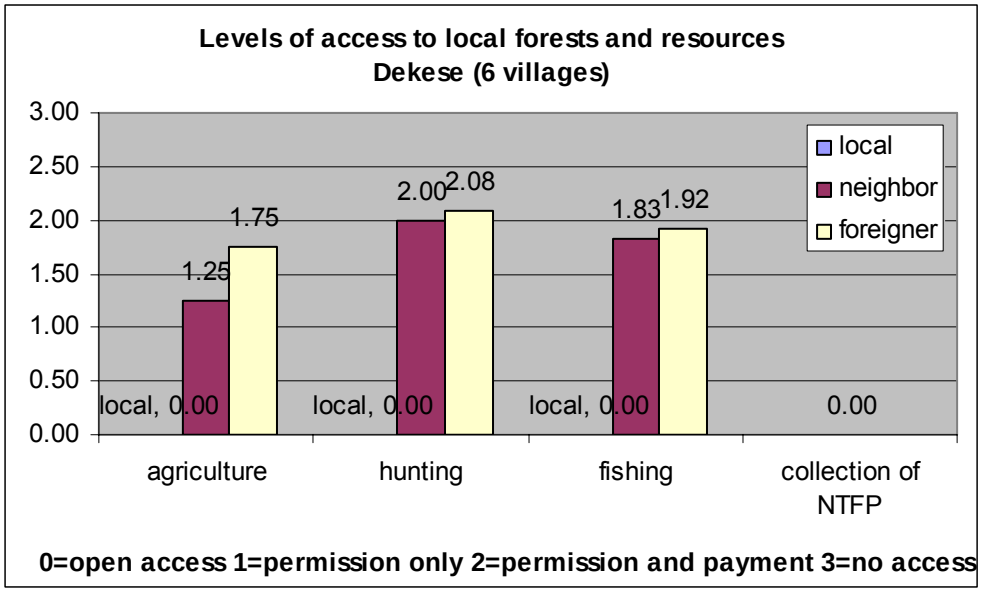
Table 123

Village	Activity	Forests or zones
Bolonga Lukenie	agriculture	Nkolo, Nzoku Mpunda, Vidji Mpese, Yenge
Djongo Nord	agriculture	Idji, Lokongo, Buala, Yakayaka, Bonkonkake, Yengefa, Bosomba, Bambanga
Djongo Nord	Hunting	Bosomba, Boso Kongo, Boso Alengole
Djongo Nord	NTFPs	Imponza, Idji, Boswamba, Vunga elota
Ilongaba	agriculture	Tonkongo, Tende nkoyi, Vidjoswo, Ingadje, Yanema, Boyaka, Nsoko, Bombodji
Ilongaba	NTFPs	Ingandji, Lombo, Ikalo, Intwama, Vidjoswe, Loyaka, Ekota
Ingodji	agriculture	Village's forest limits: SNP (8 km away), Luayi river (limit with village Bokomo), Bedjita (limit with village Ilongaba), Isasandja (limit with village Embe). Forests: Yembe, Iangalosango, Nkoto, Esonge Ekombe, Mboka Esanga, Inyotfu
Ingodji	Hunting	Village's forest limits: SNP (8 km away), Luayi river (limit with village Bokomo), Bedjita (limit with village Ilongaba), Isasandja (limit with village Embe). Forests: Yembe, Bamponde, Ekongo, Mboka Koko, Edjiya, Iyela, Anganga
Itunga	agriculture	Ilasa (clans Indole and Mbala), Imbombe (clans Indole, Mbala and Ekondjolo), Ikoyopadji (clan Mbala), Boseswe, Evungu, Tooko, Pinapina, Mpanzi.
Itunga	Hunting	Bekoto, Luango, Betoko, Elasa

People from neighboring villages and foreigners to the area access local land and resources through traditional authorities, who determine whether people may have open access, need permission, or must pay access rights. Participants in men and women's focus groups were

asked about access mechanisms for farming, hunting, fishing and collecting NTFPs. Figure 160 depicts the average levels of control for all categories[272].

Figure 160



The highest restrictions for neighbors and foreigners were reported for hunting and fishing. All villages reported that neighbors and foreigners must pay hunting rights, making Dekese the area of the landscape with highest restrictions for this activity. Fishing restrictions were also the highest reported in the landscape.

The greatest restrictions were reported in the village of Itunga, where participants from the women's focus group said that neighbors and foreigners could not fish in the village's waterways. Hunting access by neighbors was by payment, and foreigners were never granted permission to hunt. Men from the same village differentiated between subsistence and commercial activities, explaining that permission for subsistence only activities could be granted to outsiders, while payment of rights was necessary for commercial activities.

Divergences between men and women's interpretation of access to land and natural resources were recorded in various villages. Female participants from Boswe Kungu said neighbors were not allowed to fish in the village's waterways, but that despite prohibitions, neighbors fish "illegally." Men, from the same village said neighbors could fish provided they pay access rights. In Djongo Nord, female participants said neighbors could fish with permission of the local *chef the terre*, while men said they needed to pay, as well, for access rights. Female participants in Ilongaba said neighbors were free to clear primary forest for agriculture while men said payment was required.

Some of these differences may be because traditional authorities request payment from certain individuals and not from others, depending on a variety of factors including clan or family ties.

> *« We have agreements or pacts with certain villages…These alliances were established in order to stop rivalry [over resources] between us."* (Men's focus group, Boswe Kungu)

Participants from Boswe Kungu explained that pacts with certain villages allowed them to hunt in those villages' forests and vice versa. These pacts or alliances between villages (or *"esambi"*), constituted conflict resolution mechanisms and involved exchanges of fetiches and

[272] A complete list of villages and the forms of access and restrictions for locals, neighbors and foreigners is included in appendix 9.

the sacrifice of two slaves to symbolize the end of “bad blood.” While these ceremonies are no longer practiced, pacts between villages still guarantee access to resources.

While traditional authorities continue to control access to local forests and other resources, illegal use by neighbors and foreigners was reported in the villages of Boswe Kungu and Bolonga Lukenie.

IV. Conclusions

A. Landscape-level trends: isolation, adaptation, and threats to livelihoods and conservation

Villages across the Salonga-Lukenie-Sankuru Landscape share cultural traits including ethnicity as well as a history of displacement and migration caused by ethnic wars, colonial rule, and in some cases, the creation of Salonga National Park. Local communities also share their dependence on local natural resources in a forest region characterized by difficult access and isolation from markets, urban centers and basic services. Even though migration into the area is relatively recent (circa 1900s), local populations express and demonstrate strong **attachment to the land and its resources**, which is manifested through their socioeconomic activities as well as in their culture and folklore. While differences among areas exist (particularly between villages in the Monkoto Territory and the rest of the landscape), it is possible to identify commonalities in the landscape's populations use of resources and associated trends, changes, and adaptations in use.

The strong dependence of local communities on natural resources for subsistence and income generation is illustrated by the fact that between 10% and 30% of households have only two sources of income. The two sources of income are usually two of four resource dependent activities: agriculture, the collection of NTFPs, fishing, or hunting. Agriculture and the collection of NTFPs constitute principal subsistence activities, while hunting and fishing are increasingly important sources of income.

Changes in local subsistence and economic activities fall under three categories:

1. Changes brought about by "**natural**" phenomenon such as crop disease and drought.
2. Changes triggered by **historical or national** events, such as Zaïrianisation and civil war, and the associated economic decline.
3. Recent changes in local economic practices, **current adaptation** to regional conditions, and a search for new livelihood strategies that sometimes include the abandonment of traditional systems of resource use and management.

Additionally, local populations often mentioned a fourth category that sometimes influences resource availability and their livelihood activities:

4. Changes provoked by **supernatural** causes such as the death of traditional leaders, curses, etc.

The effect of these changes on people's lives and their subsequent adaptation strategies vary depending on the activity (agriculture, hunting, fishing, or collection of NTFPs). Village and regional dynamics are, however, complex and changes in certain activities have caused and continue to trigger changes in others. **Changes in agriculture and collection of NTFPs** are for the most part associated with the first two causes, while **changes in fishing and hunting** are perceived by local populations as falling mostly under the third category. Changes in fishing and hunting are also considered the consequence of changes in agriculture.

The principal historical change that impacted villages was the **onset of the commercialization of agriculture and NTFPs** (rubber, resins, etc.) during the colonial period and its subsequent decline as source of income starting in the late 1960s and culminating with the political conflict of the 1990s. Few landscape participants mentioned the negative aspects of colonial rule and positive memories of the colonial and early post-colonial periods continue to shape **populations' development expectations. Commercial agriculture systems of the past and visions of future large-scale enterprise are** associated with viable transportation, the presence of local markets, and availability of services like health and education.

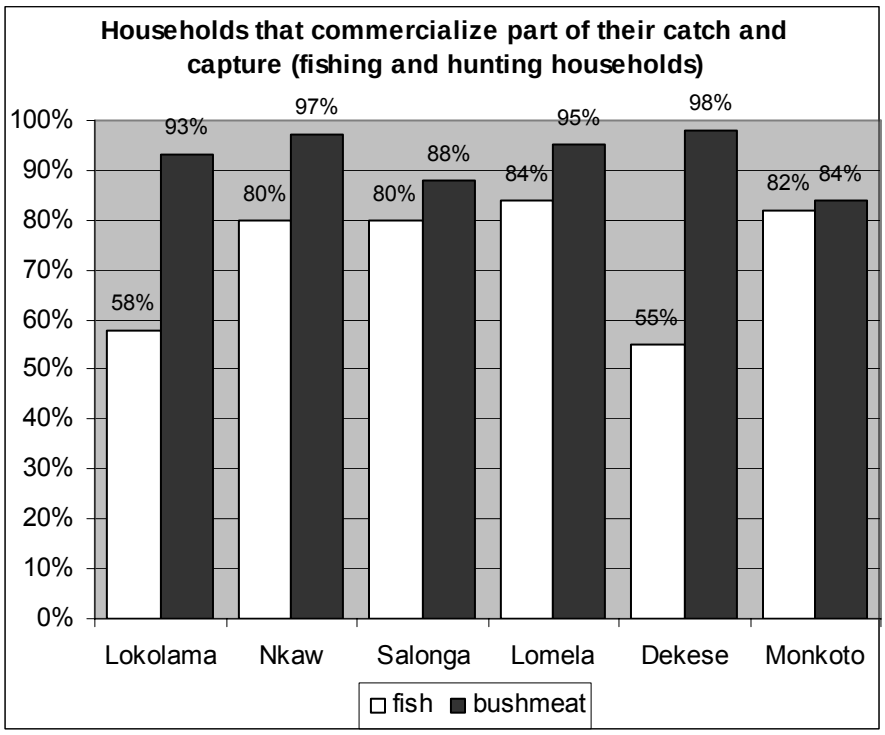
Box 3 The risk of selective memory
The possibility of agriculture enterprises and other large-scale, extractive industries (e.g., logging companies) returning to the area will most likely be perceived as a positive change by local populations. Time appears to have erased the more negative and violent aspects of colonial agricultural and extractive systems, leaving memories of cash circulation, fair rates of exchange, and easy transportation. However, local communties have neither the experience nor the necessary skills to negotiate for their rights with these companies. Landscape partners should work with local populations to increase their understanding of the pitfalls (poaching, illegal extraction, loss of access to community lands) and opportunities of commercial enterprise as well as to improve their lobbying and negotiation skills.

The decline of commercial agriculture resulted in the search for replacement **income generating activities**. Today, earnings per kilogram from fish and bushmeat are higher than from agriculture, and **commercial hunting and fishing** are viewed as a partial solution to declining agricultural sales. The need to generate income, paired with new **demand for fish and bushmeat** from urban and mining areas outside the landscape, triggered the introduction of new practices and the intensification of activities, which in turn impacted and continues to impact the **availability of fish and game** in local forests and waterways.

The **shift from subsistence to trade-oriented hunting** was illustrated by the different units for both. While whole carcasses and halves were reported for trade, consumption was often quantified in smaller units like pieces and piles of pieces. The local consumption of undesirable parts such as certain internal organs and feet is another example of this trend. Participants across the landscape reported a reduction in weekly **consumption of bushmeat** after the establishment of the *"bipese"* system, referring to the growing trend of selling animal carcasses in whole or halves, leaving little for household consumption. The sale of larger volumes is also associated with an increase in individual hunting and the **disappearance of collective, traditional hunting**.

Fish is also an important income-generating activity. A part of the catch is commercialized by more than half of fishing households; however, a higher percentage of hunting households reported commercializing part of their capture than for fishing households (figure 161).

