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Assessment of bush meat sale and its implication on wildlife conservation in Old Oyo National Park, Nigeria

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ABSTRACT

Illegal hunting of wildlife is a major issue in today's society, particularly in tropical ecosystems. Thus, this study assessed bush meat sales and its implication on wildlife conservation in Old Oyo National Park. Data were obtained through structured questionnaire and focus group discussion from hunters and bush meat sellers in Oke-ogun communities. The study population is comprised of 78 hunters and 42 bush meat sellers. Data were subjected to descriptive statistics. The result revealed that age group 41-60 recorded the highest for both the hunters and the bush meat sellers (50% and 52%), while age group 20-40 respondents (21% and 18%, respectively) is the least. Fourteen (14) bush meat species were identified: eleven (11) mammals and three (3) reptiles. The bush meat trade, channeling from hunters through sellers to the ultimate consumers was profitable. According to our findings, 57% of all the respondents indicated that they get their bush meat from local hunters and 43% of the respondent's sources for the bush meat are met by personal hunting inside the National Park, on farm land, near the park or around their homes. Instrument use for hunting includes gun, arrow and bow, net, traps and domestic dogs. Majority of the respondents (54%) come about hunting through inheritance from parent and personal guidance. This confirms the fact that hunting is a traditional exercise that is inherited by male children from their father or community. Beyond the aforementioned, 3% of the respondents acquired their hunting through training and 43% of the respondents develop hunting by personal interest. These results could have come about due to lack of jobs or because of rural poverty. Strengthening law enforcement, increasing ecological awareness and environmental education, and developing mechanisms to reduce human-wildlife conflicts will assist in further minimizing illegal hunting activities in Nigeria's National Parks.

Keywords: Bushmeat, Sale, Implication, Wildlife, Nigerians National Parks, Old Oyo National Park, *Thryonomys swinderianus*

1. INTRODUCTION

Bush meat (the meat of wild animals) has traditionally been a natural protein source for people in West and Central Africa. During the past decades, however, bush meat hunting and trade has become a widespread commercial activity, with serious negative consequences on wild animal populations. As human populations continue to grow and poverty increases, increasing numbers of people are becoming dependent on bush meat and on the income opportunities from the trade (Bowen-Jones *et al.* 2002, and Milner-Gulland *et al.* 2003). Hunting of wildlife for food (i.e. bush meat hunting) is today considered a significant threat to conservation of wildlife diversity in tropical forest (Milner-Gulland *et al.*, 2003). Particularly in Africa the available information indicates that hunting is often not sustainable and wildlife populations have shown consistent declines or become locally extirpated (Robinson and Bennett, 2000). Over the past decade, the hunting for wildlife across West and Central Africa has increased so drastically that it is now recognized as the major threat to the region's rich biodiversity, including Africa's great apes (Fa *et al.*, 2002; Nganje, 2003; Kaiser, 2003).

Bush meat is transported from forests (where the hunting mainly takes place) to markets within local communities or to larger markets in urban centers, where it is then sold or traded. A great number of animal species can be found in the markets, ranging from birds, reptiles, bats, rodents, and antelopes to larger mammals, such as elephants, buffalos, leopards, and primates. The current rate of exploitation is not only unsustainable but also indiscriminate, i.e. all animals are taken whether they are common or endangered (Bowen-Jones *et al.*, 2002). Surveys of bush meat markets across West Africa show that the current trade is dominated by smaller mammals; with rodents, such as the grass cutter/cane rat (*Thryonomys swinderianus*) being the most frequently traded and consumed bushmeat species (Cowlshaw *et al.*, 2005; Ntiamoa-Baidu, 1998).

