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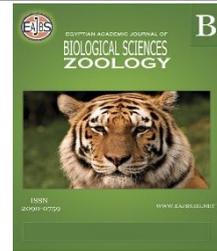


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**Bushmeat Trade on The Markets Near the Lomako Yokokala Wildlife Reserve
(Tshuapa Province) in the Democratic Republic of the Congo**

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ABSTRACT

A survey was conducted in Befale and Boende in the Democratic Republic of the Congo. It revealed that the purchase of the game from hunters and the resale of these games in small pieces at the market are more practiced by women (100%). The experience of time spent in this activity varies from less than 10 years (33, 3 %) to 30 years and more (20%). Most (60%) have no preference for the choice of game meat to sell; they sell whatever they can find, as long as the operation brings them a profit. Many people buy meat from hunters (66, 7 %) but those who have not had time to reach the hunters, buy it from wholesalers (66, 7%). Some regular hunters or wholesalers take the game on credit and pay after the sale. Local markets are cited (80%) as the places where game meat is sold, especially when it is sold fresh. They alternate, one day to buy game from hunters in the surrounding villages, and another day to go and sell at the market. The profit from the sale of game meat and other products is allocated to medical care (90%), school fees (83, 3%), clothing (83, 3%), food for children (80%), etc. Among the other products sold, there are fish (63, 3%), goat or sheep (53, 3%), caterpillars (36, 7%), pork (33, 3%), etc. We suggest as an alternative to hunting, a program for the development of socio-economic activities for the local populations.

INTRODUCTION

In the Democratic Republic of the Congo, hunting products have already been the subject of concern by several authors. Without being complete, mention may be made, for example, of the work carried out by: (i) Merode *et al.* (2004); (ii) Dupain *et al.* (2012); (iii) Nathalie *et al.* (2012).

In South Africa, a comparative economic case study of cattle and game farming was done by Cloete *et al.*, (2007) in the Northern Cape Province.

The 2009 IUCN study on big game hunting in West Africa reveals the roles, importance and status of organized and controlled hunting in conservation, Gross

Domestic Product, development tourism, employment and economic benefits for the populations of West, Central, East and Southern African countries.

Hardouin and Stiévenart 1991 reveal that, despite the total absence of statistics, bushmeat plays a very important role in the human diet in Africa, particularly in forest areas where livestock farming is very limited. But the highly exploited game is becoming increasingly rare. In many countries of sub-Saharan Africa, the consumption of game meat (bushmeat) is a very common dietary habit. It is an important source of animal protein for populations (Edderai, 2000). In most developing countries, commercial or illegal hunting and wildlife trafficking are mentioned by several researchers as a threat to the conservation, maintenance and survival of most wildlife species (Dupain *et al.*, 2000, Vanstreels *et al.*, 2010, Lindsey, 2011, Madhu *et al.*, 2011).

In Congo Brazzaville, the nature of game and ways of consuming bushmeat in the Conkouati-Douli National Park area were assessed by Makosso *et al.* (2011) while the consumption of game meat in households in Brazzaville, Congo was produced by Mbeté (2012). However, wildlife is exploited to meet the food, economic and socio-cultural needs of both rural and urban communities in most developing countries. It is exploited either for the consumption of its meat or for the trafficking of its dander (skins, horns, ivory, etc.). It is a secure source of income for some households.

In the past, game was exploited using traditional hunting techniques mainly to meet the food security needs of peasant households.

The local population knew what time of year they could go hunting and knew how to respect the opening and closing dates for hunting. This practice did not present many dangers for the survival and reproduction of wildlife species.

Nowadays, with the rural exodus, population growth, the ever-increasing need to supply the markets of urban centers with bushmeat, the development of meat marketing chains between the countryside and the cities and the evolution of modern and destructive hunting techniques, especially the proliferation of firearms, with the passage from a traditional logic of subsistence to a commercial logic, has led to poaching or illegal hunting for commercial purposes.