Figure 161[273]



Local populations consider the arrival of **merchants as a driver of change**, associating the shift from agriculture to hunting and fishing for income not only to historical and economic events but to the specific demands of present-day merchants. In the case of agriculture and NTFPs, European merchants influenced activities in the colonial and early post-colonial periods by purchasing products like palm nuts, rubber and resin, while supplying local markets with agricultural production material such as tools, seeds and technology. Today, merchants traveling to and from distant markets like Kikwit and Tshikapa are influencing changes in local practices by prioritizing bushmeat and fish in return for manufactured goods, salt, soap, equipment and tools, and so forth.

Participants view the **shift from commercial agriculture and NTFPs to commercial hunting and fishing generally as a negative change**. Local populations equate commercial agriculture and the collection of NTFPs with increased local trade, better systems of transport and state-sponsored health and education. Conversely, commercial hunting and fishing is associated with low revenues, long-distances, difficult travel, and the need to generate income to pay for health and education services. The contrast between both periods was also evident in participants' perceptions of the commercial terms of trade. Although colonial period trade was often based on **barter**, the introduction of a cash economy at the time remains a strong positive memory. Commercial hunting and fishing, on the other hand, are strongly associated with unfair barter conditions imposed by traveling merchants that take advantage of villages' isolation to give little in exchange for fish and bushmeat.

The identification of **demographic pressure** as a driver of change is another example of the distinction between agriculture, and fishing and hunting in terms of changes and their associated causes. Increasing numbers of **local fishers** was identified among the three principal drivers of

273

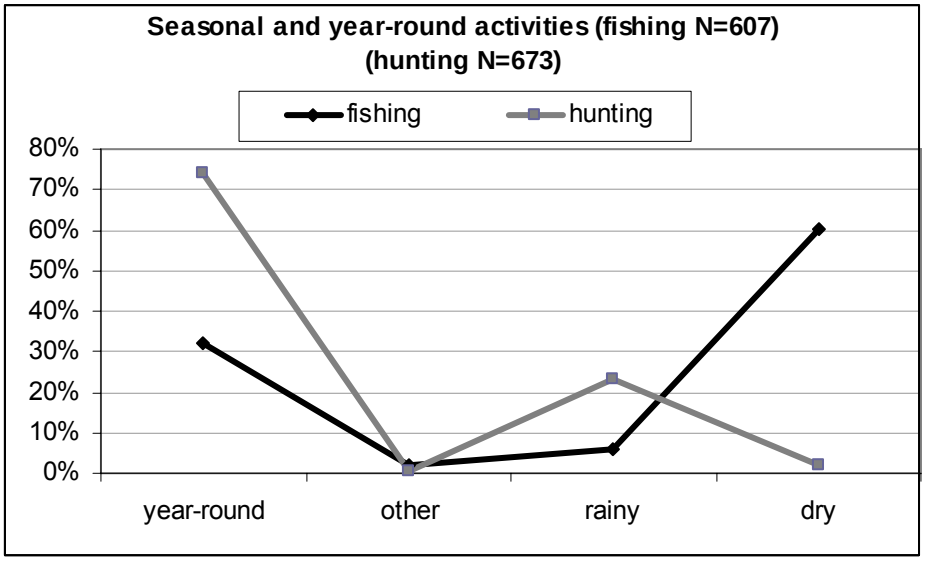
N = (Households)	Lokolama	Nkaw	Salonga	Lomela	Dekese	Monkoto
Fishing	163	156	54	57	87	90
Hunting	164	155	51	90	92	121

change by local populations[274]. Demographic pressure was also among the three principal causes associated with decreasing wildlife in Dekese and Monkoto. In contrast, changes in agriculture were not associated with demographic pressure, and transformation from forest to agricultural land was not considered a major driver of change for NTFPs, with the exception of Dekese, where 14% of all participating households mentioned demographic pressure as a cause of the decreased availability of NTFPs.

Although local populations associate **growing demand for fish and bushmeat** with their decreasing availability, they did not always identify the need to generate income as the cause for the use of new techniques, increasing equipment numbers, and the expansion of hunting and fishing seasons. However, the interconnectivity between these changes and causes is evident: a need to generate income, paired with increased demand for fish and bushmeat, has resulted in the adoption of new practices and/or the intensification of existing methods, which in turn impacts the availability of fish and bushmeat in local forests and freshwater habitats.

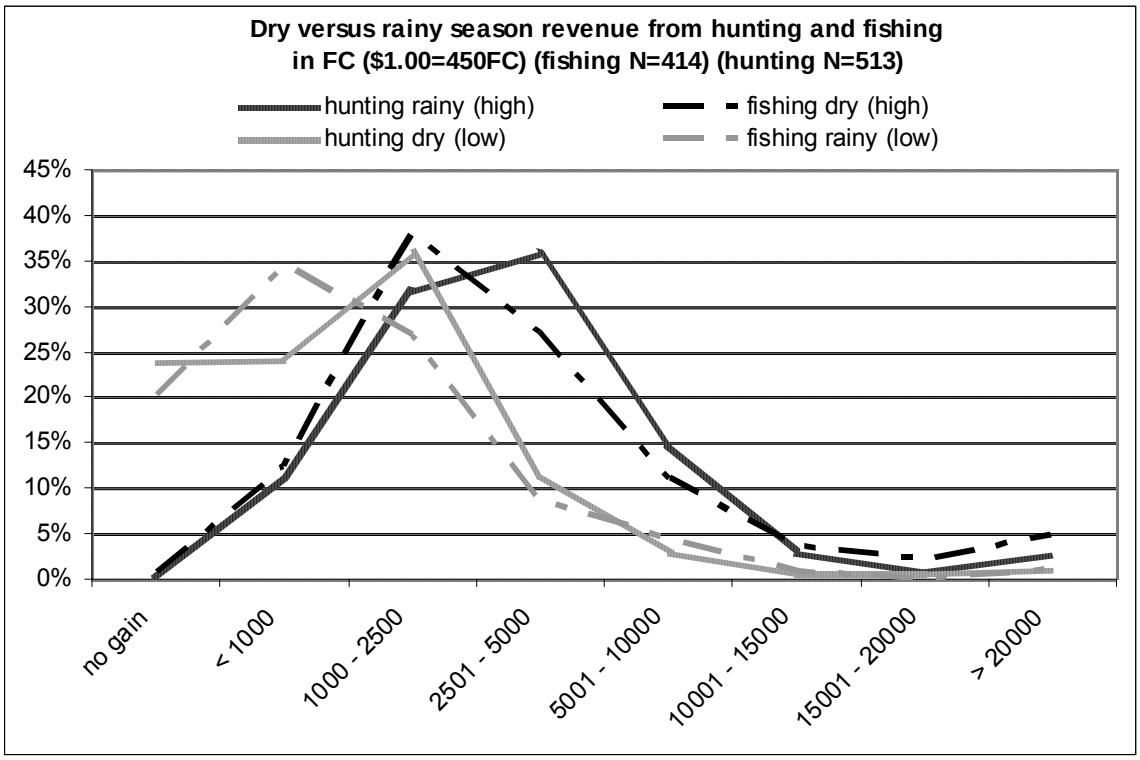
The seasonality of different activities remains important, impacting the socioeconomic dynamics of households. While 32.0% of fishing households and 74.0% of hunting households reported practicing activities year-round (figure 2), hunting and fishing still retain some of their seasonal character: yields and, in most cases, revenue decrease significantly during their respective low seasons. The dry season is the high season for fishing but the low period for hunting, while the rainy season is the primary season for hunting but the low period for fishing. The decrease in one activity is therefore compensated by an increase in the other, making hunting and fishing seasons **complementary** in terms of subsistence and income generation. As illustrated in figure 162, earnings reported during the low and high seasons are similar for both activities.

Figure 162



[274] With the exception of Oshwe Territory, where the principal drivers of decreasing fish stocks were associated with the need to generate income.

Figure 163



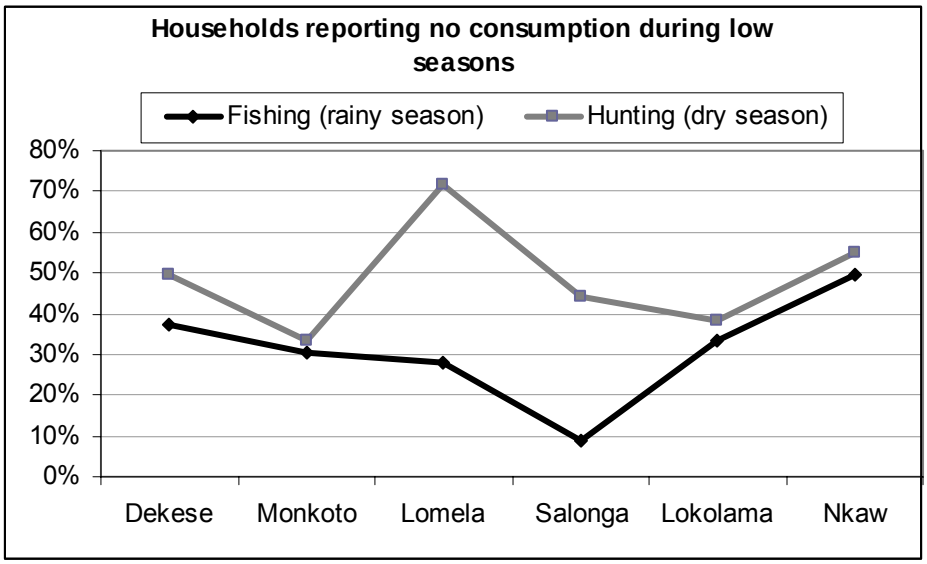
In terms of revenue from hunting and fishing, less than 25% of households that sell a portion of their catch or capture make more than 5000 FC ($11.11) during peak seasons. Less than 20% of households report earnings of over $5.56 during low seasons.

Box 4
Using research findings to foster partnerships

Research findings indicate that the prolongation of the hunting and fishing seasons and the intensification of activities may be putting unsustainable pressure on local resources without necessarily improving consumption rates and net income-generation. While the data used to arrive at these conclusions came from local participants, it is not evident that they fully understand the implications of these findings. Not only should landscape partners return to villages to share the results of this report with collaborating villages, but the findings should also facilitate the identification of points of convergence between livelihoods and conservation objectives.

However, engaging in an activity throughout the year does not necessarily translate into year-round consumption. A higher percentage of hunting versus fishing households reported year-round activities; however, consumption of fish during the low season was higher than that for bushmeat (figure 4). This discrepancy may be explained in terms of subsistence versus commercial priorities: while fish constitutes an important revenue source, more households reported fishing only for subsistence purposes than for hunting. Another factor impacting consumption may be the level of involvement of different household members: hunting is almost exclusively a male activity, fishing, on the other hand, involves between 57% and 94% of female household members. In rural DRC, men are traditionally more involved in cash-generating activities; while women place a greater emphasis on first meeting the immediate needs of their family. This difference may link to gender-differentiation in fishing techniques used by men and women, with methods used mostly by women being more subsistence-oriented in scale while the opposite may be true for techniques preferred by men. Participation of different household members using different fishing methods may allow some fishing activities to remain subsistence-only and others to be oriented for trade.

Figure 164



The availability of wildlife including fish for local consumption is therefore threatened by the growing number of local fishers and hunters who favor commerce over consumptive use. At the same time, households need cash to purchase salt, sugar, manufactured goods, and pay for basic services like health and education. With few viable income generating alternatives, fish and bushmeat will remain principal sources of income for the majority of landscape households and market demand will continue to motivate local hunters and fishers to intensify activities and **prioritize trade over consumption**.

Merchants coming from outside the landscape continue to practice mostly barter. As this system is perceived as disadvantageous to local population, a growing numbers of local fishers and hunters may decide to engage in long-distance commerce themselves, in order to obtain better prices, and cash, for their products.

Threats to the landscape's biodiversity and local populations' livelihoods not only stem from internal demographic pressure and income generation needs. Demand for bushmeat and fish coming from areas where fish stocks and wildlife have already been depleted and economic alternatives are limited also poses a threat in terms of increasing numbers of hunters and fishers coming from outside the landscape.

For example, the presence of fishers from the Congo River and Lake Mai Ndombe, as well as from more densely populated areas like Mbandaka and Boende, confirms that the problem of **decreasing fish stocks** is not particular to the landscape and that it may be, in fact, be more serious in other regions. Competition over freshwater resources can be expected to increase if economic alternatives inside and outside the landscape remain limited.

Box 5 The bushmeat trade

Local and outside interests overlap in the case of bushmeat trade. Anti-poaching activities and controls of bushmeat trade within the landscape will only have a limited impact if drivers originating from outside the landscape are not addressed simultaneously. Outside interests include:

- Bushmeat merchants and suppliers of ammunition
- Government officials collecting unofficial market and transportation taxes
- Poachers, including military and ex-military
- Consumers in urban and mining areas

While the participation of local communities is fundamental in the reinforcement of traditional controls of access at the grassroots level, initiatives to reduce commercial hunting and poaching need to link to activities targeting the source of demand for the landscape's wildlife.