It has been suggested that this is the result of an extinction filter: vulnerable taxa (slow reproducers), such as primates and other large mammals have been historically depleted, so that mainly species with fast reproduction such as rodents and small antelopes are now hunted (Cowlshaw *et al.*, 2005). Illegal bush meat trade is therefore developing fast in urban areas and is beginning to drive demand (Milledge and Barnet, 2000). Hence, unless bush meat hunting becomes managed within sustainable limits, it will be an increasing threat to conservation of wildlife as human populations continue to grow ultimately it may lead to the empty forest described by Redford (1992) with adverse consequences to the livelihood of rural households dependent on these resources. Furthermore, because many of the species targeted by bush meat hunting are highly frugivorous, depletion of these populations may have adverse effects on the forest regeneration and long-term development (Redford, 1992). There is need to have an up to date information on the illegal raiding activities of wildlife animals in our National Parks. Such record will form the basis for the development of appropriate intervention programmes and subsequent policy guidelines.

2. METHODOLOGY

2. 1. Description of the study area

Old Oyo National Park is one of the national parks of Nigeria, located across northern Oyo State and southern Kwara State, Nigeria. The park has total land mass of 2,512 km² and is

located in south west park of Nigeria, specifically northern Oyo State at latitude 8° 15' and 9° 00'N and longitude 3° 35' and 4° 42' E. The location has inevitably placed the park at a vantage position of abundance land area, as well as diverse wildlife and cultural/historical settings. Eleven local government areas out of which ten fall within Oyo State and one in Kwara State surround it. The Administrative Head Office is located in Oyo, Isokun area along Oyo-Iseyin road, where necessary information and booking could be made. The landscaping and organized space within the large yard has made the facility very endearing to the public. It is rich in plant and animal resources, including buffaloes, bushbuck, and a variety of birds. The park is easily accessible from southwestern and northwestern Nigeria. The nearest cities and towns adjoining Old Oyo National Park include Saki, Iseyin, Igboho, Sepeteri, Tede, and Igbeti which have their own commercial and cultural attractions for tourism.

3. STUDY POPULATION AND SAMPLE SIZE

The population for this study comprised the Hunters and Bush meat sellers. The sample of the research study has put at one hundred and twenty (120) respondents.

3. 1. Sampling Technique

A simple random sampling was used to select 78 hunters out of a total population of 100 and 42 bush meat sellers was conveniently sample.

3. 2. Method of Data Collection

Questionnaire was personally administered by the researcher. The questionnaire contained a series of structure question which were related to the research work and directed to respondents with the aim of gaining first hand information. The questionnaire consisted of closed ended questions.

3. 3. Data Analysis

Data obtained was analyzed using descriptive statistics where results were expressed in tables, frequency, and percentage.

4. RESULT

The study identified fourteen (14) bush meat species (**Table 1**). A total of 845 dry carcasses of the 14 bush meat species, comprising eleven mammals and three reptiles were encountered in the markets during the 6-month study period. African grass rat (*Arvicanthus niloticus*), representing 18% of the total bush meat encountered dominated the bush meat trade. Following closely were Grass cutter (*Thryonomis swiderianus*), 14%; and the Common gray duiker (*Sylvicapra grimmia*), 10%, respectively. The Bush Pig, Patas Monkey (*Erythrocebus patas*), potted Hyena (*Crocuta crocuta*) and African Civet Cat (*Civettictis civetta*) represented a decimated bush meat trade in the study area. The corresponding proportions of these bush meat species out of the total number (845) encountered over the study period were 4%, 1%, 0.3%, and 0.8%, respectively. Average price of transaction between the hunters and bush meat

sellers is depicted in **Table 2**. It was revealed that all the bush meat is profitable, i.e the bush meat sellers make a much gain on each species bought from the hunters. However, Bush pig is the most profitable amongst the species ‘buy and sold’. **Fig. 1** shows how individual respondents source of bush meat they sell, in which 57% of the respondents indicate that they get their bush meat from the local hunter and 43% of the respondents sources for the bush meat by personal hunting. The study indicated that most of the meat the hunters sell to the retailer and to the restaurants are sold in Pieces for easy movement and in body part to the herbalist and herbal seller.