In the DRC, commercial wildlife hunting is currently carried out, both outside and in protected areas, without observing any regulations, Law No. 82-002 of 28 May 1982 regulating hunting and Ordinance -Law n°69/041 of August 22, 1969, relating to the conservation of nature (Official Journal DRC). Wildlife pays a heavy price for this practice so that the natural renewal of the most exploited species may no longer take place. This will result in the depletion and extinction of species.

In the Lomako-Yokokala Faunal Reserve region, more than a decade later, human pressure has not eased and nothing has been put in place to reduce it.

This study concerned the two markets located in the southern part of the Lomako-Yokokala wildlife reserve, in particular, the market of Befale (headquarters of the territory of Befale) and that of Boende (headquarters of the province of Tshuapa). It has limited itself to the marketing of wild meat. It does not address the epidemiological aspect of wildlife although certain small mammals are the subject of stronger suspicions as being natural reservoirs of filovirus (Ebola virus) thus causing serious epidemics in humans and animals (Peterson *et al.*, 2004; Leroy *et al.*, 2005; Dobson 2005).

The lack of necessary financial means did not allow us to extend the surveys to a large sample and to reach the northern part of the reserve.

The objectives of this study are to analyze the activity of the marketing of wild meat by the local populations around the Lomako Yokokala reserve and what it represents in terms of the element sold and the allocation of income.

MATERIALS AND METHODS

Study Environment:

The Lomako-Yokokala Wildlife Reserve was created in June 2006 by Ministerial Order No. 024/CAB/MIN/ECN-EF/2006 (DRC Official Journal). We aimed to protect endangered flagship species such as the bonobo (*Pan paniscus*), the Congolese peacock (*Afropavo congolensis*), the forest elephant (*Loxodonta africana*), the aquatic chevrotin (*Hyemoschus aquaticus*), the leopard (*Panthera pardus*) and bongo (*Tragelaphus euryceros*).

It is located in the center north of the Democratic Republic of Congo, between latitude 00°54' and 01°10' N and longitude 21°26' and 21°39' E. The reserve is shared between the territories of Bongandanga and Befale respectively in the province of Mongala and that of Tshuapa. It is limited to the north by the Yokokala River, to the south by the Lomako River, to the west by the Tuende River, from its mouth in the southwest to its source head in the northwest and to the east by the Waya River, from its mouth in the northeast in the Yokokala River to its source head in the southeast. It extends over an area of 3625 km² (Ministerial Order No. 024/CAB/MIN/ECN-EF/2006 creating a nature reserve called Lomako-Yokokala Wildlife Reserve "RFLY", Official Journal DRC).

The reserve is also accessible by rivers from the Lomako and Yokokala rivers, tributaries of the Maringa and Lopori.

It is surrounded by forest concessions to the south (TRANS M) and to the north, Société Industrielle et Forestière du Congo (SIFORCO).

In its southern part, it is located 7 kilometers from the main road where the villages of the surrounding communities are located.

The Lomako-Yokokala Faunal Reserve is a humid and equatorial forest. The vegetation encountered presents physiographic units which can be grouped as follows: (1) mixed forest open undergrowth, closed undergrowth, and very closed undergrowth; (2) monodominant forest; (3) swamp forest without or with liana; (4) liana forest; (5) young and mature secondary forest; (6) Marantaceae forest; (7) seasonally flooded forest; and (8) fallow and swamp.

This vegetation is home to several flagship and endangered wildlife species such as the bonobo (*Pan paniscus*), the forest elephant (*Loxodonta africana*), the Congolese peacock (*Afropavo congolensis*), the water chevrotain (*Hyemoschus aquaticus*), the leopard (*Panthera pardus*) and bongo (*Tragelaphus euryceros*) (Dupain et al., 2000).