Poaching is also a serious threat to the landscape's biodiversity and therefore local population's resource-dependent livelihoods. Locals and hunters from neighboring villages are rarely categorized as poachers, even if they sell a portion of their capture. Instead, local participants often define poachers as individuals or groups from the exterior who engage in large-scale hunting for commercial purposes often using automatic or heavy gauge firearms. Locals were considered poachers only when involved in hunting or trapping led by outsiders, either as guides, hosts, or participants. Local men forced by military and ex-military to serve as guides and hunters were not considered poachers.

Poaching was sometimes associated with the decline and disappearance of specific species, particularly forest elephant and buffalo.

Local populations consider fishing and hunting by outsiders as a threat particularly when these groups do not abide by **traditional rules of governance and access**. Fishers and hunters that respect local controls and pay access rights when required are allowed to exploit local resources. Poaching, however, poses a serious threat because it is often linked to intimidation and disrespect for communities and local authorities.

Box 6 Local populations and Salonga National Park
Participants view SNP as a threat to their livelihoods in those areas where traditional forests and resources were originally and are still considered contained within park boundaries.
Local population conflict with SNP appear to be the greatest in the areas of the Salonga and Lomela Rivers. The division between park and community waters runs through the middle of the different boundary rivers and is a great source of tension between ICCN and fishers. On the Lomela River in particular, ICCN agents charge daily and monthly fees for fishing activities in the park's waters. Addressing the problem of park boundaries will be critical to both improving river management as well as the relations between partners, including ICCN, and local populations.

With the exception of SNP, where the government is responsible for law enforcement, all other rules of access and prohibition are determined by traditional leaders. Due to the absence of **de jure** authority in rural areas, ancestral norms continue to determine access and use. **De facto** systems were reported in all participating villages, with participants often mentioning that territory and sector-level representatives of the Congolese state have never set foot in their villages. The prevalence of traditional, de facto systems renders the possibility of companies claiming access through the de jure system a remote, unlikely possibility in local populations' perceptions. The belief that their traditional norms are not threatened by government-level decisions renders these populations vulnerable to the likely establishment of forestry concessions in areas of the landscape. Additionally, local controls are effective only if users share and respect traditional values, therefore, traditional authorities have and will have little control over groups and individuals that base their claims on the de jure system of use.

While isolation has favored the continuity of community-level controls, difficult access is becoming less of a deterrent probably as a consequence of the depletion of wildlife in more accessible areas, within and outside of the landscape. The dynamics of pressure on the landscape's natural resources is illustrated by the dates associated with the onset of perceived decreases in wildlife numbers. While more isolated areas like Lokolama and the Salonga and Lomela Rivers placed the onset of change to the 1990s, more accessible areas like Nkaw dated changes to the 1980s.

Traditional values and practices are also changing at the local level. Participants talked about **intergenerational differences** in resource use, citing examples such as the abandonment of collective hunting by young men, the increasing dominance of trade over consumption needs, and disappearance of fishing specialists and their associated knowledge. Economic changes have also resulted in changes in the values assigned to different resources. For example, as agricultural lands expand and the size of forests in proximity to villages decline proportionally,

the collection of NTFPs decreases, and consequently so does the importance of these products to the household in terms of income and time allocation.

Subsistence activities, like collective hunting, are increasingly replaced by individual, commercial-oriented hunting. The value of collective hunting lies not only in its cultural importance as a unifying activity between community members and neighboring clans, but also in its function as a mechanism for the distribution of bushmeat among community members including those unable to hunt for themselves.

Changes in community priorities are directly linked to future **conservation interests**. Local population knowledge and appreciation of their natural resources will directly impact the building of partnerships and the successful creation of CBNRM areas or community forests. Fortunately, many of the problems and solutions identified by participants constitute opportunities for collaboration at the grassroots level.

B. Opportunities for partnerships

Opportunities for partnership exist where local populations have identified problems and negative changes but are either unable to find a solution or do not understand the interconnectivity between variables negatively impacting their livelihoods. Widely shared views, such as agriculture being preferred over hunting and fishing for income generation, combined with community's awareness of decreasing fish stocks and wildlife, constitute a realistic starting point for building partnerships and finding sustainable solutions. Table 124 summarizes opportunities for partnerships identified during the course of the study as well as factors and variables that may negatively impact the promotion of more formalized systems of CBNRM and other types of collaboration between local populations and landscape partners.

Table 124 Opportunities and constraints

Activity	Opportunities for partnerships	Constraints
Agriculture	• Addressing low agricultural yields and problems caused by plant diseases, insects and lack of appropriate technology and knowledge. • Improving farmers' knowledge of high-value products and market conditions. • Finding solutions to existing transportation limitations aimed at linking communities to provincial and national agricultural markets.	• Isolation from markets and poor infrastructure limit the potential of agricultural expansion in all areas of the landscape. • Improved infrastructure for agricultural commerce will also facilitate access by poachers and commercial fishers from outside the landscape. • Agricultural development will not necessarily result in decreased pressure on wildlife and fish, particularly if market demand for these products continues to grow. • The vision of commercial agriculture as a panacea for all problems is unrealistic and when expectations are not met may lead to its abandonment and greater pressure on wildlife and fish.
Collection of NTFPs	• High value NTFPs like caterpillars and mushrooms constitute an opportunity to work with local populations to define sustainable harvest	• Present-day traditional restrictions on access to NTFPs are limited. Perceived availability and limited commercial relevance for local

Activity	Opportunities for partnerships	Constraints
	rates while increasing the value of the forest versus agricultural land. • Women's high level of participation in the collection of NTFPs represents an important opportunity for collaboration and can be used to develop sustainable harvesting systems and the commercialization of products to the benefit and empowerment of women	households translates into open access to outsiders. • The belief that supernatural phenomenon instead of human activity is responsibility for NTFP availability may render arguments in favor of sustainable harvest difficult to promote.
Fishing	• Common concern for decreasing fish stocks will facilitate collaboration between populations and conservation initiatives. • Supporting traditional authorities in the control of unsustainable fishing methods like the use of poison or fishing in reproduction sites.	• Access regulations currently apply only to neighbors and foreigners. Traditional authorities do not regulate the methods and number of instruments employed by local fishers. • While awareness of unsustainable practices exists, sustainable alternatives remain unknown to local populations. • Increasing demand for fish from outside the landscape. • Lack of economic alternatives to fishing. • Complicity of some ICCN agents in fishing activities within SNP boundaries.
Hunting	• Negative attitudes vis-à-vis hunting as an income generating activity can be an advantage in the reinforcement of traditional forms of access and stewardship. • While outside pressure on resources exists, the distance from urban areas and the apparent strong links between certain actors and specific threats (e.g. poaching by military and ex-military poachers), increases the opportunity of reducing poachers' impact on the landscape through targeted interventions. • Local populations' interest in livestock projects as a protein and income-	• Traditional controls appropriate for small scale hunters may not be adequate for larger, better organized hunting activities. • Control of poaching by military and ex-military depends on the collaboration of military authorities. • Difficulty of enforcing anti-poaching laws given the landscape's isolation, lack of government personnel with the necessary capacity, etc. • Complicity of some ICCN agents in hunting activities within SNP. • Strong food preferences for bushmeat may make the transition to domestic animal production slow and limited in scope.

Activity	Opportunities for partnerships	Constraints
	generating alternative to hunting	

Additional opportunities, constraints and conditions:

- The organizational capacity of communities is weak throughout the landscape and most groups and associations have little experience in actual project management and coordination of activities. Existing social networks rely strongly on clan or kinship connections. Future activities that involve local populations will have a better opportunity of success if they are based on existing kinship ties and traditional attachment to the land. Highly hierarchical and male dominated social structures will necessitate a well-formulated strategy to ensure the participation of youth and women in decision making processes.
- Present and future conflict over scarce resources needs to be taken into account in management plans, particularly in areas located within 10 km of SNP boundaries.
- Better communication mechanisms between ICCN and local populations are necessary to address tensions in areas neighboring park boundaries and as a means of engaging communities in collaborative systems to control illegal access and resource extraction both within the park boundaries and in the neighboring traditional forests of communities that border SNP.

Given the poor record of law enforcement in the area as well the prevailing dependence of local populations on natural resources, community participation in regulating land access and resource use is more of a necessity than an alternative. Without community engagement in sustainable use and conservation, internal and external pressures will continue to threaten the landscape's natural resources, and consequently, the livelihoods of the local population.

Results from this study can help monitor trends and changes in resource use and measure the impact of conservation and sustainable activities in the landscape. Landscape partner activities should result in improved livelihoods and successful CBNRM systems that promote traditional controls of access and sustainable use. Local populations' perceptions of changes and threats to their livelihoods will also help evaluate the effectiveness of community based partnerships. Changes in levels of de facto control over resources constitute a way to measure internal and external pressure over villages' forests and waterways. Variables indicating land use change, intensification of activities, commercialization of products, and decrease in resource availability can help monitor trends of use across the landscape[275]. Additionally, results from this study can serve as means to engage local populations in discussions that are relevant to their livelihoods.

Conservation and sustainable use initiatives can best engage community participation when articulated in terms of local knowledge and perceived needs and threats. Enough points in common exist between the goals of communities and conservation organizations and landscape partners to serve as a solid starting point for the development of community-based systems of natural resource management in the Salonga-Lukenie-Sankuru Landscape.

[275] Appendixes 2, 4, 7, and 9 include villages' current levels of control over local resources. Appendix 10 includes a list of household-level indicators of change that can help monitor the impact of partners' activities on the landscape's human population.

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Appendix 10: Names of rivers and waterways associated with fishing activities Lokolama and Nkaw sectors

Methods: all types of fishing methods associated to each waterway, by village.
db= damming bailing**, h=**hook and line**, n=**nets**, t=**traps
Participation: involvement by men, women and children in fishing activities in each zone.
Fishing zones: names provided by households regarding where they practice each activity.
Distances (km): Very rough estimates based on participants calculations. Some distances left in terms of walking days.
Number of activities reported: Number of times an activity was associated with the fishing zone, by village.

sector	village	Methods used	men	women	children	Fishing zones	Distance (km)	number of activities reported
Lokolama	Belonge 1	db		yes		Amala	1.25	1
Lokolama	Ngendo	db		yes		Ampene	3.75	1
Lokolama	Bokala	db		yes		Baboo	2.5	1
Lokolama	Eyanza	t		yes	yes	Bapaka	1	1
Lokolama	Sama	db		yes		Basangi	7.5	1
Lokolama	Ntemo	db		yes		Basanya	0.416	1
Lokolama	Esama	db		yes	yes	Bedita	0.8	1
Lokolama	Sama	db		yes	yes	Beete	1.25	1
Lokolama	Inyongo	db		yes		Bekungu	2 days	1
Lokolama	Nganda	db		yes		Bentongo	5	1
Lokolama	Ikongo	db		yes		Besoko	2.5	1
Lokolama	Sama	db		yes	yes	Bima	1.25	1
Lokolama	Bokala	h		yes		Bolumbele	30	1
Lokolama	Ikongo	db		yes		Bolumu	5	3
Lokolama	Banyomo	t	yes			Bome	2.5	2
Lokolama	Mimia	n, h, t, db	yes	yes		Bosimani	1.5	10
Lokolama	Nkopo	t		yes		Botipili	0.832	1
Lokolama	Belonge 1	db	yes	yes		Botuna Lokole	5 days	2
Lokolama	Belonge 1	n	yes	yes		Ekele	5 days	2
Lokolama	Nganda	db		yes		Ekoka	5	1
Lokolama	Bisenge	db		yes		Elali (old village site)	17.5	1
Lokolama	Ikongo	db		yes		Elopi	2.5	1
Lokolama	Ngendo	db		yes		Eyango	3.75	1
Lokolama	Sama	poison, n, h, db		yes	yes	Ibeke	2.5	4
Lokolama	Belonge 2	t	yes	yes	yes	Isepe		1
Lokolama	Inyongo	db		yes		Itume	2.5	1
Lokolama	Banyomo	N,h	yes	yes		Kiyo	7.5	2
Lokolama	Ikongo	db		yes	yes	Koli	2.5	1
Lokolama	Banyomo	t	yes	yes		Koli	1	2
Lokolama	Esama	db		yes	yes	Kololo	0.5	1
Lokolama	Lokako	t		yes		Lilanga	5	1
Lokolama	Nganda	db		yes		Lilo	2	1
Lokolama	Belonge 2	t		yes		Lobende	5	1
Lokolama	Belonge 1	n	yes			Lobende	7 days	1
Lokolama	Ikongo	db		yes		Loe	5	2
Lokolama	Nganda	db		yes		Loeli	5	1
Lokolama	Ngendo	Db		yes		Loile	5	4
Lokolama	Eyanza	T		yes	yes	Lokeli	3	1
Lokolama	Basobe	t, h, n			yes	Lokeli	10	5
Lokolama	Nganda	n, h, t, db	yes	yes	yes	Lokeli	15	11