Figure 2 presents information about how the sampled respondents come about hunting in which 54% of the respondents indicated hunting through inheritance from parent and guidance. This confirms the fact that hunting is a traditional exercise that is inherited by male children from their father or community, while 3% of the respondents acquired their hunting through training, and 43% of the respondents developed hunting by personal interest. This could be as a result of lark of job or due to the poverty among the rural dweller in Nigeria, and this is a bad omen on conservation.

Table 3 shows the instrument used in hunting wildlife animal in the study area, in which 34% of the respondents made use of gun, 15% of the respondents made use of bow and arrow, 7% of the respondents made use gin trap/wire trap, 10% of the hunters made use of net and 16% of the respondents made use of dogs. **Table 4** shows where the hunters or individual hunt the animals they sell or utilize, in which 37% of the respondents logical and smartly, according to them hunt around the park using bait to attract the animals, while 57% of the respondents claim that they hunt outside the park and 6% of the respondents manage or snick into the park to hunt wildlife animals.

Table 1. Bush meat species majorly pouched and Carcass encounters in the study area

Common Name	Scientific Name	Frequency	Percentage (%)
Common Gray Duiker	<i>Sylvicapra grimmia</i>	92	10
Grasscutter	<i>Thryonomis swiderianus</i>	119	14
Rabbit	<i>Sylvilagus brasiliensis</i>	53	6
Bush pig (Forest Hog)	<i>Potamocheorus spp</i>	34	4
Porcupine	<i>Atherurus africanus</i>	82	9
Patas Monkey	<i>Erythrocebus patas</i>	13	1
Alligator	<i>Alligator mississippiensis</i>	54	6
Nile Monitor Lizard	<i>Veranus niloticus</i>	49	5
Spotted Hyena	<i>Crocota crocuta</i>	3	0.3
African Grass Rat	<i>Arvicanthus niloticus</i>	159	18

Cobra	<i>Naja nivea</i>	61	7
African civet	<i>Civettictis civetta</i>	7	0.8
Stripped Ground Squirrel	<i>Euxerus erythropus</i>	44	5
Water Buck	<i>Kobus ellipsiprymnus</i>	75	8
TOTAL		845	100

Table 2. Average price of bush meat transaction between hunters, whole sellers and the consumer in the study area

Common Name Scientific Name	Average Price Of Buying	Average Price of Selling (naira)	Mode Of Selling (naira)	Mode Of Buying
Grass cutter	1500-3000	2,000 – 5000	In parts/pieces	In parts/pieces
Common Gray Duiker	9,000- 15,000	12,000-27,000	Whole/part/pieces	In parts/pieces
Monitor Lizard	1500-12000	2000-17000	In parts	Parts/pieces
Spotted Hyena	10,000-14,000	12,000-20000	In parts/pieces	parts/pieces
Cobra	3,000-12000	5,000-17,000	Whole/part/pieces	In parts/pieces
Waterbuck	9,000-15,000	12,000-27,000	In parts/pieces	In parts/pieces
Squirrel	500-1000	700-1200	Whole	In parts/pieces
Wildcat	4000-7000	5000-11000	In parts/pieces	In parts/pieces
Bush pig	9,000-15,000	12,000-27,000	Whole/part/pieces	In parts/pieces
Patas Monkey	4000-7000	6000-13500	In parts/pieces	In parts/pieces
Porcupine	1500-3000	2000-4000	In parts/pieces	Whole
Rabbit	1500-3000	1500-3000	Whole	Whole
African Grass Rat	300-500	700-1000	Whole	