According to DUPAIN and al., (2000), an increasing number of indigenous inhabitants around the reserve are turning to the forest to exploit natural resources.

They practice hunting to market game meat.

The aforementioned authors consider that the support and development of local agriculture and the presence of researchers are the most important factors for the preservation of the population of Bonobos by the indigenous inhabitants.

Sampling:

From August 5 to 11, 2012, we investigated, using a questionnaire, a sample of 30 respondents distributed as follows: 10 merchants at the Befale market and 20 merchants at the Boende market. These two markets are located south of the Lomako-Yokokala Wildlife Reserve.

The survey questionnaire developed for this study included a total of one sheet devoted to the marketing of game meat.

It has been reviewed and approved by the supervisors and sociology specialists of the University of Liège.

Survey Instruments, Questionnaire Administration and Study Variables:

In the field, the survey questionnaire was administered from August 5 to 11, 2012 as follows:

The form marketing of game meat was administered in two markets, one in the center of the capital of the territory of Befale and the other in the center of Boende, the capital of the province of Tshuapa. Respondents were randomly selected by lot.

The survey sites can be illustrated on the “Maringa – Lopori – Wamba” forest landscape macro zoning map below (Fig. 1).

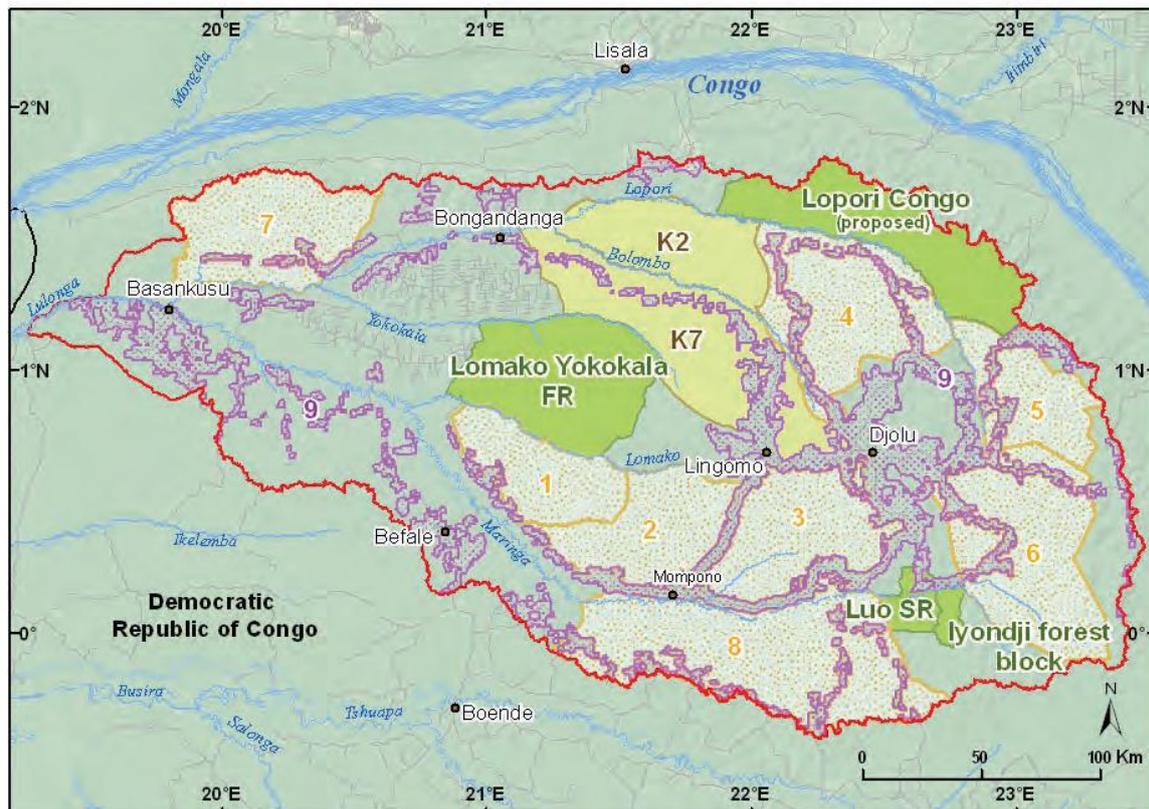


Fig. 1: Macro zoning map of the “Maringa Lopori Wamba” forest landscape illustrating the situation of Befale and Boende in relation to the Lomako Yokokala reserve
Source: African Wildlife Foundation (AWF), in collaboration with Central African Regional Program for the Environment (CARPE), Satellite Observatory of Central African Forests (OSFAC), International Union for Conservation of Nature (IUCN).

The direct interrogative method, based on a questionnaire, was used by the investigator. The questionnaire on the marketing of wild meat consisted of 23 questions subdivided into 4 parts (general information on the profile of the traders; sale of game meat and frequency of supplies; protected species and period of the abundance of game on the market; and allocation of profit from the sale of game and other products.

The number of respondents per market is shown in Table 1 below.

Table 1: Breakdown of respondents on the marketing of wild meat according to the survey market

Survey location	SURVEY SHEET
	Wild meat marketing (Merchants surveyed)
Market	Effective
BEFALE	10
BOENDE	20
Total	30

The interviewer had the form filled out directly, using French and/or one of the languages used in the region. The questions were asked by one person; who made it possible to explain the unknown words and to clarify certain obscure points of the questionnaire in the same way each time.