sector	village	Methods used	men	women	children	Fishing zones	Distance (km)	number of activities reported
Lokolama	Manga	n, h	yes			Lokoro 1	9	2
Lokolama	Eyanza	n, h	yes			Lokoro 1	8	2
Lokolama	Mimia	t, h, n	yes	yes		Lokoro 1	12	3
Lokolama	Iyoko	n, hook	yes	yes		Lokoro 1	5	14
Lokolama	Mbungusani	n, h, db	yes	yes	yes	Lokoro 1	7	15
Lokolama	Ntemo	t, h	yes			Lokoro 2	12.5	2
Lokolama	Mimia	t, h, n	yes	yes		Lokoro 2	0.15	3
Lokolama	Esama	n, h, db	yes	yes	yes	Lokoro 2	3	3
Lokolama	Mangialokombe	t, hook, n	yes	yes	yes	Lokoro 2	9	4
Lokolama	Nkopo	n, h	yes		yes	Lokoro 2	17.5	5
Lokolama	Ikongo	t, h, n	yes	yes	yes	Lokoro 2	4 days	5
Lokolama	Nkakaotike	t, h, n	yes	yes	yes	Lokoro 2	5	6
Lokolama	Ngendo	n, h, db	yes	yes	yes	Lokoro 2	17.5	10
Lokolama	Manga	t, h, n	yes	yes	yes	Lokoro 2	5	10
Lokolama	Bosongo	t, h, n	yes	yes		Lokoro 2	25	12
Lokolama	Basobe	t, h, n	yes	yes	yes	Lokoro 2	20	13
Lokolama	Eyanza	t, h, n	yes	yes	yes	Lokoro 2	7.5	14
Lokolama	Ngendo	Db		yes		Lolama	5	4
Lokolama	Inyongo	Db		yes	yes	Lolama	5	7
Lokolama	Bokota 1	T		yes		Lolongo	2.5	1
Lokolama	Nkopo	T	yes	yes		Lolongo	5	3
Lokolama	Bosongo	Db		yes		Lomata	9	1
Lokolama	Bosongo	Db		yes		Lompwete	9	1
Lokolama	Ikongo	Db		yes		Lompwete	2.5	4
Lokolama	Sama	N		yes		Loole	2 days	1
Lokolama	Belonge 1	N	yes	yes		Loole	5 days	3
Lokolama	Banyomo	t, h, n	yes	yes		Loole	7.5	5
Lokolama	Belongwandjale	t, h, n	yes			Loole	60	7
Lokolama	Ikongo	t, h, n	yes			Loole	100	8
Lokolama	Ntemo	t, h, n	yes	yes	yes	Loole	30	10
Lokolama	Ngendo	db		yes		Looli	5	1
Lokolama	Belonge 1	t, h, n	yes	yes		Loonko	1 day	6
Lokolama	Bokota 2	t		yes		Loosa	7.5	2
Lokolama	Bisenge	t, h	yes	yes	yes	Loosa	12	4
Lokolama	Nganda	db		yes		Lopombe	7	1
Lokolama	Bokota 2	t		yes		Losoo	10	2
Lokolama	Bisenge	t, h, n	yes	yes		Losoo	7.5	8
Lokolama	Bokota 1	t		yes		Luaka	12.5	1
Lokolama	Belongwandjale	t		yes		Luaka	15	1
Lokolama	Belonge 2	t		yes		Luaka	10	2
Lokolama	Ikongo	db		yes		Luene	4 days	1
Lokolama	Inyongo	db		yes	yes	Luenge	10	4
Lokolama	Inyongo	db		yes	yes	Lulo	20	9
Lokolama	Mimia	n, h, t, db	yes	yes		Lulo	30	14
Lokolama	Sama	n, h, t, db	yes	yes	yes	Lulo	7.5	22
Lokolama	Bisenge	t	yes	yes		Lute	1	4
Lokolama	Bosongo	t, db		yes		Lwanya	1.25	2
Lokolama	Esama	db		yes	yes	Mpembe	0.6	1
Lokolama	Bosongo	t		yes		Mpeti	1.25	1
Lokolama	Ntemo	db		yes		Mpokote	0.416	1
Lokolama	Ngendo	t, db	yes	yes		Nkoli	5	2
Lokolama	Bosongo	t, db		yes		Ntopa	1.25	2
Lokolama	Banyomo	t, h	yes	yes		Tokiso	4 days	2
Lokolama	Banyomo	t, h	yes	yes		Yakolo	7.5	2

sector	village	Methods used	men	women	children	Fishing zones	Distance (km)	number of activities reported
Lokolama	Sama	db		yes		Yetele	7.5	1
Lokolama	Banyomo	t	yes			Yetele	2.5	1
Nkaw	Ikomo	t, db		yes	yes	Bakakato	5	2
Nkaw	Ikomo	n, h, db	yes			Bakangatu	15	3
Nkaw	Pengola	db		yes		Bameli	7.5	1
Nkaw	Mbinza	db		yes		Belima	9	1
Nkaw	Nsese	db	yes	yes		Bepali	2.5	4
Nkaw	Nongempela Nord	db		yes		Bepeka	3	1
Nkaw	Bosenge	t, db	yes	yes		Bokelu	5	6
Nkaw	Loma	h, db	yes	yes		Bokelu	10	10
Nkaw	Ikembe	db		yes		Bokiliyomo	10	2
Nkaw	Mbinza	h, db	yes	yes	yes	Bolimu	2.5	2
Nkaw	Pengola	t	yes	yes		Bolopo	5	1
Nkaw	Ikembe	t		yes	yes	Bomotio	5	2
Nkaw	Bosenge	t, db	yes	yes		Bonyanga	2.5	2
Nkaw	Mange	db		yes		Bosasanga	2.5	1
Nkaw	Pengola	db		yes		Bosaw	1	1
Nkaw	Ikembe	t, db		yes		Bosaw	4	3
Nkaw	Nsese	h, db		yes		Bosawani	5	4
Nkaw	Ikomo	t, db		yes	yes	Bosomboni	10	3
Nkaw	Ikomo	n, h, db	yes			Bosawani	15	3
Nkaw	Boko	db		yes		Botsina	8	1
Nkaw	Nsese	h, db	yes	yes	yes	Botsina	10	6
Nkaw	Pengola	n, h, t, db	yes	yes	yes	Botsina	10	12
Nkaw	Ikembe	t, db		yes	yes	Botsina	30	13
Nkaw	Lokongo	n, h, t, db	yes	yes	yes	Botsina	12	15
Nkaw	Bolinda	n, h, t, db	yes	yes	yes	Botsina	5	22
Nkaw	Nsese	db		yes		Bwato	2.5	1
Nkaw	Ikembe	db		yes		Ibeke	10	1
Nkaw	Lokongo	db		yes		Ikeli	2.5	1
Nkaw	Lokongo	t		yes		Ikeliekima	3.75	1
Nkaw	Loma	db		yes	yes	Ikole	3	1
Nkaw	Nsese	db		yes		Iliko	2.5	1
Nkaw	Lokongo	db		yes		Iyeke	2.5	4
Nkaw	Loma	db	yes	yes	yes	Iyolo	3	3
Nkaw	Ikembe	t	yes	yes	yes	Kake	10	2
Nkaw	Ikembe	db		yes		Kesekese	5	1
Nkaw	Boko	t		yes	yes	Kokoka	4	1
Nkaw	Pengola	db		yes	yes	Kokoni	7.5	1
Nkaw	Pengola	db		yes		Kololo	7.5	1
Nkaw	Pengola	db		yes		Libeke	1	1
Nkaw	Ikembe	db		yes		Libeke	1	1
Nkaw	Loma	db		yes	yes	Lilanga	3	1
Nkaw	Bosenge	db		yes		Lilanga	1	1
Nkaw	Bokwankoso	t		yes	yes	Lilanga	11	1
Nkaw	Ikembe	t		yes	yes	Liombo	5	1
Nkaw	Loma	db		yes		Lokoro 1	25	1
Nkaw	Bosenge	n, h			yes	Lokoro 1	50	2
Nkaw	Bolinda	db		yes	yes	Lokoro 1	55	2
Nkaw	Mange	n, h, db	yes	yes	yes	Lokoro 1	10	16
Nkaw	Lokolama 2	n, h, t, db	yes	yes	yes	Lokoro 1	1	33
Nkaw	Bolinda	db		yes	yes	Lolengeolongo	2	1
Nkaw	Ikomo	t, db		yes	yes	Lolongo	2	4

sector	village	Methods used	men	women	children	Fishing zones	Distance (km)	number of activities reported
Nkaw	Bosenge	n, h	yes			Loole	7.5	2
Nkaw	Boko	h, db	yes	yes	yes	Loole	7	3
Nkaw	Bokwankoso	n, h, db	yes	yes	yes	Loole	11	7
Nkaw	Mbinza	n, h, t, db	yes	yes	yes	Loole	5	11
Nkaw	Nongempela Nord	harpoon, n, h, db	yes	yes	yes	Loole	10	14
Nkaw	Loma	n, h, db	yes	yes	yes	Loole	5	16
Nkaw	Bolinda	n, h, t, db	yes	yes	yes	Loole	5	24
Nkaw	Pengola	n, h, t, db	yes	yes	yes	Loole	10	27
Nkaw	Loma	n, h, db		yes	yes	Lopale	5	3
Nkaw	Boko	t, h, db	yes	yes	yes	Lopale	4	3
Nkaw	Bokwankoso	t, db		yes	yes	Lopale	10	5
Nkaw	Pengola	db		yes	yes	Lopale	3	6
Nkaw	Bosenge	h, db	yes	yes		Lopale	2.4	10
Nkaw	Lokongo	t, n, db	yes	yes	yes	Losengi	5	16
Nkaw	Nsese	h, db	yes	yes		Lotingo	2.5	8
Nkaw	Ikembe	t, db		yes		Lotingo	5	8
Nkaw	Pengola	db		yes		Lowete	7.5	1
Nkaw	Nsese	db	yes	yes		Loyi	2.5	2
Nkaw	Mbinza	n, h, db	yes	yes	yes	Lukenie	5	3
Nkaw	Bolinda	n, h, db	yes	yes	yes	Lula	5	4
Nkaw	Nongempela Nord	h, db	yes	yes	yes	Luna	10	7
Nkaw	Mbinza	n, h, t, db	yes	yes	yes	Luna	5	9
Nkaw	Bosenge	n, h, db	yes	yes	yes	Luna	7.5	11
Nkaw	Bokwankoso	t, n, db	yes	yes	yes	Luna	10	11
Nkaw	Loma	n, h, db	yes	yes	yes	Luna	10	12
Nkaw	Bolinda	n, h, t, db	yes	yes	yes	Luna	25	12
Nkaw	Ikomo	n, h, db	yes	yes	yes	Luna	20	13
Nkaw	Pengola	n, h, t, db	yes	yes	yes	Luna	3	14
Nkaw	Mange	n, h, db	yes	yes	yes	Luna	2	27
Nkaw	Ikomo	n, h	yes			Makakata	12.5	3
Nkaw	Ikembe	t		yes	yes	Mbela	5	1
Nkaw	Nongempela Nord	db		yes	yes	Nantikala	3	3
Nkaw	Bosenge	t, db	yes	yes		Nganene	2.5	2
Nkaw	Nsese	h, db	yes	yes		Nkake	3.75	7
Nkaw	Nsese	db		yes		Nkampia	2.5	1
Nkaw	Ikembe	db		yes		Nkese	4	1
Nkaw	Pengola	t, h, db	yes	yes	yes	Nkimo	5	4
Nkaw	Bolinda	n, h, db	yes	yes	yes	Nkimo	2	10
Nkaw	Mbinza	n	yes		yes	Nkombe	2.5	1
Nkaw	Pengola	n, h	yes	yes		Nkotepomi	7.5	2
Nkaw	Mbinza	n, h, db	yes		yes	Nkotepomi	9	3
Nkaw	Lokongo	t		yes		Nkuta	5	1
Nkaw	Mange	db		yes		Nsangokeke	3	1
Nkaw	Pengola	t, h, n	yes		yes	Otanema	2	3
Nkaw	Pengola	db		yes		Songebe	7.5	1
Nkaw	Lokolama 2	h, db	yes	yes		Wanda	1	2
Nkaw	Pengola	db		yes		Weliomo	1	1
Nkaw	Lokongo	t, db		yes		Weliomo	5	4
Nkaw	Ikembe	t, db		yes		Weliomo	4	4
Nkaw	Pengola	db		yes	yes	Wenge	2.5	1
Nkaw	Bokwankoso	db		yes	yes	Wenge	7.5	1

sector	village	Methods used	men	women	children	Fishing zones	Distance (km)	number of activities reported
Nkaw	Boko	t, h, db	yes	yes	yes	Yenge	3	4
Nkaw	Loma	n, h, db	yes	yes	yes	Yenge	7.5	7
Nkaw	Pengola	t, h, db	yes	yes	yes	Yenge	2	13
Nkaw	Bolinda	db		yes		Yenge	5	1
Nkaw	Bokwankoso	t, db		yes	yes	Yenge	5	2
Nkaw	Bosenge	t, db	yes	yes		Yenge	5	8
Nkaw	Lokongo	n, h, db	yes	yes	yes	Yoliya	12.5	3