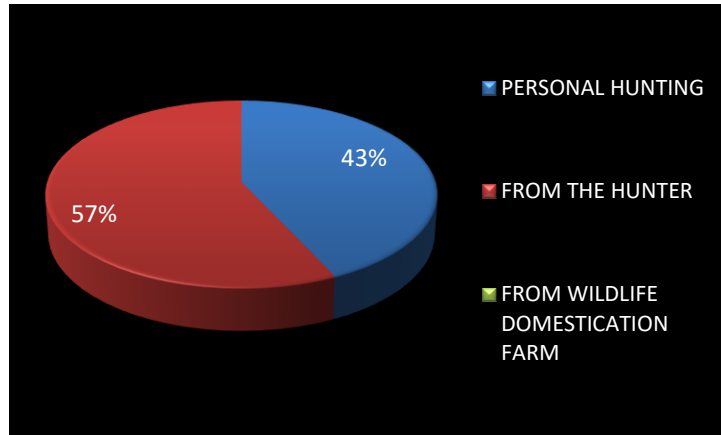


Figure 1. Source of bush meat for sell in the study area

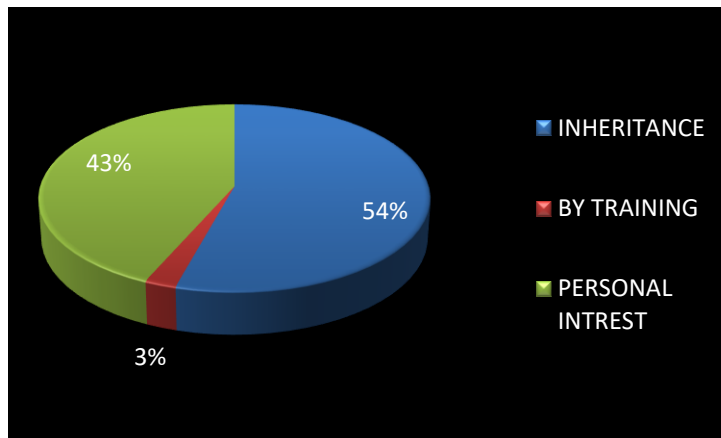


Figure 2. Difference hunting practices in the study area

Table 3. Instrument used in hunting in the study area

OPTION	FREQUENCY	PERCENTAGE (%)
GUN	27	34
BOW AND ARROW	12	15
GIN TRAP	6	7
WIRE TRAP	12	15
NET	8	10
Dog	13	16
Total	78	100

Table 4. Areas of the Park where hunting is carried out in the study area.

OPTION	FREQUENCY	PERCENTAGE (%)
Around the park	26	33
Outside park	41	52
Inside park	11	14
TOTAL	78	100

5. DISCUSSION

Mammals clearly dominated the bush meat traded in the study areas (Table 2), which was in line with the work of Davies and Brown, 2007; Fa *et al.* 2006; Robinson and Bennett, 2000. Some taxonomic groups (reptiles and amphibians) were probably underrepresented in the sample studied because of a higher difficulty in species identification and the distinct focus on mammals in some studies. The greater number of mammalian species, particularly the African grass rat, grass cutter and the common gray duiker, traded in the study area markets could mean that the preferences and high demand for these species generated corresponding high hunting intensity on them to satisfy the demand. These preferences could be attributed to tastes, religious, as well as cultural/traditional affiliations of the consumers. For species like Patas monkey, spotted hyena, and African civet, which were dismally supplied to the markets, it could be that human interferences including hunting might have dwindled their population in the wild. The Parliamentary Office of Science and Technology, POST (2005) reported that the hunting of wildlife in West Africa in recent years has increased beyond sustainable limits. This perhaps is due to the uncontrolled development and population growth, habitat loss and access to the hitherto in-accessible areas, and improvement in hunting technology.

Other possible reasons are poor rural economic or nutritional alternatives, and growing wealthy urban elite with a preference for bush meat. These issues must therefore be corrected if sustainability of bush meat is to be maintained. The relatively higher number of bush meat in the market during the dry months than the rainy months is attributed to the relatively lesser efforts required for harvesting/hunting bush meat during the dry season than the rainy season. The hunting effectiveness for bush meat is adversely affected by thicker vegetal cover during the rainy season than during the dry season. Profit is an unequivocal motivating factor for entrepreneurs to remain in business. The result of this study shows that bush meat trade is profitable. This profitability in the view of Brown and Williams, (2003), is fundamental to the management of wildlife resources, and should be harnessed as such. Furthermore, the profitable disposition of bush meat trade would encourage the traders to remain in bush meat trade as a means of livelihood. However, as demand for bush meat continues and the traders remain in business, the pressure on wildlife resources would likely threaten their sustainability (Fa, 2000; 2003; Brown and Williams, 2003). Peter, 2016; Becker, 2013).