The respondents freely consented to participate in the study and to publish their photos and the principle of access and benefit sharing (APA) on the convention on biological diversity was respected. In the laboratory, the questionnaire from the field was subject to manual verification, numbering and coding of open questions. This operation also made it possible to verify the exact number of questionnaires actually administered in the field. With a view to so-called intelligent data entry, a mask corresponding to the survey form was designed using the "Epi data" software. This software also made it possible to enter the codified questionnaire.

The "Stat Transfer" software was used to transport the data collected in Epi data to the Statistics for Social Sciences "SPSS" Version 20.0 software where they were analyzed to produce the relevant indicators for the study.

The data entered in the SPSS software was labelled. This operation consisted in labeling all the coded variables.

In order to eliminate all the inconsistencies due to data entry and incorrect filling out and various manipulations of the questionnaire, systematic cleaning of the database was carried out. This operation made it possible not only to clean up the database but also to prepare it for analysis.

To subscribe to the main objective of this study, and thanks to a data analysis plan, tables were produced to highlight the relevant information.

Statistical Analysis:

Data were analyzed using descriptive statistics indices, including frequency and percentages. Thus, the responses were expressed in terms of frequencies and percentages of the total number of respondents.

RESULTS

The present results come from a sample of 30 merchants divided respectively into ten on the Befale market and twenty on the Boende market surveyed from August 5 to 11, 2012. We try to present here the frequency of the answers given to the main questions asked in the form of our questionnaire.

Marketing Wild Meat:

The general information of respondents on the marketing of game meat, as illustrated in Table 2 (in the appendix), shows that they are all of a single female gender (100%), of recorded age included between 28 – 39 years old (30%) to 52 years and over (16.7%) but the large number is between 40 – 51 years old (46.7%). Among them are

married (60%), divorced (13.3%), widowed (10%) and single (10%). The household size recorded is between less than 5 people (16.7%) to 10 people and more (40%). The number of children recorded varies from 5 children (36.7%) to 10 children and more (13.3%), most of them have 5 – 9 children (43.3%). They are merchants (90%) of primary (36.7%) and secondary (46.7%) education level belonging to a Mongo ethnic group (93.3%). Sales experience varies between less than 10 years (33.3%) to 30 years and more (20%).

The only type encountered among our respondents suggests that in this region, the purchase of game from hunters and the resale of this game in small pieces at the market is more practiced by women.