Appendix 11: Forms of traditional access to land and resources Lokolama and Nkaw sectors

0=no permit required or just parental
1=permit without paying rights
2=permit through payment of rights
3=not allowed
n/a=no reply

Villages Lokolama	status	agriculture	hunting	fishing	collection of NTFP
Banyomo	local	0	0	0	0
	neighbor	1	2	2	0
	foreigner	1	2	2	0
Basobe	local	0	0	1	0
	neighbor	2	3	2	0
	foreigner	1	1	1	0
Belonge 1	local	0	0	0	0
	neighbor	1	1	1	0
	foreigner	2	2	2	0
Belonge 2	local	0	0	0	0
	neighbor	1	1	1	0
	foreigner	1	1	1	0
Belongwandjale	local	0	0	0	0
	neighbor	1	1	1	0
	foreigner	2	2	2	0
Bisenge	local	0	0	0	0
	neighbor	2	2	3	0
	foreigner	0	1	n/a	0
Bokala	local	0	0	0	0
	neighbor	1	1	1	0
	foreigner	1	1	1	0
Bokota 2	local	0	0	0	0
	neighbor	1	2	n/a	0
	foreigner	1	2	n/a	0
Bokota I	local	0	0	0	0
	neighbor	0	1	1	0
	foreigner	1	1	1	0
Bolendo	local	0	n/a	0	0
	neighbor	1	n/a	1	0
	foreigner	1	n/a	1	0
Booko	local	0	0	1	0
	neighbor	3	2	2	0
	foreigner	1	2	2	0
Bosongo	local	0	0	1	0
	neighbor	3	1	2	0
	foreigner	2	1	2	0
Esama	local	0	0	0	0
	neighbor	1	2	2	0
	foreigner	2	2	2	2
Eyanza	local	0	0	0	0
	neighbor	3	3	3	3
	foreigner	1	1	1	1
Ikongo	local	0	0	1	0
	neighbor	1	2	2	0
	foreigner	1	2	3	0
Lokako	local	0	0	n/a	0
	neighbor	1	1	1	0

Villages Lokolama	status	agriculture	hunting	fishing	collection of NTFP
	foreigner	1	1	1	0
Manga	local	0	0	0	0
	neighbor	1	1	1	0
	foreigner	1	1	1	0
Mangialokombe	local	0	0	0	0
	neighbor	1	1	1	0
	foreigner	2	2	2	0
Ngendo	local	0	0	0	0
	neighbor	1	1	1	0
	foreigner	2	2	2	0
Nkakaotike	local	0	0	0	0
	neighbor	1	2	2	0
	foreigner	2	2	2	2
Nkopo	local	0	0	0	0
	neighbor	1	1	1	0
	foreigner	1	1	1	0
Ntemo	local	0	0	0	0
	neighbor	1	2	1	0
	foreigner	1	2	2	0

Appendix 12: Names of rivers and waterways associated with fishing activities Salonga and Lomela Rivers

Methods: all types of fishing methods associated to each waterway, by village.
db= damming bailing**, h**=hook and line**, n**=nets**, t**=t
Participation: involvement by men, women and children in fishing activities in each zone.
Fishing zones: names provided by households regarding where they practice each activity.
Distances (km): Very rough estimates based on participants calculations. Some distances left in terms of walking days.
Number of activities reported: Number of times an activity was associated with the fishing zone, by village.

River Area	village	Methods used	men	women	children	Fishing zones	Distance (km)	number of activities reported
Lomela	Besoyi	db		yes		Baampombe	1.5	1
Lomela	Besoyi	t		yes	yes	Bampame	3 min	2
Lomela	Botsima	h	yes			Bampone	1.25	1
Lomela	Besoyi	db		yes		Banobano	7.5	1
Lomela	Ibali 1	db		yes	yes	Bawuma	2.5	1
Lomela	Besoyi	db		yes		Belapaelapa	5	1
Lomela	Ibali	db,n,h	yes	yes		Beloke	7	3
Lomela	Yafala	db,h	yes	yes		Beloke	2	2
Lomela	Ibali 1	h	yes			Boa	2	1
Lomela	Ikomo Lomoko	db,h	yes	yes		Bokitaka	2	3
Lomela	Ikomo Lomoko	n,h	yes		yes	Bombelo	5	2
Lomela	Ibali 1	db		yes	yes	Bompu	2.5	1
Lomela	Ibali 1	db		yes	yes	Bonkomo	2.5	1
Lomela	Ibali	db		yes		Bototala	1.25	1
Lomela	Yafala	db		yes	yes	Bototala	1.25	2
Lomela	Besoyi	db,n,h,t	yes	yes	yes	Bungwa	1	9
Lomela	Bokela/ Kankonde	db,h	yes	yes	yes	Bungwa	12	5
Lomela	Ikomo Lomoko	db,n,h	yes	yes	yes	Bungwa	12	5
Lomela	Bokela/ Kankonde	db,n,h,t	yes	yes	yes	Bungwa	2	5
Lomela	Botsima	db		yes		Efonyaka	1.25	1
Lomela	Yafala	db,n,h	yes	yes		Emelaka	2	7
Lomela	Ibali 1	h	yes			Fome	2	1
Lomela	Ibali 1	db		yes	yes	Impo	2	1
Lomela	Botsima	db		yes		Isikaya	5 min	2
Lomela	Ikomo Lomoko	db		yes		Isofanya	3	1
Lomela	Ikomo Lomoko	db,h	yes	yes		Iyete	2	2
Lomela	Yafala	db,n,h	yes	yes		Iyokotama	1	3
Lomela	Besoyi	db,n,h	yes	yes		Iyondo	4	3
Lomela	Ibali 1	db		yes	yes	Iyonge	2.5	1
Lomela	Ibali	db		yes		Lifuya	4	1
Lomela	Ibali	db,n,h	yes	yes	yes	Likeli	2.5	5
Lomela	Ibali	db,h	yes	yes	yes	Loile	5	2
Lomel	Besoyi	h,t	yes	yes	yes	Lokoli	2.5	2
Lomela	Besoyi	db,n,h,t	yes	yes	yes	Lomela	2	17

River Area	village	Methods used	men	women	children	Fishing zones	Distance (km)	number of activities reported
						River		
Lomela	Bokela/ Kankonde	n,h,t	yes	yes	yes	Lomela River	2.5	14
Lomela	Botsima	db,n,h,t	yes	yes	yes	Lomela River	2	10
Lomela	Ibali	db,n,h	yes	yes	yes	Lomela River	5	12
Lomela	Ibali 1	db,n,h,t	yes	yes	yes	Lomela River	.8-3.75	20
Lomela	Ikomo Lomoko	n,h		yes	yes	Lomela River	5	3
Lomela	Bokela/ Kankonde	db,n,h	yes	yes	yes	Lomela River	2	7
Lomela	Yafala	db,n,h,m	yes	yes	yes	Lomela River	0.5	21
Lomela	Besoyi	db		yes		Looya	2.5	1
Lomela	Bokela/ Kankonde	n,h	yes	yes	yes	Luayi	5	3
Lomela	Bokela/ Kankonde	h	yes			Luenge	3	1
Lomela	Ibali	db		yes		Mabeke	5	1
Lomela	Ibali 1	n,h	yes			Mabeke	2.5	2
Lomela	Ibali	db,		yes		Mpoka River	2	2
Lomela	Yafala	db		yes	yes	Mpoka River	1	2
Lomela	Ibali 1	n,h	yes			Neyakone	1.25	2
Lomela	Ibali	db,n,h	yes	yes	yes	Ngili	7	3
Lomela	Yafala	db,n,h	yes	yes		Ngili	3	7
Lomela	Ibali	db,n,h	yes	yes		Nkake	6	3
Lomela	Yafala	db,n,h	yes			Nkake	2	4
Lomela	Besoyi	db,n	yes	yes		Nkuma	6	2
Loela	Yafala	db		yes		Nymola	1	1
Lomela	Besoyi	db,n,h	yes	yes		SNP	2	3
Lomela	Ibali	db		yes		SNP	6	1
Lomela	Ibali 1	n,h	yes			SNP	2.5	2
Lomela	Bokela/ Kankonde	db,n,h	yes	yes	yes	SNP	5	3
Lomela	Ikomo Lomoko	db,n,h	yes	yes	yes	Welwa	5	8
Lomela	Ibali 1	h	yes			Wilo	2	1
Lomela	Ikomo Lomoko	db		yes		Wiyomo	3	1
Lomela	Besoyi	h,t	yes	yes	yes	Yanaa	2.5	2
Lomela	Ikomo Lomoko	db,h	yes	yes		Yoka	4	2
Salonga	Efeka	t		yes		Baila	5	1
Salonga	Beele	db,h	yes	yes	yes	Bofaka River	3 min	5
Salonga	Efeka	db,t	yes	yes		Bofunga	5	4
Salonga	Ilonge Centre	db,n,h	yes	yes		Bofunga	5	3
Salonga	Beele	db,n,h,t	yes	yes	yes	Bolango River	1.25	15

River Area	village	Methods used	men	women	children	Fishing zones	Distance (km)	number of activities reported
Salonga	Efeka	db		yes		Bolango River	1.25	1
Salonga	Ilonge Centre	db,n,h	yes	yes		Bolango River	5	5
Salonga	Lokanda	h	yes			Bolengo swamp	2.5	1
Salonga	Efeka	db		yes		Bombene	5	1
Salonga	Beele	h			yes	Bomia	7	1
Salonga	Ilonge Centre	n	yes			Bomia	5	1
Salonga	Ilonge Centre	db		yes		Bonsune	2	1
Salonga	Efeka	t		yes		Booye	5	1
Salonga	Bamata	db,n,h	yes	yes		Bosomo River	5 min	6
Salonga	Malela	db		yes		Bosomo River	5	3
Salonga	Lokanda	n	yes			Ika swamp	2.5	1
Salonga	Beele	h			yes	Kuya	10	1
Salonga	Lokanda	db		yes		Mpayela	1.25	1
Salonga	Malela	db,h	yes	yes	yes	Mpayela	5	3
Salonga	Bamata	db,n,h,t	yes	yes	yes	Salonga River	1.25	14
Salonga	Beele	db,n,h	yes	yes	yes	Salonga River	7.5-17.5	28
Salonga	Efeka	db,n,h	yes	yes	yes	Salonga River	2.5	20
Salonga	Ilonge Centre	db,n,h	yes	yes	yes	Salonga River	7.5-12	17
Salonga	Lokanda	db,n,h	yes	yes	yes	Salonga River	12	9
Salonga	Bamata	db,n,h	yes	yes		SNP	2.5	3
Salonga	Efeka	n,h	yes		yes	SNP	6	2
Salonga	Ilonge Centre	n,h	yes			SNP	13	2
Salonga	Ilonge Centre	t		yes		Tonwanwa	17.5	1
Salonga	Ilonge Centre	t		yes		Too	17.5	1

Appendix 13: Forms of traditional access to land and resources Salonga and Lomela Rivers

0=no permit required or just parental
1=permit without paying rights
2=permit through payment of rights
3=not allowed

Villages Salonga	status	agriculture	hunting	fishing	collection of NTFP
Bamata	local	0	0	0	0
	neighbor	2	2	0	0
	foreigner	2	2	0	0
Efeka	local	0	0	0	0
	neighbor	2	1	0	0
	foreigner	2	2	2	0
Ilonge Centre	local	0	0	0	0
	neighbor	1	2	0	0
	foreigner	1	2	1	0
Malela Centre	local	0	0	0	0
	neighbor	1	1	1	0
	foreigner	1	2	2	0
Lonkanda	local	0	0	0	0
	neighbor	1	1	1	0
	foreigner	2	2	2	1