This notwithstanding, economic theory suggests that providing consumers with access to acceptable and affordable alternatives may help reduce unsustainable hunting and enhance wildlife conservation. Alternatives could be found in fish, poultry, and other livestock sources.

The complementary human activities, bush meat trade and hunting have been identified as very significant cause of the collapse in the sustainability of biodiversity and wildlife supply (Fa *et al.*, 2003; Bowen-Jones, *et al.*, 2003; Okiwelu *et al.*, 2009). As the demand for bush meat consumption increases, hunting activities also increase to cope with the rising demand. The unrestrained pressure on the wildlife resources would eventually decrease their population in the wild and hence a collapse in their conservation. This is a common stand among many researchers (Bowen-Jones *et al.*, 2003; Fa *et al.*, 2003; Okiwelu *et al.*, 2009). Surfeit hunter is still very present in most of tropical Africa, professional or semi-professional hunters spend considerable time on bush meat harvesting, and to maximize their profit they enter deep inside the forests where the animals move less or more abundant (Davies and Brown, 2007). Such an increase in the size of harvested animals may have considerable implications for altering the ecological dynamics of the environments exploited for the bush meat trade.

The research anticipate that the increasing extirpation of medium to large sized herbivores (due to direct hunting) may produce a decline in the density of the medium and large sized predators (due to increased hunting rate and indirect cascade effects of the reduced food availability), and in the long term this will produce a significant loss of species in this trophic level of the ecosystem. Similar types of relationships between abundances of prey and predators are already well known in the literature, also with respect to medium- and large-sized mammals. Ultimately increased abundances of carnivore may cause a decline in the herbivores, which may in turn produce a population collapse in carnivore density. Hence, to better understand the ecological attributes of the bush meat trade, further research should be done in regions different from the ones already repeatedly surveyed, such as kisi, Igboho, Saki, and other communities around the park, from where no quantitative data are available. Overall, the study confirms that there has been a detectable dynamic in hunting pressure, with shifting pressure (increasing) in different habitats and on prey of different body size, due to a plethora of factors including spreading of weapons, relative availability of game animals, and changing attitudes of hunters. The main effect of the bush meat trade in the decades to come will be the creation of a living world of small-sized prey and predators within the remnant of reserve area.

6. CONCLUSIONS

Bush meat is widely consumed in the study area and the numerous bush meat carcasses traded depict the existent exploitation pressure on wildlife; and threat to their sustainability. Bush meat supply to the market comes primarily from farms, near National Park and inside National Park through illegal hunters and other forest products' harvesters. The channels of bush meat trade perform the distributive functions, and this comprise of the primary producers, the middlemen, and the ultimate consumers. The profitability of bush meat trade in the Okeogun propels bush meat traders to remain in business. This has increased pressure on wildlife harvests for trade and hence threats to their sustainability.

Recommendation

- Security should be beefed up around the parks to monitor, track arrests, and prosecute offenders. The security operatives should change their attitudes and show more commitment to the protection of the parks.

- Direct protection of wildlife species through exclusion policies, incentives for hunters to be selective in hunting and taking alternative livelihood activities are advocated. Also, replacement of wild bush meat with domesticated species or alternative protein sources, as well as working on the consumers' attitude will promote wildlife sustainability.
- Hunters' access to more complicated weapons. like guns, ammunition, and snares, should be checked and kept low.
- The Nigerian government should adopt the provisions of the Convention on Biological Diversity (CBD) of the United Nation to safeguard the sustainable livelihood and biodiversity of the nation.
- Increased awareness and environmental Education should be provided.

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