With regard to the choice of the sale of game, place and frequency of supplies (Tables 3 in the appendix), the experience of time spent in this activity varies from less than 10 years (33.3%) to 30 years and more (20%). Most (60%) have no preference for the choice of game meat to sell; they sell whatever they can find, as long as the operation brings them a profit. Many people buy meat from hunters (66.7%) but those who have not had time to reach the hunters, buy it from wholesalers (66.7%). Some regular hunters or wholesalers take the game on credit and pay after the sale. Others prefer, at the point of sale, to take the products from the wholesalers and sell on their behalf in order to make a profit. Local markets are cited (80%) as the places where game meat is sold, especially when it is sold fresh. Only smoked meats arrive in markets in urban centres. Regarding the frequency of game meat supplies, the majority of traders will stock up 3 times (30%) to 4 times (20%) per week and buy all the species found without preference (80%). They alternate, one day to buy game from hunters in the surrounding villages, and another day to go and sell at the market. This frequency of supply suggests that the market for the sale of game meat is dynamic. Merchants buy frequently and resell easily. In other words, on the other side of the hunters, game is slaughtered at a steady pace to satisfy the laws of supply and demand!

With regard to knowledge of protected species and the period of the abundance of game meat on the markets (Table 4), respondents do recognize that there are species protected by law (90%). They all mentioned respectively: (i) Mbuli (*Tragelaphus spekei*) (53.3%); (ii) Crocodile (*Crocodilus niloticus*) (43.3%); (iii) Bonobos (*Pan paniscus*) (33.3%); (iv) Elephant (*Loxodonta africana*) (30%); (v) Magistrate monkey (*Colobus colobus*) (20%); (vi) Python (*Python sebae*) (16.7%) and (vii) Leopard (*Panthera pardus*) (10%).

Despite their knowledge, once they encounter these species, they buy them and resell them easily on their shelves. They are content to pay only the appropriate taxes to the state services that come to check at the market.

As to whether there are times of the year when game meats are easily found, the majority (86.7%) say it is during the rainy season (53.3%).

But many are those who do not know how to put forward the reasons (46.7%). Few of them think that it is due to the abundance of fruits in the forest during the rainy season (26.3%), others finally think that during this period, the pupils are on vacation, which increases the number of hunters (10%).

Their perception of the evolution of the quantity of game meat is down (76.7%). They do not know the reason (43.3%).

Regarding the allocation of the profit from the sale of game meat and other products (Table 5), they allocate it to medical care (90%), school fees (83.3%), clothing (83.3%), children's food (80%), etc. Among the other products sold, there are fish (63.3%), goat or sheep (53.3%), caterpillars (36.7%), pork (33.3%), etc.



Fig. 2: [A] Merchant returning from the supply and carrying the antelope herself, which she is going to resell in small pieces on the Boende market; [B] Merchant reselling game meat in small pieces on the Boende market; [C] Merchant cutting the monkey into small pieces and other products sold on the Boende market; [D] Pieces of fresh game on the Boende market.

DISCUSSION

However, the only feminine gender encountered among our respondents on the marketing of game meat suggests that in this region, the purchase of game from hunters and above all, the resale of the latter in small pieces on the markets is more practiced, by women.

On the other hand, the fact that the respondents belong to a single Mongo ethnic group does not suggest that it is the only ethnic group specializing in the wild meat trade. We think this is because our study area is in a part where this ethnicity is from (indigenous). The lack of preference, for most (60%) of women traders, on the choice of game meat to sell, is explained by the fact that they buy everything they can find from hunters (66.7%), provided that the operation brings them profits.