Villages Lomela	status	agriculture	hunting	fishing	collection of NTFP
Ikomo-Lomoko	local	0	0	0	0
	neighbor	2	1	2	0
	foreigner	2	1	1	0
Bokela/ Kankonde	local	0	0	0	0
	neighbor	1	0	0	0
	foreigner	2	2	1	0
Besoyi	local	0	0	0	0
	neighbor	1	1	0	0
	foreigner	1	1	1	1
Botsima	local	0	0	0	0
	neighbor	1	1	1	0
	foreigner	2	2	2	2
Ibali 1	local	0	0	0	0
	neighbor	1	0	0	0
	foreigner	1	1	1	0
Yafala	local	0	0	0	0
	neighbor	1	1	0	0
	foreigner	2	1	2	0
Ibali	local	0	0	0	0
	neighbor	1	1	1	0
	foreigner	1	1	1	2
Impete Kadumba	local	0	0	0	0
	neighbor	1	1	1	0
	foreigner	2	2	2	0

Appendix 14: Examples of exchanges through barter in the territory of Monkoto

Category (given or "sold")	Quantity	Unit	Product	Category (received or "bought")	Quantity	Unit	Product
Agricultural	6	Pile	Cassava	Artisanal work	1		Mortar
Agricultural	1	Pile	Cassava	Bushmeat	1	Piece	Peter's duiker
Agricultural	16	Unit	Cassava	Bushmeat	1	Thigh	River red hog
Agricultural	10	Unit	Cassava	Fish	1		Mongusu
Agricultural	1	Pile	Cassava	Food	70	Gram	Salt/ sugar
Agricultural	1	Pile[276]	Cassava	Food	1	Jar	Sugar
Agricultural	17	Pile	Cassava	General hardware	1		Machete
Agricultural	25	Pile	Cassava	General hardware	1		Machete
Agricultural	1	Sack	Cassava	General hardware	1		Machete
Agricultural	1	Sack	Cassava	General hardware	1		Machete
Agricultural	1	Sack	Cassava	General hardware	1		Ax
Agricultural	10	Basket	Cassava	Manufactured	6	Yard	Cloth + 1 basket
Agricultural	25	Pile	Cassava	Manufactured	6	Yard	Cloth
Agricultural	45	Pile	Cassava	Manufactured	6	Yard	Cloth
Agricultural	1	Sack	Cassava	Manufactured	6	Yard	Cloth
Agricultural	1	Sack	Cassava	Manufactured	6	Yard	Cloth
Agricultural	1	Sack	Cassava	Manufactured	6	Yard	Cloth
Agricultural	1	Sack	Cassava	Manufactured	6	Yard	Cloth
Agricultural	2	Sack	Cassava	Manufactured	6	Yard	Cloth
Agricultural	2	Sack	Cassava	Manufactured	6	Yard	Cloth
Agricultural	1	Sack	Cassava	Manufactured	1		Cooking pot
Agricultural	1	Harvest (0.25 ha)	Cassava	Service	1		Fees school year
Agricultural	1	Live animal	Chicken or duck	Manufactured	6	Yard	Cloth
Agricultural	4	Live animal	Chicken/ duck	Manufactured	6	Yard	Cloth
Agricultural	50	Cup	Coffee	Manufactured	6	Yard	Cloth
Agricultural	4	Pile	Fufu	Fish	1	Pile	Ngolo
Agricultural	2	Pile	Fufu	Food	70	Gram	Salt
Agricultural	2	Pile	Fufu	Food	70	Gram	Salt/ sugar
Agricultural	1	Sack	Fufu	General hardware	2		Machete+ lime
Agricultural	2	Sack	Fufu	General hardware	1		Machete
Agricultural	1	Sack	Fufu	Hunting hardware	3	Meters	Wire
Agricultural	1	Pile	Fufu	Manufactured	1	Bar	Soap
Agricultural	10	Pile	Fufu	Manufactured	1		Basin
Agricultural	15	Pile	Fufu	Manufactured	6	Yard	Cloth
Agricultural	1	Sack	Fufu	Manufactured	6	Yard	Cloth
Agricultural	1	Sack	Fufu	Manufactured	6	Yard	Cloth
Agricultural	1	Sack	Fufu	Manufactured	6	Yard	Cloth

[276] A pile, tas, or mopiko, is roughly the equivalent of 7 or 8 units of cassava/smoked fish

Category (given or "sold")	Quantity	Unit	Product	Category (received or "bought")	Quantity	Unit	Product
Agricultural	1	Sack	Fufu	Manufactured	1		Plastic bucket
Agricultural	2	Sack	Fufu	Manufactured	6	Yard	Cloth
Agricultural	1	Live animal	Goat	Artisanal work	1		Pirogue
Agricultural	1	Live animal	Goat	General hardware	1		Machete + lime
Agricultural	1	Live animal	Goat	General hardware	1		Machete + lime
Agricultural	1	Live animal	Goat	Hunting hardware	4	Meter	Wire
Agricultural	1	Live animal	Goat	Hunting hardware	2	Meter	Wire
Agricultural	1	Live animal	Goat	Hunting hardware	1	Package	Ammunition
Agricultural	4	Live animal	Goat	Hunting hardware	1		Shotgun
Agricultural	4	Live animal	Goat	Hunting hardware	1		Shotgun (locally made)
Agricultural	10	Live animal	Goat	Hunting hardware	1		Shotgun
Agricultural	1	Live animal	Goat	Manufactured	1		Knife
Agricultural	1	Live animal	Goat	Manufactured	6	Yard	cloth
Agricultural	1	Live animal	Goat	Manufactured	6	Yard	Cloth
Agricultural	1	Live animal	Goat	Manufactured	12	Yard	Cloth
Agricultural	1	Live animal	Goat	Manufactured	6	Yard	Cloth
Agricultural	4	Live animal	Goat	Manufactured	1		Bicycle
Agricultural	4	Live animal	Goat	Manufactured	1		Bicycle
Agricultural	5	Live animal	Goat	Manufactured	1		Bicycle
Agricultural	10	Live animal	Goat	Manufactured	1		Bicycle
Agricultural	3	Live animal	Goat	Service	1	House	Construction (masonry only)
Agricultural	1	Live animal	Hog	Manufactured	18	Yard	Cloth
Agricultural	1	Live animal	Hog	Manufactured	1		Radio
Agricultural	1	Sack	Maize	Manufactured	6	Yard	Cloth
Agricultural	1	Sack	Maize	Manufactured	6	Yard	Cloth
Agricultural	1.5	Sack	Maize	Manufactured	6	Yard	Cloth
Agricultural	50	Bottle	Palm oil	Agricultural	1	Live animal	Goat
Agricultural	1	Jug (25 lt)	Palm oil	Agricultural	1	Sack	fufu
Agricultural	10	Bottle	Palm oil	Artisanal work	1		Chair
Agricultural	5	Bottle	Palm oil	Bushmeat	1	Thigh	Duiker

Category (given or "sold")	Quantity	Unit	Product	Category (received or "bought")	Quantity	Unit	Product
Agricultural	10	Bottle	Palm oil	Bushmeat	1	Whole	Brush-tailed porcupine
Agricultural	15	Bottle	Palm oil	Bushmeat	0.5	Whole	Peter's duiker
Agricultural	1	Bottle	Palm oil	Fish	3		Ngolo
Agricultural	5	Bottle	Palm oil	Fish	7		Ngolo
Agricultural	1	Bottle	Palm oil	Food	70	Gram	Salt
Agricultural	40	Bottle	Palm oil	General hardware	1		Machete
Agricultural	40	Bottle	Palm oil	General hardware	1		Machete
Agricultural	50	Bottle	Palm oil	General hardware	1		Machete
Agricultural	50	Bottle	Palm oil	General hardware	1		Machete
Agricultural	50	Bottle	Palm oil	General hardware	1		Machete
Agricultural	50	Bottle	Palm oil	General hardware	1		Machete
Agricultural	60	Bottle	Palm oil	General hardware	1		Machete
Agricultural	10	Bottle	Palm oil	Hunting hardware	1		Cartridge (00)
Agricultural	20	Bottle	Palm oil	Hunting hardware	1	Meter	Cable
Agricultural	35	Bottle	Palm oil	Hunting hardware	3	Meters	Wire
Agricultural	1	Barrel	Palm oil	Manufactured	60	Yard	Cloth
Agricultural	1	Bottle	Palm oil	Manufactured	1		Notebook (24 pages)
Agricultural	2	Bottle	Palm oil	Manufactured	1		Notebook
Agricultural	10	Bottle	Palm oil	Manufactured	1	Pair	Flip flops
Agricultural	10	Bottle	Palm oil	Manufactured	1	Pair	Flip flops
Agricultural	15	Bottle	Palm oil	Manufactured	1	Bottle	"Extra Claire" lotion
Agricultural	15	Bottle	Palm oil	Manufactured	1	Pair	Flip flops
Agricultural	15	Bottle	Palm oil	Manufactured	1	Bottle	Lotion "Extra Claire"
Agricultural	15	Bottle	Palm oil	Manufactured	1	Pair	Shorts
Agricultural	15	Bottle	Palm oil	Manufactured	1	Pair	shorts
Agricultural	20	Bottle	Palm oil	Manufactured	1		T-shirt
Agricultural	20	Bottle	Palm oil	Manufactured	1		t-shirt
Agricultural	20	Bottle	Palm oil	Manufactured	1	Pair	Pants
Agricultural	25	Bottle	Palm oil	Manufactured	1		Plastic jug
Agricultural	30	Bottle	Palm oil	Manufactured	1	Pair	Flip flops
Agricultural	30	Bottle	Palm oil	Manufactured	1		Plastic jug
Agricultural	30	Bottle	Palm oil	Manufactured	1		Cooking pot
Agricultural	30	Bottle	Palm oil	Manufactured	6	Yard	Cloth
Agricultural	30	Bottle	Palm oil	Manufactured	1		lime
Agricultural	35	Bottle	Palm oil	Manufactured	1		Plastic jug
Agricultural	40	Bottle	Palm oil	Manufactured	1	Piece	Cloth
Agricultural	40	Bottle	Palm oil	Manufactured	6	Yard	Cloth
Agricultural	40	Bottle	Palm oil	Manufactured	1		Plastic jug
Agricultural	40	Bottle	Palm oil	Manufactured	2		Bowls
Agricultural	40	Bottle	Palm oil	Manufactured	6	Yard	Cloth
Agricultural	45	Bottle	Palm oil	Manufactured	1		Knife
Agricultural	45	Bottle	Palm oil	Manufactured	6	Yard	Cloth

Category (given or "sold")	Quantity	Unit	Product	Category (received or "bought")	Quantity	Unit	Product
Agricultural	50	Bottle	Palm oil	Manufactured	6	Yard	Cloth
Agricultural	50	Bottle	Palm oil	Manufactured	6	Yard	Cloth
Agricultural	50	Bottle	Palm oil	Manufactured	6	Yard	Cloth
Agricultural	50	Bottle	Palm oil	Manufactured	1		Plastic jug
Agricultural	50	Bottle	Palm oil	Manufactured	1		Plastic jug
Agricultural	50	Bottle	Palm oil	Manufactured	1		Lime
Agricultural	50	Bottle	Palm oil	Manufactured	6	Yard	Cloth
Agricultural	50	Bottle	Palm oil	Manufactured	6	Yard	Cloth
Agricultural	50	Bottle	Palm oil	Manufactured	6	Yard	Cloth
Agricultural	70	Bottle	Palm oil	Manufactured	1		Cooking pot
Agricultural	70	Bottle	Palm oil	Manufactured	6	Yard	Cloth
Agricultural	70	Bottle	Palm oil	Manufactured	6	Yard	Cloth
Agricultural	70	Bottle	Palm oil	Manufactured	1		Cooking pot
Agricultural	70	Bottle	Palm oil	Manufactured	6	Yard	Cloth
Agricultural	75	Bottle	Palm oil	Manufactured	6	Yard	Cloth
Agricultural	75	Bottle	Palm oil	Manufactured	6	Yard	Cloth
Agricultural	75	Bottle	Palm oil	Manufactured	6	Yard	Cloth
Agricultural	75	Bottle	Palm oil	Manufactured	2		Plastic jug
Agricultural	80	Bottle	Palm oil	Manufactured	6	Yard	Cloth
Agricultural	100	Bottle	Palm oil	Manufactured	6	Yard	Cloth
Agricultural	120	Bottle	Palm oil	Manufactured	1		Clock
Agricultural	40	Bottle	Palm oil	Manufactured	1		Plastic jug (25 lt.)
Agricultural	8	Bottle	Palm oil	Service	1	Month	School fees
Agricultural	40	Bottle	Palm oil	Service	10	Day	Healthcare
Agricultural	20	Glass	Rice	Manufactured	1		Shirt
Bushmeat	1	Whole	Bay/ Peter's duiker	Manufactured	1		Cooking pot
Bushmeat	1	Whole	Black-fronted duiker	Manufactured	1		Cooking pot
Bushmeat	5	Quarter	Duiker	General hardware	1		Machete
Bushmeat	2	Whole	Duiker	Hunting hardware	4	Meter	Wire
Bushmeat	1	Whole	Duiker	Manufactured	1		Cooking pot
Bushmeat	2.5	Whole	Duiker	Manufactured	1		Cooking pot + plastic jug
Bushmeat	1	Whole	Peter's duiker	Hunting hardware	1	Meter	Wire
Bushmeat	1	Whole	Peter's duiker	Manufactured	6	Yard	Cloth
Bushmeat	1	Whole	Peter's duiker	Manufactured	1		Man's outfit
Bushmeat	1	Whole	Peter's duiker	Manufactured	6	Yard	Cloth
Bushmeat	2	Whole	Peter's duiker	Manufactured	6	Yard	Cloth
Bushmeat	2	Whole	Peter's duiker	Manufactured	6	Yard	Cloth
Bushmeat	2	Whole	Peter's duiker	Manufactured	6	Yard	Cloth
Bushmeat	1	Thigh	Peter's duiker	Service	1	Field	Planting (200m2)
Bushmeat	1	Quarter	River red hog	Agricultural	5	Bottle	Palm oil
Bushmeat	4	Quarter	River red	Manufactured	6	Yard	Cloth