The local markets are mentioned as the places of sale (80%) of wild meat in the sense that there are many people who come there to look for what to buy to go and prepare and especially that game meat is sold in small pieces (within reach of any purse) and in a fresh state where it cannot be kept for so many days without it rotting. The frequency of supplying game meat 3 times (30%) to 4 times (20%) per week and the purchase of all the species found without preference (80%), suggests that the market for selling meat from

game is dynamic. Merchants buy frequently and sell easily. In other words, on the other side of the hunters, game is slaughtered at a steady pace to satisfy the laws of demand.

Despite the respondents' knowledge of the existence of species protected by law (90%), once these species have been encountered, they buy them and resell them easily on their shelves in the sense that they are content to pay only the appropriate taxes to the state services which pass the control to the market. Regarding the affirmation of the majority of respondents (86.7%) that it is during the rainy season (53.3%) when game meat is easily found, many are those who do not know how to reason (46.7%) and few of them (26.3%) think that it is due to the abundance of fruits in the forest during the rainy season, others finally think that during this period, the students are on vacation, which increases the number of hunters.

The perception they have of the evolution of the quantity of game meat is that it is down (76.7%). They do not know the reason (43.3%) and lose sight of the population growth, the destruction of the natural habitat, the pressure exerted on the fauna to satisfy the demand on marketing, the evolution of the techniques hunting (Caliber 12), lack of knowledge of reproductive biology for most hunted species, etc.

Profits from the sale of game meat and other products are allocated to medical care (90%), school fees (83.3%), clothing (83.3%), food for children (80%), etc. Among the other products sold, there are fish (63.3%), goat or sheep (53.3%), caterpillars (36.7%), pork (33.3%), etc.

Conclusion and Perspectives:

In the markets around the Lomako-Yokokala wildlife reserve where we conducted the surveys, the marketing of wild meat is a very dynamic activity and is practiced more by women (100%). The merchants buy frequently, three (30%) to four (20%) times a week, from hunters in the surrounding villages, all the species of game found without preference (80%) and resell them easily in small pieces, at the fresh, in local markets. In other words, on the hunter side, game is slaughtered at a steady pace to satisfy the laws of supply and demand.

Game meat is sold, fresh or smoked, both to households and to resellers who bring it to local markets where it is easily purchased by local consumers. It is appreciated and preferred by consumers considering that it is the easiest to find and the cheapest.

Income from the sale of game meat and other products is allocated to medical care (90%), school fees (83.3%), clothing (83.3%), children's food (80%) and small savings, etc. Among the other products sold, there are fish (63.3%), goat or sheep (53.3%), caterpillars (36.7%), pork (33.3%), etc.

The respondents, on the marketing of wild meat, affirm that in the current days compared to the past, the evolution of the quantity of game meat on the market is down (76.7%). This finding demonstrates that wildlife is exploited in an unsustainable way both outside and inside the reserve.

To guarantee the sustainability and sustainable management of this natural resource, the involvement of everyone, the international community, local populations, civil societies, and managers of protected areas, is essential.

Given the realities on the ground and the data obtained from our survey, to contribute to the sustainable management of the biodiversity of the Lomako-Yokokala wildlife reserve in particular, and of the Democratic Republic of Congo in general, we suggest as an alternative to hunting, a program for the development of socio-economic activities for local populations.

The development of these alternative activities constitutes a means both of preventing or reducing anthropogenic pressures in general and wildlife poaching in particular; and improves the living conditions of local communities by increasing their sources of income

and livelihood.

In the specific context of the populations bordering the Lomako-Yokokala wildlife reserve, while taking into account their habits and preferences, the Program can be based on the following activities: (i) participatory and community management of resources natural; (ii) promotion of tourist activities; (iii) support for fish farming and artisanal fishing; (iv) promotion and development of small livestock; (v) promotion and development of agricultural production and agro-forestry initiatives; (vi) development of non-timber forest products; (vii) support for small grants; (viii) literacy support for target groups; (ix) partnership and cooperation;

As long as the local populations remain poor and do not find their accounts in any Project / Program of conservation, they will continue to exert pressure on the natural resources.

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