Category (given or "sold")	Quantity	Unit	Product	Category (received or "bought")	Quantity	Unit	Product
			hog				
Bushmeat	1	Whole	River red hog	Manufactured	1		Cooking pot
Bushmeat	1	Whole	River red hog	Manufactured	12	Yard	Cloth
Bushmeat	1	Whole	River red hog	Manufactured	6	Yard	Cloth
Bushmeat	4	Whole	River red hog	Manufactured	1		Bicycle
Bushmeat	1	Piece	Unspecified	Food	70	Gram	Salt/ sugar
Fish	25		Fish	Fishing hardware	25		Hooks (No.12)
Fish	250		Fish	Fishing hardware	12		Fish nets
Fish	350		Fish	Fishing hardware	12		Fish nets (+ plastic nylon)
Fish	150		Fish	Hunting hardware	4	Meter	Wire
Fish	80		Ngolo	Manufactured	6	Yard	Cloth
Fish	60		Ngolo/ Mongusu	Manufactured	6	Yard	Cloth
Manufactured	2		Dish	Service	1	Moth	School fees
NTFP	1	Cup	Caterpillars	Food	70	Gram[277]	salt
NTFP	1	Cup	Caterpillars	Manufactured	1	Bar	Soap
Service	1	Field	Clearing of large trees	Manufactured	6	Yard	Cloth
Service	1	Harvest	Collection	Manufactured	6	Yard	Cloth
Service	1	House	Construction (masonry only)	Manufactured	1		Cooking pot
Service	1	Outfit	Seamstress	Agricultural	1	Bottle	Palm oil

[277] "1 mesure de boîte tomate" or the contents of one tin of tomato paste.

Appendix 15: Names of rivers and waterways associated with fishing activities Monkoto Territory

Methods: all types of fishing methods associated to each waterway, by village.
db= damming bailing**, h=**hook and line**, n=**nets**, t=**t
Participation: involvement by men, women and children in fishing activities in each zone.
Fishing zones: names provided by households regarding where they practice each activity.
Distances (km): Very rough estimates based on participants calculations. Some distances left in terms of walking days.
Number of activities reported: Number of times an activity was associated with the fishing zone, by village.

Village	Methods used	men	women	children	Fishing zone	Distance	Number of activities reported
Bokongo	h	yes			Adjike	10.0	1
Weta	db,h		yes	yes	Bahadi	2.5	2
Bokombola	db		yes		Baibai	1.3	1
Weta	db,h		yes	yes	Baibai	2.5	2
Itota	db,h	yes	yes	yes	Bakeku	2.5	7
Nongo II	h,n	yes		yes	Bakoka	2.5	2
Iyete I	db		yes	yes	Baleke	2.5	1
Iyete II Mpuma	db		yes	yes	Banganda	1.9	1
Itongu	db		yes		Bemwa	0.5	1
Itota	db,h	yes	yes	yes	Bemwa	2.5	7
Nongo II	db		yes		Benkonde	2.5	1
Bokongo	db		yes	yes	Beyanga	2.5	1
Tumba	db		yes	yes	Biale	2.5	1
Weta	h	yes			Boimbo	10.0	1
Iyete II Mpuma	db		yes	yes	Bokafi	5.0	1
Tumba	h	yes		yes	Bokiakela	2.5	1
Iyete I	h,n	yes		yes	Bokili	2.5	2
Tumba	db,h	yes	yes	yes	Bokome	7.5	2
Tumba	db			yes	Bokungu	7.5	1
Bokombola	h,n	yes			Boleki	2.5	2
Isenga	db,h,n	yes	yes	yes	Boleki	12.5	5
Weta	h	yes			Boleki	10.0	1
Bonkoyi	n			yes	Bomponde	5.0	1
Isenga	db,h,n	yes	yes	yes	Bompongo	n/a	3
Iyete II Mpuma	db		yes	yes	Bongona	2.5	1
Iyete I	db		yes	yes	Bonono	5.0	2
Iyete II Mpuma	db		yes	yes	Bonono	2.5	1
Bokongo	db		yes	yes	Bontshofono	2.5	1
Iyete I	db,h,n	yes	yes	yes	Bosakitela	5.0	3
Bokongo	db,h	yes	yes	yes	Bosunuaka	5.0	5
Weta	h	yes			Botedia	10.0	1
Bokongo	n	yes			Botoka	20.0	1
Bokongo	h	yes			Boyau	10.0	1
Bonkoyi	db,h	yes	yes	yes	Boyau	5.0	6
Nongo II	db		yes		Boyau	5.0	1

Village	Methods used	men	women	children	Fishing zone	Distance	Number of activities reported
Tumba	db,h	yes	yes		Bwana	5.0	2
Bonkoyi	db,h	yes	yes	yes	Enyonga	2.5	5
Nongo II	db		yes		Enyonga	2.5	1
Bokongo	h,n	yes			Ifosalua	4.0	2
Tumba	h,n	yes		yes	Ifutu	5.0	3
Isenga	db,h,n				Ikali	n/a	3
Iyete I	db		yes		Ikeke	5.0	2
Bokombola	db,h		yes	yes	Ikendi	5.0	2
Bonkoyi	db		yes		Ikolo	1.3	1
Tumba	h	yes		yes	Impoto	3.8	1
Bonkoyi	h,n	yes		yes	Inyanyale	2.5	3
Bokombola	db,h,n	yes	yes	yes	Itsuadi	2.5	9
Tumba	db,h,n	yes	yes	yes	Itsuadi	7.5	20
Itongu	db,h,n	yes	yes	yes	Ituali	10.0	7
Itota	db,h	yes	yes	yes	Ituali	2.5	7
Iyete I	db		yes	yes	Iyomona	2.5	1
Tumba	db		yes		Iyomona	5.0	2
Bokombola	db		yes	yes	Kango	1.3	3
Tumba	db,h,n,t	yes	yes	yes	Kango	5.0	5
Tumba	h,t	yes		yes	Kango	7.5	2
Weta	db,h		yes	yes	Kango	2.5	2
Tumba	h	yes		yes	Konge	3.8	1
Bokombola	db,h	yes	yes	yes	Kungo	10.0	4
Nongo II	db,h,n	yes	yes	yes	Libeke	5.0	6
Bokongo	db,h		yes	yes	Liike	5.0	6
Bokongo	h	yes			Lima	12.5	1
Bokongo	db,h,n	yes	yes	yes	Lioko	12.5	11
Bonkoyi	db,h	yes	yes	yes	Lioko	3.0	5
Nongo II	h,n	yes		yes	Lokoke	2.5	2
Tumba	db,h	yes		yes	Lokonga	5.0	2
Weta	h	yes			Lominate	10.0	1
Iyete II Mpuma	db		yes	yes	Lonomo	2.5	1
Isenga	db,h,n	yes	yes	yes	Losanga	15.0	3
Itongu	db,h,n	yes	yes	yes	Luakayi	12.5	4
Iyete I	db,h,n	yes	yes	yes	Luanga	5.0	7
Iyete II Mpuma	db,h,n	yes	yes	yes	Luanga	2.5	8
Bokongo	db,h,n	yes	yes	yes	Luile	12.5	14
Bonkoyi	db,h,n	yes	yes	yes	Luile	5.0	14
Isenga	db,h,n	yes	yes	yes	Luile	15.0	11
Iyanda	db,h,n	yes	yes	yes	Luile	5.0	5
Nongo II	db,h,n	yes	yes	yes	Luile	7.5	26
Isenga	db,h,n	yes	yes	yes	Maa	n/a	5
Iyete I	h,n	yes	yes	yes	Momboyo	5.0	12
Iyete II Mpuma	db,h,n	yes	yes	yes	Momboyo	5.0	13
Bokongo	db		yes	yes	Mpetempete	2.5	1
Bokongo	n	yes			Mpongo	20.0	1
Tumba	db,h,n	yes	yes	yes	Mpotonkonge	2.5	4

Village	Methods used	men	women	children	Fishing zone	Distance	Number of activities reported
Bokombola	db,h		yes	yes	Munyu	5.0	2
Tumba	db		yes	yes	Nkoholo	5.0	2
Tumba	db			yes	Nkoholo	7.5	1
Iyete I	h,n	yes		yes	Nyaetango	7.5	3
Iyete II Mpuma	h,n	yes		yes	Nyaetango	5.0	6
Tumba	db,h	yes	yes		Tokoli	5.0	2
Tumba	db,h,n	yes	yes	yes	Tsustsu	7.5	6
Weta	db,h		yes	yes	Tsustsu	2.5	2
Itongu	db,h,n	yes	yes	yes	Tuale	12.5	4
Bokombola	db,h	yes	yes	yes	Wakudi	10.0	4
Bokongo	h	yes			Wama	10.0	1
Bokongo	db		yes	yes	Wandjanga	7.5	2
Bonkoyi	n			yes	Wanyikomo	5.0	1
Isenga	h,n	yes			Wilamo	12.5	2
Bonkoyi	db		yes	yes	Wini	5.0	1
Nongo II	h,n	yes		yes	Yanane	2.5	2
Tumba	h	yes		yes	Yondo	2.5	2
Itongu	db,h,n	yes	yes	yes	Yoni	12.5	4

Appendix 16: Forms of traditional access to land and resources Monkoto Territory
0=no permit required or just parental
1=permit without paying rights
2=permit through payment of rights
3=not allowed

Villages	status	agriculture	hunting	fishing	collection of NTFP
Tumba	local	0	0	0	0
Tumba	neighbor	0	1	1	0
Tumba	foreigner	1	1	1	0
Itota	local	0	0	0	0
Itota	neighbor	2	2	3	1
Itota	foreigner	2	2	1	1
Bokombola	local	0	0	0	0
Bokombola	neighbor	1	2	0	0
Bokombola	foreigner	2	2	0	0
Bonkoi	local	0	0	0	0
Bonkoi	neighbor	1	2	2	0
Bonkoi	foreigner	2	2	2	0
Iyete (II) Mpuma	local	0	0	0	0
Iyete (II) Mpuma	neighbor	1	2	0	0
Iyete (II) Mpuma	foreigner	2	2	0	0
Bokongo	local	0	0	0	0
Bokongo	neighbor	2	2	2	0
Bokongo	foreigner	2	2	2	0
Weta	local	0	0	0	0
Weta	neighbor	2	2	0	0
Weta	foreigner	1	1	0	0
Itongu	local	0	0	0	0
Itongu	neighbor	2	2	0	0
Itongu	foreigner	2	2	0	0
Iyanda	local	0	0	0	0
Iyanda	neighbor	1.5	2	1.5	0
Iyanda	foreigner	2	2	1.5	0
Iyete (I) Bankanya	local	0	0	0	0
Iyete (I) Bankanya	neighbor	2	2	2	0
Iyete (I) Bankanya	foreigner	2	2	2	0

Appendix 17: Names of rivers and waterways associated with fishing activities Dekese Territory

Methods: all types of fishing methods associated to each waterway, by village.
db= damming bailing**, h=**hook and line**, n=**nets**, t=**t
Participation: involvement by men, women and children in fishing activities in each zone.
Fishing zones: names provided by households regarding where they practice each activity.
Distances (km): Very rough estimates based on participants calculations. Some distances left in terms of walking days.
Number of activities reported: Number of times an activity was associated with the fishing zone, by village.

village	methods	men	women	children	fishing zone	Distance (km)	number of activities reported
Itunga	n	yes			Sankuru	50.00	1
Itunga	h,n	yes		yes	Bola losi	25.00	2
Itunga	h,n	yes		yes	Nkete	25.00	2
Itunga	h			yes	Evungu	2.50	1
Ingodji	h			yes	Luayi	1.87	1
Djongo Nord	h	yes			Lukenie	n/a	1
Ingodji	db,t,m		yes	yes	Befumba	2.00	13
Ingodji	db,t,m		yes	yes	Djamba	1.00	3
Ingodji	db,t,m		yes	yes	Djosango	1.00	3
Ingodji	db,t,m		yes	yes	Iyenda	1.00	3
Ingodji	db,m		yes	yes	Bedjita	2.00	6
Boswe Kungu	db,m		yes	yes	Bokomboko	1.87	2
Boswe Kungu	db,m		yes	yes	Bolek'angembe	10.00	5
Ingodji	db,m		yes	yes	Lokwa	2.00	6
Ilongaba	db,m		yes		Toope	1.00	2
Djongo Nord	db,h,n,t,m	yes	yes	yes	Lac Impondja	2.50	47
Itunga	db,h,n,t	yes	yes	yes	Bantolo	3.00	11
Bolonga Lukenie	db,h,n,t	yes	yes	yes	Lukenie	0.42	24
Itunga	db,h,n,m	yes	yes	yes	Bantoo	5.00	19
Boswe Kungu	db,h,n,m	yes	yes	yes	Bantoo	5.00	13
Ilongaba	db,h,n,m	yes	yes	yes	Bedjita	2.00	9
Djongo Nord	db,h,n,m	yes	yes	yes	Insanga	4.50	12
Itunga	db,h,n,m	yes	yes	yes	Isakanvula	1.25	15
Djongo Nord	db,h,n,m		yes	yes	Lokaki	5.00	15
Ilongaba	db,h,n,m	yes	yes	yes	Lombo	1.00	13
Itunga	db,h,n,m	yes	yes	yes	Lukenie	5.00	22
Boswe Kungu	db,h,n,m	yes	yes	yes	Lula	50.00	7
Ilongaba	db,h,n,m	yes	yes	yes	Vembiso	2.00	9
Djongo Nord	db,h,n	yes	yes	yes	Bangala	5.00	6
Djongo Nord	db,h,n	yes	yes	yes	Bodjiyobamba	2.50	3
Djongo Nord	db,h,n	yes	yes	yes	Etshulo	1.00	3
Ilongaba	db,h,n	yes	yes	yes	Insanga	7.00	3
Djongo Nord	db,h,n	yes	yes	yes	Lamane	2.00	3
Ilongaba	db,h,n	yes	yes	yes	Lila	6.00	4

village	methods	men	women	children	fishing zone	Distance (km)	number of activities reported
Ilongaba	db,h,n	yes	yes	yes	Luayi	4.00	17
Itunga	db,h,n	yes	yes	yes	Lutu	1.66	4
Itunga	db,h,n	yes	yes	yes	Luula	50.00	8
Boswe Kungu	db,h		yes	yes	Belenge	25.00	2
Boswe Kungu	db,h		yes	yes	Bosaka	7.50	2
Ilongaba	db,h	yes	yes	yes	Ingadji	2.50	5
Boswe Kungu	db		yes		Bantolo	1.00	1
Djongo Nord	db		yes	yes	Bekfuka	6.00	1
Itunga	db	yes	yes	yes	Bekongo	3.00	1
Djongo Nord	db	yes			Bengongo	1.87	1
Djongo Nord	db		yes		Bokanga	6.00	1
Itunga	db	yes	yes	yes	Bolek'angembe	10.00	1
Ingodji	db			yes	Bomboko	3.75	1
Djongo Nord	db		yes	yes	Etek'entoshi	2.50	1
Ilongaba	db		yes		Isofa	0.42	1
Djongo Nord	db		yes	yes	Itongo	1.00	2
Itunga	db	yes	yes	yes	Kako	3.00	1
Boswe Kungu	db		yes		Kanku	3.33	1
Ilongaba	db		yes	yes	Loa	1.00	4
Itunga	db		yes		Loango	1.87	2
Djongo Nord	db		yes	yes	Lolongo	5.00	2
Ilongaba	db		yes	yes	Lomama	2.00	2
Bolonga Lukenie	db		yes		Miluka	7.50	2
Djongo Nord	db		yes		Mpongo	1.87	1
Djongo Nord	db		yes	yes	Ndongo	5.00	1
Boswe Kungu	db		yes	yes	Nkete	10.00	1
Djongo Nord	db		yes		Ntotsha	5.00	1
Djongo Nord	db		yes		Temitemi	1.25	1
Djongo Nord	db		yes	yes	Tokotoko	5.00	1
Boswe Kungu	db		yes	yes	Vandja	2.00	5
Bolonga Lukenie	db		yes	yes	Yenge	2.50	1
Boswe Kungu	db		yes	yes	Ngembi	10.00	2

Appendix 18: Forms of traditional access to land and resources Dekese Territory
0=no permit required or just parental
1=permit without paying rights
2=permit through payment of rights
3=not allowed

Villages Dekese	status	agriculture	hunting	fishing	collection of NTFP
Itunga	local	0	0	0	0
Itunga	neighbor	1.5	2	2.5	0
Itunga	foreigner	2	2.5	2.5	0
Bolonga Brazza	local	0	0	0	0
Bolonga Brazza	neighbor	1	2	2	0
Bolonga Brazza	foreigner	1.5	2	2	0
Boswe Kungu	local	0	0	0	0
Boswe Kungu	neighbor	2	2	2	0
Boswe Kungu	foreigner	2	2	2	0
Djongo Nord	local	0	0	0	0
Djongo Nord	neighbor	1	2	1.5	0
Djongo Nord	foreigner	2	2	2	0
Ilongaba	local	0	0	0	0
Ilongaba	neighbor	1	2	1	0
Ilongaba	foreigner	1	2	1	0
Ingodji	local	0	0	0	0
Ingodji	neighbor	1	2	2	0
Ingodji	foreigner	2	2	2	0

Appendix 10 Household-level indicators of change

Household level Indicators	Area	% (2005)
General		
Reliance on natural resources for income and subsistence activities: % of households engaged in non-extractive activities (not including commerce)	Lokolama	13.8
	Nkaw	8.8
	Salonga River	9.8
	Lomela River	11.6
	Monkoto	23.1
	Dekese	11.3
Reliance on barter for commercial transactions: % of households reporting barter	Lokolama	65.7
	Nkaw	69.1
	Salonga and Lomela Rivers	68.4
	Monkoto	72.8
	Dekese	74.5
Agriculture		
Diversification of agricultural products: average number of agricultural products raised by households	Lokolama	3.9
	Nkaw	4.3
	Salonga River	3.1
	Lomela River	3.5
	Monkoto	5.0
	Dekese	4.1
Land transformation (forest to agricultural land): % of households traveling distances over 1 km to access agricultural fields	Lokolama	45.1
	Nkaw	43.8
	Salonga River	43.4
	Lomela River	49.3
	Monkoto	38.9
	Dekese	59.2
Land transformation (forest to agricultural land): % of households with fields of over 1 ha.	Lokolama	20.2
	Nkaw	13.3
	Salonga River	0.0
	Lomela River	25.6
	Monkoto	9.1
	Dekese	3.8
Land transformation (forest to agricultural land): average length of fallow period (years)	Lokolama	6.9
	Nkaw	5.5
	Salonga River	4.3
	Lomela River	2.6
	Monkoto	4.4
	Dekese	5.3
Land ownership: % of households reporting agricultural fields as “private property” according to de facto systems.	Lokolama	82.5
	Nkaw	97.3
	Salonga River	91.3
	Lomela River	97.6
	Monkoto	95.4
	Dekese	93.8
Collection of NTFPs		
Households’ reliance on NTFPs products: average number of NTFPs collected by households	Lokolama	3.9
	Nkaw	4.8
	Salonga River	4.2
	Lomela River	4.7
	Monkoto	4.2
	Dekese	4.8
Land transformation (forest to agricultural land): % of	Lokolama	46.5
	Nkaw	42.4

Household level Indicators	Area	% (2005)
households traveling distances over 1 km to access NTFPs.	Salonga River	53.2
	Lomela River	41.4
	Monkoto	38.3
	Dekese	56.5
Availability of NTFPs: % of households reporting decreased availability of NTFPs.	Lokolama	16.0
	Nkaw	6.7
	Salonga River	12.7
	Lomela River	20.0
	Monkoto	24.1
	Dekese	67.7
Importance of NTFPs as a revenue source: % of households that collect NTFPs and commercialize part of their harvest.	Lokolama	17.3
	Nkaw	46.3
	Salonga River	14.3
	Lomela River	56.7
	Monkoto	45.0
	Dekese	84.5
Diversification of commercialized NTFPs: average number of NTFPs commercialized by households.	Lokolama	1.4
	Nkaw	2.4
	Salonga River	1.6
	Lomela River	2.1
	Monkoto	2.1
	Dekese	2.8
Fishing		
Sustainability of activities: % of activities occurring only during the dry (peak) season.	Oshwe Territory	80.4
	Salonga and Lomela Rivers	52.5
	Monkoto	63.8
	Dekese	44.4
Intensification of activities: % of fishing households reporting 50 or more fish lines	Lokolama	62.1
	Nkaw	59.1
	Salonga River	86.4
	Lomela River	62.7
	Monkoto	90.8
	Dekese	27.9
Intensification of activities: % of fishing households reporting 50 or more nets	Lokolama	13.4
	Nkaw	14.8
	Salonga River	8.6
	Lomela River	6.4
	Monkoto	24.1
	Dekese	13.5
Availability of fish: % of households consuming fish.	Lokolama	57.5
	Nkaw	100.0
	Salonga River	76.8
	Lomela River	56.8
	Monkoto	95.9
	Dekese	97.1
Availability of fish: % of households reporting decreased availability of fish.	Lokolama	59.6[278]
	Nkaw	64.9
	Salonga and Lomela Rivers	74.8
	Monkoto	51.4
	Dekese	83.2
Importance of fishing as a revenue source: % of	Lokolama	57.7
	Nkaw	79.5

[278] Only fishing households.

Household level Indicators	Area	% (2005)
households that fish and commercialize part of their catch.	Salonga River	79.6
	Lomela River	84.2
	Monkoto	82.2
	Dekese	55.2
Importance of fishing as a revenue source: % of households reporting gains over $10 during peak season	Lokolama	43.1
	Nkaw	42.9
	Salonga and Lomela Rivers	3.4
	Monkoto	24.7
	Dekese	22.0
Commercialization of fish species: Average number of species commercialized by households	Lokolama	3.0
	Nkaw	3.4
	Salonga River	3.7
	Lomela River	3.9
	Monkoto	4.0
	Dekese	2.2
Hunting		
Sustainability of activities: % of activities occurring only during the rainy (peak) season.	Oshwe Territory	18.2
	Salonga and Lomela Rivers	30.1
	Monkoto	17.7
	Dekese	27.3
Intensification of activities: % of hunting households reporting use of shotguns	Lokolama	19.0
	Nkaw	21.1
	Salonga River	7.8
	Lomela River	15.4
	Monkoto	38.0
	Dekese	9.8
Intensification of activities: % of households reporting use of wire snares	Lokolama	n/a
	Nkaw	40.5
	Salonga River	15.7
	Lomela River	15.4
	Monkoto	n/a
	Dekese	17.4
Availability of game: % of households consuming bushmeat.	Lokolama	81.5
	Nkaw	99.5
	Salonga River	76.8
	Lomela River	63.2
	Monkoto	93.2
	Dekese	100.0
Availability of game: % of households reporting decreased availability of animals[279].	Lokolama	76.9[280]
	Nkaw	77.5
	Salonga River	76.2
	Lomela River	61.7
	Monkoto	75.4
	Dekese	75.8
Importance of hunting as a revenue source: % of households that hunt and commercialize part of their capture.	Lokolama	93.3
	Nkaw	96.8
	Salonga River	88.2
	Lomela River	94.9
	Monkoto	84.3
	Dekese	97.8
	Lokolama	37.0

[279] Includes disappearance of species.
[280] Only hunting households.

Household level Indicators	Area	% (2005)
Importance of hunting as a revenue source: % of households reporting gains over $10 during high season	Lokolama	37.0
	Nkaw	52.4
	Salonga River	20.9
	Lomela River	16.7
	Monkoto	19.0
	Dekese	53.3